United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-ID-C010-2015-0013-EA
July 2016

Wallace L. Forest Conservation Area at Blue Creek Bay Vegetation Treatment and Trails

Coeur d'Alene Field Office
3815 Schreiber Way
Coeur d'Alene, ID 83815

Table of Contents

1.0 Introduction 7

1.1 Background 7

1.2 Location 8

1.3 Proposed Action Summary 9

2.0 Purpose and Need 10

2.1 Need 10

2.2 Purpose 10

3.0 BLM Decision to be Made 11

4.0 Land Use Plan Conformance, Statutes, Regulation, and Other Plans 11

4.1 BLM Land Use Plan Conformance 11

4.2 Relevant Statutes and Authorities 13

5.0 Scoping and Issues 13

5.1 Scoping 13

5.2 Issues 13

5.2.1 Issues Considered for the Development of Alternatives and Analysis 14

5.2.2 Issues Eliminated from Further Analysis 15

6.0 Alternatives 15

6.1 Alternative A (Proposed Action) 15

6.1.1 Environmental Design Features 24

6.2 Alternative B (No Forestry Treatment on Western Portion of the Ownership, No Prescribed Burning and No Parking Off Bonnell Road) 28

6.3 Alternative C (No Action) 28

7.0 Affected Environment and Environmental Effects 28

7.1 Scope of Analysis 28

7.1.1 General Setting 29

7.1.2 Related Past, Present, and Reasonably Foreseeable Actions 30

7.1.3 Analytical assumptions 31

7.2 Air Quality 32

7.2.1 Affected Environment 32

7.2.2 Environmental Effects from Alternative A (Proposed Action) 34

7.2.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 36
7.2.4 Environmental Effects from Alternative C (No Action) 37
7.2.5 Cumulative Effects 37
7.3 Cultural Resources 37
7.3.1 Affected Environment 37
7.3.2 Environmental Effects from Alternative A (Proposed Action) 38
7.3.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 38
7.3.4 Environmental Effects from Alternative C (No Action) 38
7.3.5 Cumulative Effects 39
7.4 Fisheries 39
7.4.1 Affected Environment 39
7.4.2 Environmental Effects from Alternative A (Proposed Action) 41
7.4.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 42
7.4.4 Environmental Effects from Alternative C (No Action) 42
7.4.5 Cumulative Effects 42
7.5 Forest Vegetation 42
7.5.1 Affected Environment 42
7.5.2 Environmental Effects from Alternative A (Proposed Action) 44
7.5.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 45
7.5.4 Environmental Effects from Alternative C (No Action) 45
7.5.5 Cumulative Effects 46
7.6 Fuels 47
7.6.1 Affected Environment 47
7.6.2 Environmental Effects from Alternative A (Proposed Action) 49
7.6.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 50
7.6.4 Environmental Effects from Alternative C (No Action) 51
7.6.5 Cumulative Effects 51
7.7 Invasive, Non-Native Vegetation 52

7.7.1 Affected Environment 52
7.7.2 Environmental Effects from Alternative A (Proposed Action) 53
7.7.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 54
7.7.4 Environmental Effects from Alternative C (No Action) 54
7.7.5 Cumulative Effects 54
7.8 Public Health and Safety 55
7.8.1 Affected Environment 55
7.8.2 Environmental Effects from Alternative A (Proposed Action) 55
7.8.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 56
7.8.4 Environmental Effects from Alternative C (No Action) 56
7.8.5 Cumulative Effects 56
7.9 Recreation 56
7.9.1 Affected Environment 56
7.9.2 Environmental Effects from Alternative A (Proposed Action) 57
7.9.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 58
7.9.4 Environmental Effects from Alternative C (No Action) 58
7.9.5 Cumulative Effects 58
7.10 Socio-Economics 59
7.10.1 Affected Environment 59
7.10.2 Environmental Effects from Alternative A (Proposed Action) 60
7.10.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 61
7.10.4 Environmental Effects from Alternative C (No Action) 61
7.10.5 Cumulative Effects 61
7.11 Soils and Water 62
7.11.1 Affected Environment 62
7.11.2 Environment Effects from Alternative A (Proposed Action) 63
7.11.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 64
7.11.4 Environmental Effects from Alternative C (No Action) 64

7.11.5 Cumulative Effects 65
7.12 Vegetation Communities, including Special Status Plant Species 65
7.12.1 Affected Environment 65
7.12.2 Environmental Effects from Alternative A (Proposed Action) 67
7.12.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 73
7.12.4 Environmental Effects from Alternative C (No Action) 74
7.12.5 Cumulative Effects 74
7.13 Visual Resource Management 75
7.13.1 Affected Environment 75
7.13.2 Environmental Effects from Alternative A (Proposed Action) 80
7.13.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 81
7.13.4 Environmental Effects from Alternative C (No Action) 81
7.13.5 Cumulative Effects 81
7.14 Wildlife 82
7.14.1 Affected Environment 82
7.14.2 Environmental Effects from Alternative A (Proposed Action) 89
7.14.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road) 98
7.14.4 Environmental Effects from Alternative C (No Action) 99
7.14.5 Cumulative Effects 101
8.0 Tribes, Individuals, Organizations, or Agencies Consulted 103
9.0 List of Preparers 103
10.0 References Cited 104
Air Quality 104
Fisheries 104
Forestry 106
Fuels 108
Invasive, Non-Native Species 109
Recreation and Socio-Economics 109
Soils and Water 110

Vegetation communities, including special status plants 110
Wildlife 111
11.0 Appendix 116
Appendix A: Map 1 Forestry Treatments Proposed Action 116
Appendix B: Map 2 Recreation Proposed Action 117
Appendix C: Map 3 Forestry-Proposed Action Roads 118
Appendix D: Map 4 Forestry-Administrative Roads 119
Appendix E: Map 5 Forestry Alternative B 120
Appendix F: Map 6 Recreation Alternative B 121
Appendix G: Map 7 Forest Cover Types 122
Appendix H: Map 8 Fire Behavior Fuel Models-LANDFIRE 2012 123
Appendix I: Map 9 Inventoried Snag locations 124
Appendix J: Northern Continental Divide Nesting Calendar 125

1.0 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of treating hazardous fuels, conducting commercial timber sales, and improving the non-motorized recreation developments within the Wallace L. Forest Conservation Area (WFCA).

The EA is a site-specific analysis of potential impacts that could result with the implementation of a Proposed Action or alternatives to the Proposed Action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the Proposed Action or another alternative. A Decision Record, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the 2007 Coeur d'Alene Resource Management Plan (RMP) (BLM 2007).

1.1 Background

The Bureau of Land Management (BLM) acquired the public land known as the WFCA throughout the early 1990's in several transactions over an eleven-year period. The area has a rich history prior to the BLMs ownership; it was used for a wide variety of purposes from haying and livestock grazing to logging. In addition, a segment of the historic Mullan Road, the first constructed overland wagon route through the Northern Rockies, crosses through the portion of the uplands. This area is comprised of a gradient of forest types ranging from wetlands to upland forest dominated vegetation. The upland forested areas consist primarily of ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), western larch (*Larix occidentalis*), western white pine (*Pinus monticola*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) and are home to a variety of upland game and birds. As a result of past timber harvests, the area contains a mosaic of trees of varying sizes and types. Old logging roads and skid trails traverse the property and have traditionally been used by hikers and equestrian users to access the upland portion of the property. A large wetland/riparian and wet meadow area extends along the mouth of Blue Creek Bay with black cottonwood (*Populas balsamifera*), thin-leaf alder (*Alnus incana*), red-osier dogwood (*Cornus sericea*), reed canarygrass (*Phalaris arundinacea* L.), sedges, cattails, and various rushes. Several meadows are also found in the upper portions of the property.

Following the ice storm of 1996 and a series of wind storms around the same time, the BLM, through a number of timber sales, treated approximately 500 acres removing wind thrown material, broken topped trees, and trees killed by insects following the storms. Since that time no further forest health treatments have occurred. Changes in vegetative conditions have also resulted in increased susceptibility and loss of forest vegetation due to drought, insect and

disease agents and climatic changes. This has resulted in a departure from historic stocking levels, an accumulation of hazardous fuels within the wildland urban interface (WUI), increased conifer encroachment to the dominant overstory and a potential hazard to recreationalists. Fuel accumulations and fire suppression have also changed the vegetation patterns, structure, and composition of forests; therefore, the role that fire plays in the ecosystem has been altered (BLM 2007). The altered forest composition, the increased recreational use and structures built adjacent to BLM lands increase the potential for future fires.

In addition to the unique forest, the WFCA is considered one of the top priority locations for non-motorized recreation planning by the Coeur d'Alene Field Office. Over the past decade, the BLM has constructed an American with Disabilities Act (ADA) accessible day-use area with docks, a day-use trailhead with parking, outdoor education amphitheater, and a viewing platform. Development of a fully accessible ADA paved trail and parking area are underway on the western side of the meadow; however, no upland developments to date have occurred on the western side of the WFCA parcel (BLM 2009). Currently, access from the east side developments to the west side are through the use of county maintained roads (Figure 1).

1.2 Location

The WFCA is approximately 751 acres of BLM managed lands located six miles east of the city of Coeur d'Alene, ID in Kootenai County and is accessible via Interstate 90 or county and city surface roads. The legal description is Boise Meridian T. 49 N., R. 2 W., section 6 lot 4; T. 49 N., R. 3 W., tract 37, 38; T. 50 N., R. 2 W., section 31 lots 5, 6, 7, 8; T. 50 N., R 3 W., tract 37, 38.

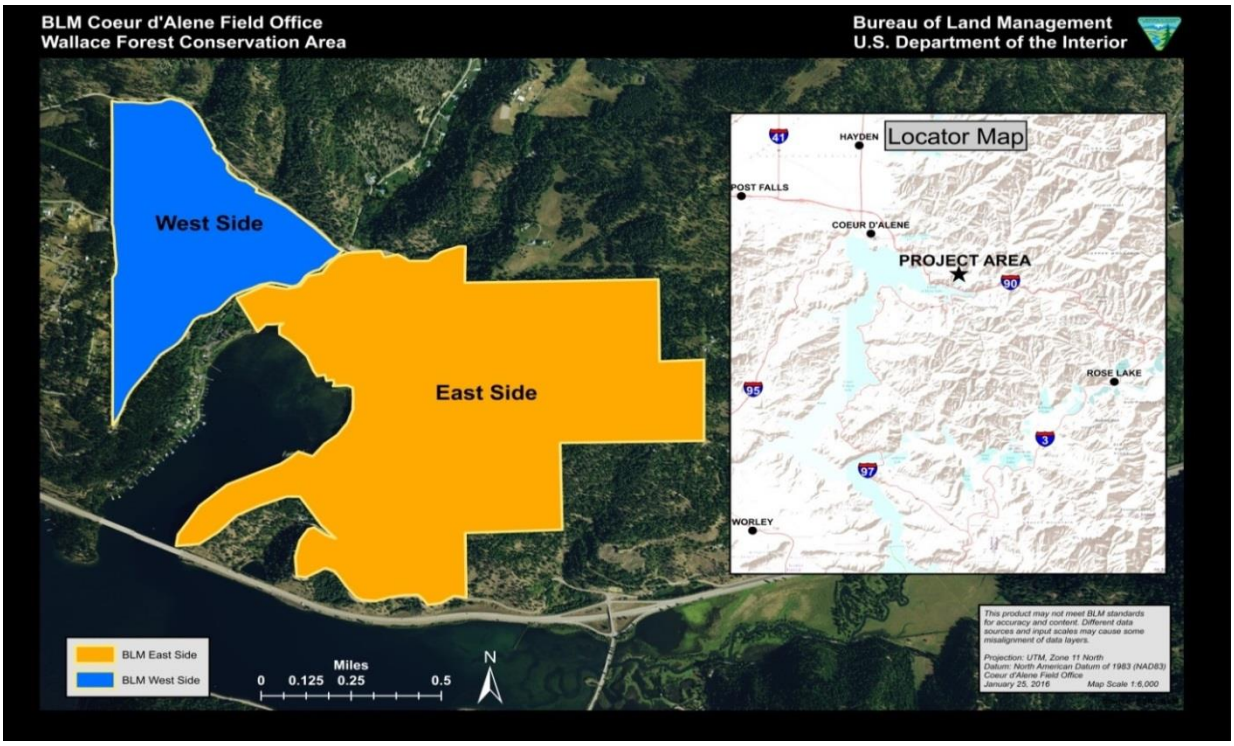


Figure 1. Locator map and BLM ownership designation of the project area.

1.3 Proposed Action Summary

Forestry

The Bureau of Land Management (BLM) is proposing to reduce stocking levels and treat hazardous fuels across approximately 616 acres within the WFCA through a combination of vegetative treatment methods including: the use of selective harvest (SH), pre-commercial thinning (PCT), hazardous fuels reduction work and prescribed burning (Appendix A: Map 1 *Forestry Treatments Proposed Action*). All vegetative treatments would favor leaving early seral species such as western larch, ponderosa pine and western white pine where they exist. To facilitate vegetative treatments existing roads and old logging trails would be utilized. In areas adjacent to homes and/or structures, or in areas that are devoid of other vegetation treatments, a fuel break of approximately 200 feet would be created. Treatments would begin in late 2016 and continue for up to six years through multiple phases.

Recreation

In addition to vegetative treatments, the BLM is proposing to enhance non-motorized trail and education opportunities within the WFCA parcel. This would include: developing the west side trail system with purpose built trails, developing more adequate parking, establishing a single track connection trail from the east side to the west side through the meadow, designating three connection trails on the east side and pursue opportunities for environmental education. The BLM anticipates that recreation activities would occur in conjunction with vegetative treatments and would continue for up to six years (Appendix B: Map 2 *Recreation Proposed Action*).

2.0 Purpose and Need

2.1 Need

The WFCA is comprised of a gradient of forest types ranging from wetlands to upland forest dominated vegetation. The present forest composition is showing signs of decline in overall health and has become overstocked with Douglas-fir, grand fir, and small diameter ponderosa pine. The resulting condition is encroachment by small diameter trees into areas that were historically dominated by large diameter, lower density ponderosa pine and western white pine stands.

Overstocking has increased fuel loadings and ladder fuels, in effect creating hazardous fuels conditions within the wildland urban interface. The forest vegetation communities are not within the appropriate fire regime condition class (FRCC) due to past fire suppression practices. The FRCC refers to the degree of departure from the natural fire regime and its subsequent effect on vegetation composition and structure on a landscape scale. Approximately 29 percent of the project area is FRCC 2 and 53 percent FRCC 3. FRCC 2 is a moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. FRCC 3 is defined as having high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and predispose the system to high risk of loss of key ecosystem components. Insect and disease agents are also prevalent and continue to kill trees, many of which are located near county roads and along recreation trails.

Demands for outdoor recreation opportunities continue to increase which make the WFCA a desirable recreation site. The demand is largely due to public access to Lake Coeur d'Alene and its proximity to Coeur d'Alene, ID. A demand for trails in the area has been demonstrated by a developing network of social trails on the west side. More trails would be needed to be analyzed for connectivity within the greater designated trail system and to meet the demand for more trails in an area with growing recreational use. The east side of the ownership has been developed with a non-motorized trail system accompanied with day-use areas, and the west side is currently undeveloped. To meet this growing demand for trails in the area, additional designated trails are needed. Recreation use would benefit with improved access and trails.

The Coeur d'Alene Resource Management Plan (RMP) states that the BLM will "restore forest vegetation towards historic species composition, structure, and function", "identify areas where fuels treatments will reduce hazards and emphasize the use of small diameter trees" and "reduce impact from wildland fire to WUI areas, municipal watersheds, and infrastructure"(BLM 2007). In addition, the Kootenai County, Idaho Community Wildfire Protection Plan identifies the proposed project area as high priority for hazardous fuels treatments. Additionally, the RMP calls for managing this area for recreational use "within an accessible natural forested lakeshore setting."

2.2 Purpose

The purpose of the proposed action has two main objectives. The first is to manage for forest health throughout approximately 751 acres within the WFCA by conducting forest vegetative treatments (commercial thinning, pre-commercial thinning, slash piling, prescribed fire, etc.) to reduce stocking levels and promote a historic species composition. This will in effect reduce the

accumulation of hazardous fuels adjacent to homes located within the WUI, protect developed recreation sites and structures on public lands, and reduce the threat of wildfire to cultural and natural resources.

The second purpose of the proposed action is to provide an upland trail network on the western side to accommodate a variety of non-motorized day-use recreation opportunities, establish connectivity between the east side features to the west side, improve access and enhance environmental education opportunities throughout portions of the WFCA.

3.0 BLM Decision to be Made

In accordance with the Federal Land Policy and Management Act (FLPMA), the BLM Coeur d'Alene Resource Management Plan, and other pertinent statutes and authorities the BLM Coeur d'Alene Field Manager will decide whether or not to implement the proposed vegetation treatments, construct recreational facilities and designate trails in the WFCA.

4.0 Land Use Plan Conformance, Statutes, Regulation, and Other Plans

4.1 BLM Land Use Plan Conformance

The proposed action as described in Section 6 of this EA is in conformance with the Coeur d'Alene Resource Management Plan (RMP) approved June, 2007. The following RMP decisions specifically apply to the proposed action.

Goal VF-1-Restore forest vegetation towards historic species composition, structure, and function across the landscape.

Objective VF-1.2: Restore forest stands to historic species composition, structure, and function by conducting vegetation treatments on 8,200 acres.

Action VF-1.2.1: Emphasize the use of natural disturbances, prescribed fire, and appropriate silvicultural methods to restore historic composition within wet/warm vegetation cover types.

Action VF-1.2.2: Emphasize the use of natural disturbances, prescribed fire, and appropriate silvicultural methods to restore historic composition within dry conifer vegetation cover types.

Action VF-1.2.6: Restore forest structure and function by reducing tree density and brush/shrub competition using appropriate silvicultural treatments including, but not limited to, intermediate treatments, release treatments, use of pesticides, and prescribed burning. Aerial spraying control brush/shrub competition will not occur. Prioritize these treatments within FRCC 2 and FRCC 3 areas.

Goal FP-1-Provide forest products to help meet local and national demands while protecting the natural component of the environment.

Action FP-1.1.1: Identify and treat areas to promote forest health and restore forest stands to historic species composition, structure, and function by:

- Retaining large diameter trees when consistent with treatment objectives.
- Treating areas with excessive forest fuel loading and ingrowth.
- Treating areas with insect or disease infestation.
- Treating areas where other disturbances have occurred (e.g. fire, ice storm, etc.)

Goal WF-1-Protect life and property while returning fire to its natural role in the ecosystem.

Objective WF-1.5: Improve or protect valuable resources and improve the FRCC through the use of fuels treatment activities within the 8,200 acres where vegetation treatments will occur.

Action WF-1.5.3: Fuels treatments (prescribed fire, mechanical, chemical, or biological) will be conducted on identified areas.

Goal RC-1-Provide opportunities for quality outdoor recreation experiences ensuring enjoyment of natural and cultural resources on BLM-managed or partnered lands and waterways.

Objective RC-1.2: Manage the Coeur d'Alene Lake SRMA for land- and water-based leisure activities for outdoor sport, relaxation, social group or family affiliation, and personal enrichment or learning through environmental study within accessible natural forested lakeshore settings.

Action RC-1.2.10: Enhance environmental education opportunities at the Mineral Ridge National Recreation Trail through maintenance of the interpretive trail, guide booklet, and bald eagle viewing booklet. Additionally, plan and construct or implement additional interpretive or environmental education sites or projects at:

- Blackwell Island Recreation Site
- Cougar Bay Wildlife Viewing Area
- Blue Creek Bay (undeveloped)
- Loff's Bay (undeveloped)

Action RC-1.2.11: Recreation site development projects will be planned and implemented at the WFCA (Blue Creek Bay) that consider the following:

- Public camping
- Docks for day use and overnight moorage
- A community use boat launching ramp
- An upland trail system for nonmotorized uses
- Wildlife viewing and interpretive facilities

4.2 Relevant Statutes and Authorities

This section is a summary of the relevant statutes/authorities that apply to this project.

- Archeological Resource Protection Act (ARPA) 1979
- Federal Land Policy and Management Act (FLPMA) 1976
- Federal Regulations (43 CFR 5003)
- Healthy Forest Restoration Act (HFRA) of 2003
- Migratory Bird Treaty Act of 1918
- National Environmental Policy Act 1969

5.0 Scoping and Issues

5.1 Scoping

Internal Scoping

An Interdisciplinary Team (IDT) of BLM resource specialists conducted internal scoping through the project planning process, which included on-site field examinations of the project area, professional observations and judgment, literature review and IDT discussions. In the project planning process the IDT considered environmental elements particular to this project site. The IDT also developed a preliminary proposed action and identified preliminary relevant issues for consideration during external public scoping.

External Scoping

The Coeur d'Alene Field Office initiated the WFCA vegetation and trails public scoping process by mailing over 75 scoping notices on July 29, 2015 to interested parties such as adjacent landowners, Kootenai county commissioners, the Coeur d'Alene Tribe, as well as to individuals that had previously expressed interested in management of WFCA. This was followed by an article written by a reporter for the Coeur d'Alene Press on August 5, 2015 and a BLM news release published in the Coeur d'Alene Press on August 13, 2015. The articles invited the public to participate in a public meeting to discuss the proposed treatments and recreational improvements.

The BLM held additional meetings with members from the biking community on October 29, 2015 and with several members of the equestrian community on December 8, 2015 to develop alternatives with regards to trail systems. During the public scoping period, the BLM received over a hundred comments that were used to refine the proposed action, develop alternatives, and identify issues for analysis.

5.2 Issues

The IDT identified issues based on applicable law, management direction contained in the RMP, and information gathered during the scoping and project planning process. The issues helped to determine whether the proposed action should be modified and the significance of the project effects on elements of the environment; and helped shape alternatives to analyze.

The IDT considered the following issues for these purposes:

5.2.1 Issues Considered for the Development of Alternatives and Analysis

Air Quality

Smoke impacts to adjacent landowners and the general public: smoke during the pile and broadcast burning portion of implementation may bother adjacent land owners and the public.

Dust Abatement: majority of the roads surrounding the project area are not paved and dust may bother adjacent land owners and visitors recreating.

Botany and Special Status Plants

Impacts to rare plants and their habitat: opening the canopy and disturbing the soil (by timber harvest, burning and/or slashing) can create an environment that is favorable to weeds. Weeds can then outcompete or inhibit the growth of sensitive plants that currently occupy or could occupy the site in the future.

Cultural

Impacts to cultural sites: implementing management actions could impact cultural sites either directly or indirectly and areas left untreated could have a negative impact to cultural sites in the event of a fire.

Socio-Economics

Adjacent property values: creating additional parking on Bonnell Road would increase traffic and diminish property values.

Fisheries

Fisheries, including special status fish species: logging, including road and skid trail construction/improvements, fuels treatments, and trail building can cause an increase in sediment and temperature in streams, and a decrease in the amount of large downed wood in the stream channel and adjacent riparian floodplain. This can affect habitat for fish and other aquatic species.

Forestry

Vegetation treatments: consider having vegetation treatment unit boundaries follow natural boundaries with changing vegetation types to reduce visual impacts.

Invasive, Non-native Species

Noxious weed introduction or expansion: disturbance to soils and vegetation through broadcast burning and utilization of logging equipment could result in the expansion of noxious weed species.

Public Health and Safety

Logging traffic from vegetation treatment could result in a higher risk of traffic accidents. The increased traffic could also create dust which reduces visibility for drivers. Visibility along I-90 could also be affected from by the smoke due to the broadcast burn on the southern end of the property. With more developed trails on the west side of the property, recreation use is likely to increase. Parking is limited to the shoulder of Bonnell Road, and more people would be likely to park on the shoulder of the road to access the new trails.

Recreation
With the forestry implementations, the area may be temporarily closed during project implementation which could temporarily displace visitors. Skid trails also have the potential to establish undesired user-created trails if not dealt with properly. A trail system with designated uses could also result in user conflict among the different recreational uses.

Soils
Minor impacts to soils would occur while building the recreation trails and trailhead as well as during harvest activities. Naturally occurring (and some man-made) erosion is prevalent in localized areas. Proposed trail building and other construction would result in disturbances to soils with increased erosion in some areas and decreased erosion in others.

Visual Resources
Timber harvest and fuels breaks: excessive removal of trees and vegetation could alter the scenic quality of the landscape.

Wildfire
Increased recreational user's increases exposure to the area and could contribute to human caused fires.

Wildlife
Disturbance to wildlife and their habitat: harvest activities may have negative effects on some species if snags and brush are removed. Changes in habitat may have negative effects on some species. Additional disturbance to wildlife resulting from human presence, equipment noise, and smoke may disrupt or deter wildlife on the site.

5.2.2 Issues Eliminated from Further Analysis
During the scoping period a comment was received concerning trapping and bow hunting outside of the appropriate seasons. Since the Idaho Fish and Game is the regulatory agency responsible for developing and enforcing the regulations associated with all hunting and trapping on public lands, the BLM is eliminating this issue because it is beyond the scope of this analysis. However, the effects of potential increases in trapping and bow hunting will be analyzed in the wildlife section.

6.0 Alternatives
The BLM considered three alternatives in this analysis, Alternative A (Proposed Action), Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Additional Parking off Bonnell Road), and Alternative C (No Action).

6.1 Alternative A (Proposed Action)
The proposed action involves a forestry component that addresses forest health and hazardous fuel issues as well as a recreation component incorporating the development of an established trail system and parking area on the west side of the BLM ownership, a new trail system bisecting the meadow, the development of new trails on the east side to improve overall trail connectivity and additional parking areas.

Forestry

The proposed forestry action would occur over the course of multiple years (estimated from 2016 thru 2022) treating approximately 616 acres which would be broken into seven treatment units shown in Appendix A Map 1: *Forestry Treatments Proposed Action* and are described in Table 1 below. The BLM anticipates that approximately 2.0 million board feet (MMBF) of merchantable material could be removed from 542 acres.

Table 1. Proposed Action Units, Harvest Methods, Vegetation Treatments and Acres Associated with Proposed Treatments.

Unit	Harvest Method	Vegetative Treatment	Treated Acres
1	Hand Cutting	Pre-commercial Thin	36
2	Tractor/Short Cable	Variable Density Thinning	130
3	Tractor	Aspen Release	5
4	Tractor/Short Cable	Variable Density	345
5	Tractor/Short Cable	Selective Cut	67
6	Hand Cutting	200' Fuel Break	33
7	Under Burning	Prescribed Fire	57*
8		Reserve Area	135**
		Total Treatment Area	616

*Treatment Overlap (15 acres of private)
**Not included in treatment area

Techniques used to implement the proposed action would include:

1. Pre-commercial Thinning (PCT): approximately 36 acres (unit 1) would be treated by removing non-commercial trees (less than 7 inches in diameter) to reduce tree densities of non-desirable trees species thus allowing for less competition of resources and to increase site productivity (Chase et al. 2016). To achieve the desired spacing of the residual trees, a 16 foot by 16 foot spacing would be utilized.

2. Variable-density Thinning (VDT): on approximately 475 acres (units 2 and 4) a variety of techniques would be utilized to achieve small scale skips (areas left unthinned), gaps (openings in the forest canopy) and a light thinning, which would be achieved through a selective cut in which primarily smaller suppressed trees would be removed to reduce ladder fuels and improve vigor and longevity of the mature overstory trees (see Figure 2). Other than in openings, on average 32 trees per acre (TPA) would be maintained favoring dominant and co-dominant trees ≥ 24" diameter at breast height (DBH), where practical.

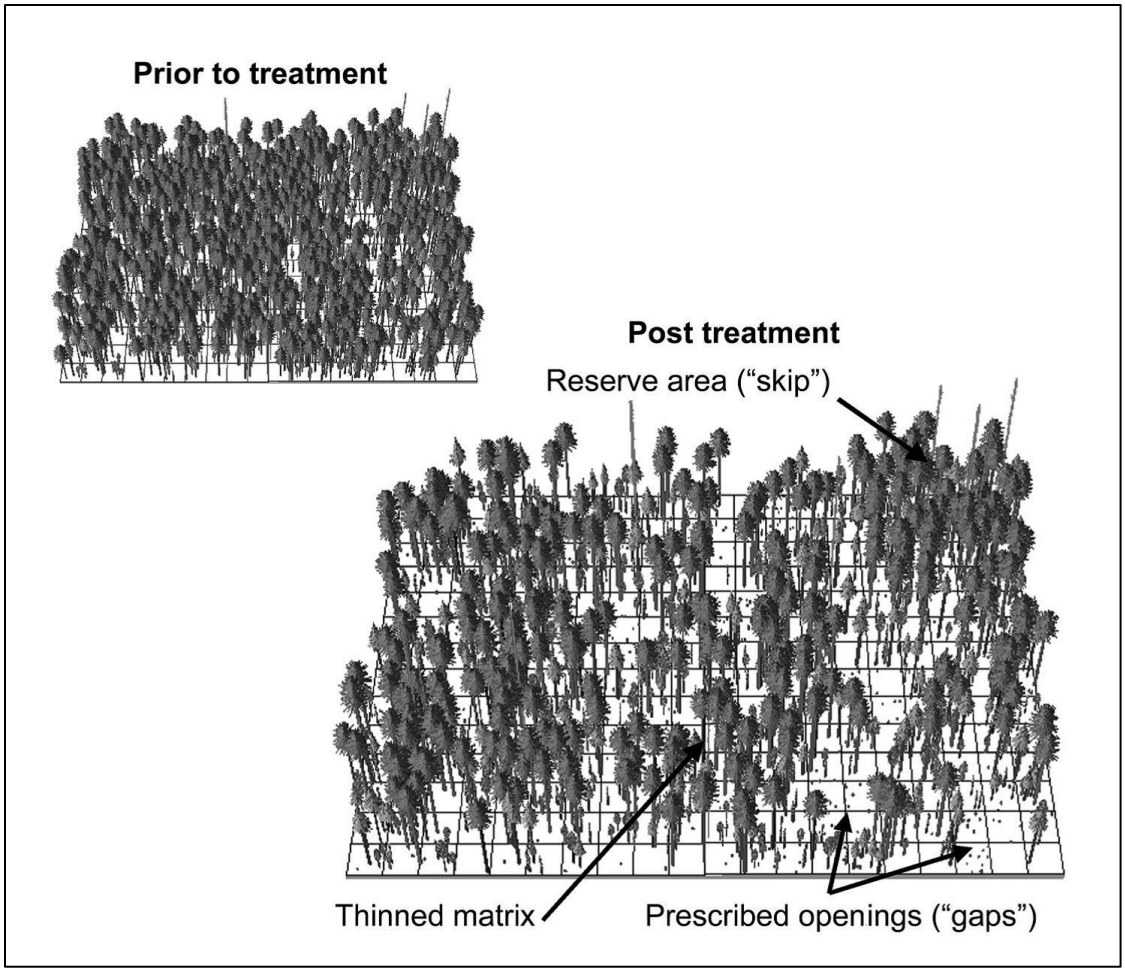


Figure 2. A stand before and after thinning with skips and gaps (Harrington 2009).

3. Aspen Release: approximately 5 acres (unit 3) would be treated near residual aspen by removing competing conifers and vegetation in order to create openings large enough to increase sunlight to reach the forest floor and stimulate sprouting (Shepperd et al. 2006). Pile burning of slash material and fencing would also be used to help stimulate aspen suckering and protecting from herbivory.

4. Selective Cut: approximately 67 acres (unit 5) would be thinned from below to remove ladder fuels and ingrowth in order to improve vigor and longevity of the overstory. Ponderosa pine and western larch and western white pine would be favored for retention especially in areas that are within 50 feet of root rot pockets. Douglas-fir trees that are competing with dominant ponderosa pine would be favored for removal to maintain a historic species composition.

5. Fuel Breaks: approximately 33 acres (unit 6) would be treated to create a 200 foot wide shaded fuel break along the ownership boundary and main road system in areas not proposed for other forestry treatments. Treatment would reduce surface fuel accumulations and ladder fuels by thinning understory vegetation and small diameter trees up to 8 inches DBH and piling slash and natural fuel accumulations.

6. Prescribed Fire: approximately 57 acres (42 BLM, 15 Private) (unit 7) would be underburned to reduce surface fuels and kill small shade tolerant trees in the understory. All prescribed burning would require a project level prescribed fire burn plan that would adhere to smoke management and air quality standards, meet the objectives for the project, and maintain or restore ecosystem processes or structure. This could also include burning 15 acres of adjacent private land in coordination with the land owner.

7. Reserve Areas: approximately 124 acres (unit 8) would be reserved from treatment to minimize disturbance to wildlife populations.

Treatments would include:

Harvest Methods

Harvest methods would include tractor (ground-based) skidding on slopes less than 45% and cable yarding on slopes greater than 45%. Cable yarding would be utilized with cable corridors varying between 400 feet and up to 1000 feet in length and may be logged using a conventional cable system (yarder) or an off-road jammer (e.g. tong-tosser).

Whole tree yarding would take place in areas that are adjacent to or within sight of trails to reduce the amount of activity fuels remaining within the units after logging operations. In areas that are isolated from public access or have low amounts of coarse woody debris, a lop and scatter approach would be utilized to ensure adequate amounts of slash is retained in order to promote nutrient cycling (see *Slash Treatments*).

Road Work

The timber harvest activities would utilize approximately 3.47 miles of existing roads on the eastern side (Figure 1) of the ownership and approximately 1.3 miles of existing roads on the western portion of the ownership (Appendix C: Map 3 *Forestry-Proposed Action Roads*). These haul roads would be reshaped and maintained to facilitate harvest operations. As needed, road maintenance actions would include blading, providing road drainage (e.g., rolling dips, ditch cleaning, culvert installation, etc.), rocking/graveling low-water fords, and road clearing (e.g., logs, debris). During logging operations dust abatement measures would be utilized when necessary to prevent excess dust and reduced visibility.

Skid trails would utilize old existing trails and would be designated prior to operations. Use of ground based equipment (e.g. crawler tractors, skidders, feller bunchers, forwarders, etc.), would not be allowed when it is determined that damage is occurring to the soil due to operating procedures or high soil moisture content. Skid trail intervals would generally range ±100 feet, keeping them to a minimum width necessary to prevent damage to reserve trees, buffer strips, snags, wildlife habitat, etc. Following operations all skid trails would be water barred, decompacted where necessary and seeded using a certified weed-free seed mix.

Two main haul roads in the project area (approx. 1 mile on the west and 1.6 miles on east) would be maintained post-harvest to allow for administrative use to facilitate future maintenance needs of the recreation site (Appendix D: Map 4- *Forestry Administrative Roads*). All roads would be treated using certified weed-free seed mixes to help prevent the

establishment of noxious weeds. Roads not used for administrative use would also be water barred and decompacted where necessary.

Noxious Weeds
Preventing any new weeds species from entering the project area is a high priority. Measures would include removing all mud, dirt, and plant parts from all off-road vehicles and off-road equipment before entering BLM lands. Cleaning must occur off BLM lands. (Cleaning requirements do not apply to vehicles that would stay on the established roadways.) All haul routes, skid trails (except the travel way on surfaced roads) and areas prone to weed invasion would be seeded in a manner that optimizes plant establishment for that specific site, using a certified weed-free seed mix that includes fast-growing, early season species to provide quick and dense re-vegetation.

Preventing Unauthorized Non-motorized Vehicle Use
All access points to the sale area are controlled by pre-existing locked gates. Gates would be kept closed and locked during periods when hauling is not occurring to prevent unauthorized use.

Riparian Buffers
Riparian conservation area (RCA) buffers would be established on all perennial and intermittent streams in the project area to maintain water quality and reduce the potential for sediment to reach the lake.

Landings
The BLM would require the timber sale operator to construct landings according to the approved logging plan.

Reforestation
Reforestation would be planned in areas were openings are larger than 3 acres in size across the entire project area and depending on availability of funding and seed supply. Planted species composition and planting density would be described in a silvicultural prescription for each unit, but in general would be planted to a density of 300 trees per acre, with species composed mostly of ponderosa pine, western white pine and western larch.

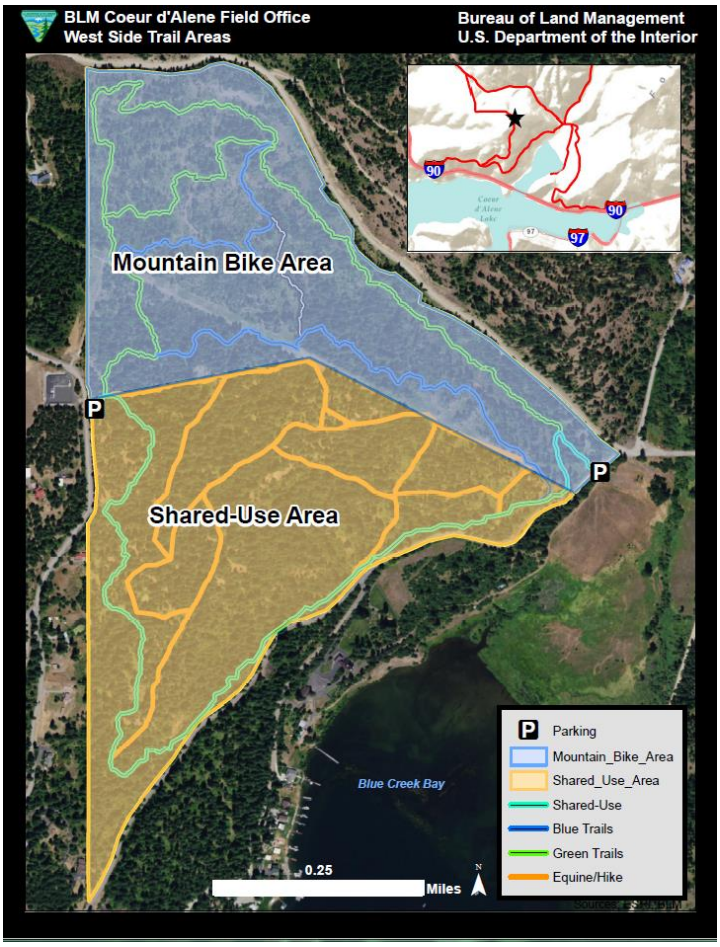
Slash Treatments
On average a minimum of fifteen (15) tons of residual slash (all size classes) per acre would be dispersed during harvest operations where possible to act as an erosion control measure and for nutrient cycling (Graham 1994). Primarily, trees would be whole tree yarded to designated landings; however, if 15 tons per acre is not being achieved, the contractor would process trees at the stump rather than at the landing to increase the residual slash (see above *Harvest Methods*). Breakage of brittle limbs and tops during felling and skidding would contribute most, if not all of the slash needed. Slash piles at landings would be burned following the completion of harvest operations and after approval of a prescribed fire burn plan.

Down Woody Material
Dependent on the cover type (see *wildlife design features* below) an adequate amount of logs ≥ 14 inches (or largest available) per acre would be retained to aid in forest productivity and to provide habitat for plants and animals (Stevens 1997).

<u>Recreation</u>

Trails

Through the scoping process the public helped identify additional uses for the west side of the WFCA. Based on public input, new trails on the west side would consist of shared-use, equestrian/hike only, and mountain bike only trails. The west side would be separated into two trail areas: The Mountain Bike Area and the Shared-Use Area (see Figure 4). These two areas would see approximately 15 miles of designated trail. The trails identified on the maps are only conceptual and used to illustrate a potential trail network.



Trails on the west side
The Shared-Use Area, located primarily south of the powerline corridor, would have equestrian/hike trails along with a perimeter shared-use trail that would provide access for all users to get from the proposed Bonnell parking area to the ADA/ABA parking area located along East Yellowstone Trail. The shared-use trails would provide connectivity for each user group allowing them to get back to the top of the west side (Bonnell Road).

The equestrian/hiking trails would primarily follow existing user created trails. This area is approximately 110 acres and would have between 5-10 miles of designated trail.

The Mountain Bike Area, located primarily north of the powerline corridor (see Figure 4), would have mountain bike purpose-built flow trails for downhill style mountain biking. The mountain bike-only trails would consist of multiple one way downhill trails beginning at the Bonnell parking area heading north into the Mountain Bike Area.

Within the Mountain Bike Area there would be 5-10 miles of new designated trails. These trails would range from beginner to a more advance trail system which would help lend to skill

progression. Technical trail features (log rides, ladder bridges, rock drops, etc.) would be built to vary in difficulty and style to diversify the trail system. The trail system would be evaluated to coincide with BLM and International Mountain Bicycling Association (IMBA) guidelines utilizing the Trail Solutions guide (IMBA, 2004) and the Managing Mountain Biking (IMBA 2007). The trails would be constructed with hand tools and heavy equipment where needed (e.g., mini excavator, trail dozer, etc.).

Trails on the east side
There would be 1.25 miles of new designated trails to the east side (trails labeled in brown), which would increase connectivity among the existing trail network with added ridgeline views of Lake Coeur d'Alene.

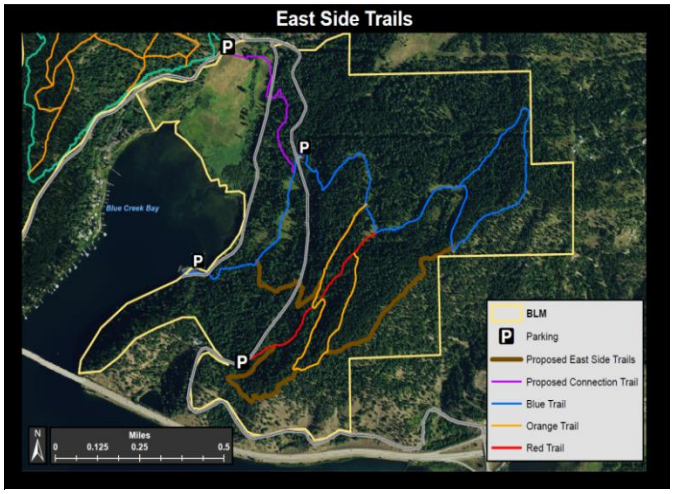


Figure 4. Proposed and Existing East Side Trail System.

In addition to the trails labeled in brown, there would also be a trail constructed to link the west side trails with the east side trails (trail labeled in purple). This trail would begin at the ADA/ABA trail parking area and traverse the upper portion of the meadow connecting to the Blue trail near the trailhead on East Yellowstone Trail. Two options are being considered in the meadow for the crossing of Blue Creek. The first option would be to place medium sized rocks (approximately 12 inches) along the creek bottom to help armor the creek bed. The second option would include a small walking bridge adjacent to the armored crossing. All new trails would have appropriate resource clearances before being constructed.

Portions of the existing Blue Trail would be rerouted to meet a more sustainable grade (see sustainable trail grades in the design features on page 26) with switchback turns being reconstructed. The trails on the east side (including the purple trail) would continue to be open for non-motorized multiple use. The full trail network concept is located in Appendix B: Map 2 *Recreation Proposed Action*.

Trailheads
Existing Trailheads
There are currently three designated trailheads for the trail network. The first trailhead offers access to the east side trails and is located on East Yellowstone Trail. The second trailhead is more centralized to the trail network located at the beginning of the ADA/ABA trail. The third trailhead is located on the old log landing road which provides day-use recreation on Lake Coeur d'Alene along with access to the trail network. There is an undeveloped parking area located at the beginning of the Red Trail. This parking is currently on the shoulder of the road with minimal room to park (see Figure 5).

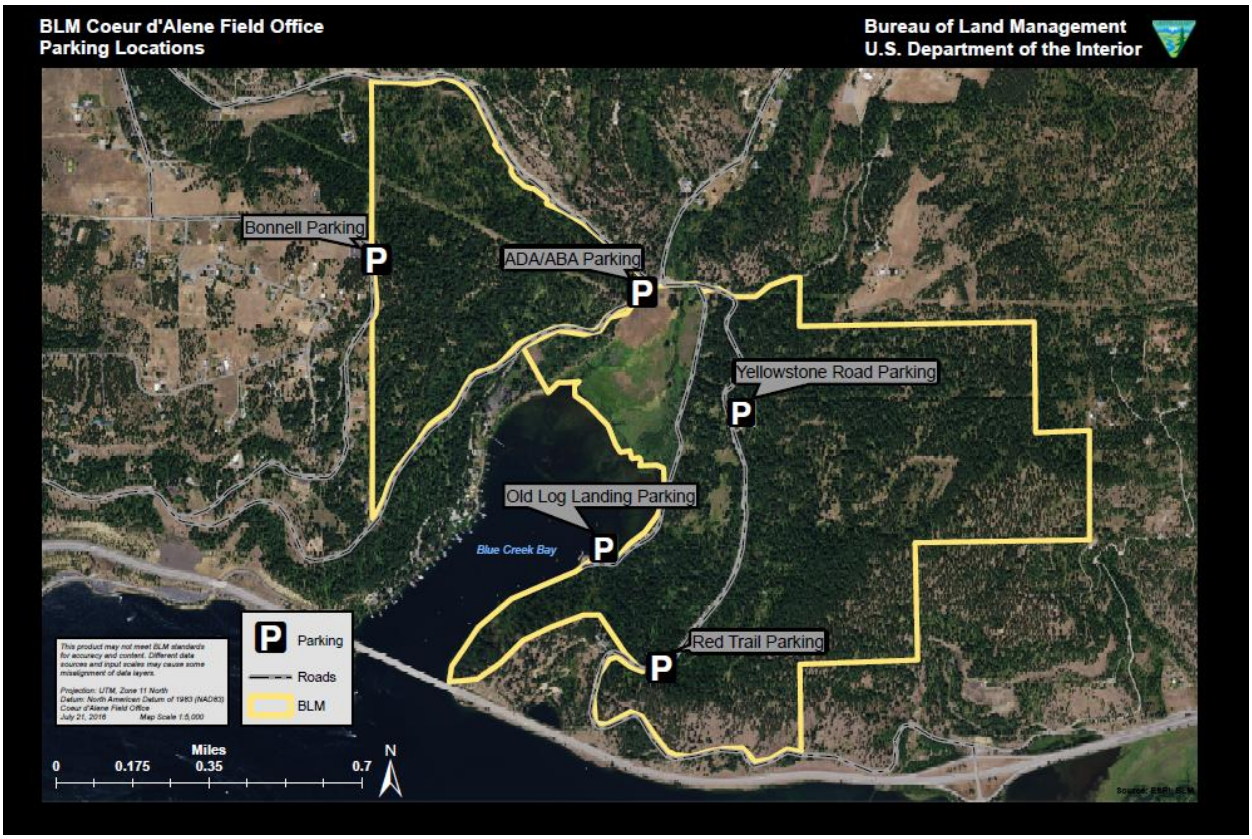


Figure 5. All parking locations, existing and proposed.

Proposed Trailheads

A new 1.0 acre trailhead would be constructed at the top of the west side trail network just off of the Bonnell Road with an adjacent 1.4 acre mountain bike skills park (see Figure 6). The new parking area would be constructed to provide for a more safe and adequate place to park. The trailhead would be constructed with a road base type material (with possible pavement in future), post and pole fence or boulders for controlled access and to help delineate parking, an informational kiosk, and a restroom. The trailhead would be accessible for low clearance vehicles and large enough to accommodate truck and trailer parking. An interpretive panel would be installed at the new parking area to inform the public about the WFCA area and the improved trail network. The beginner skills park would wrap around the southeast portion of the parking area. The skills park would have technical trail features such as ladder bridges, teeter-totters, berms, pump track, etc. The skills park would be for mountain bikers only and vegetation removal would be minimal with building looped trails that add in the technical features.

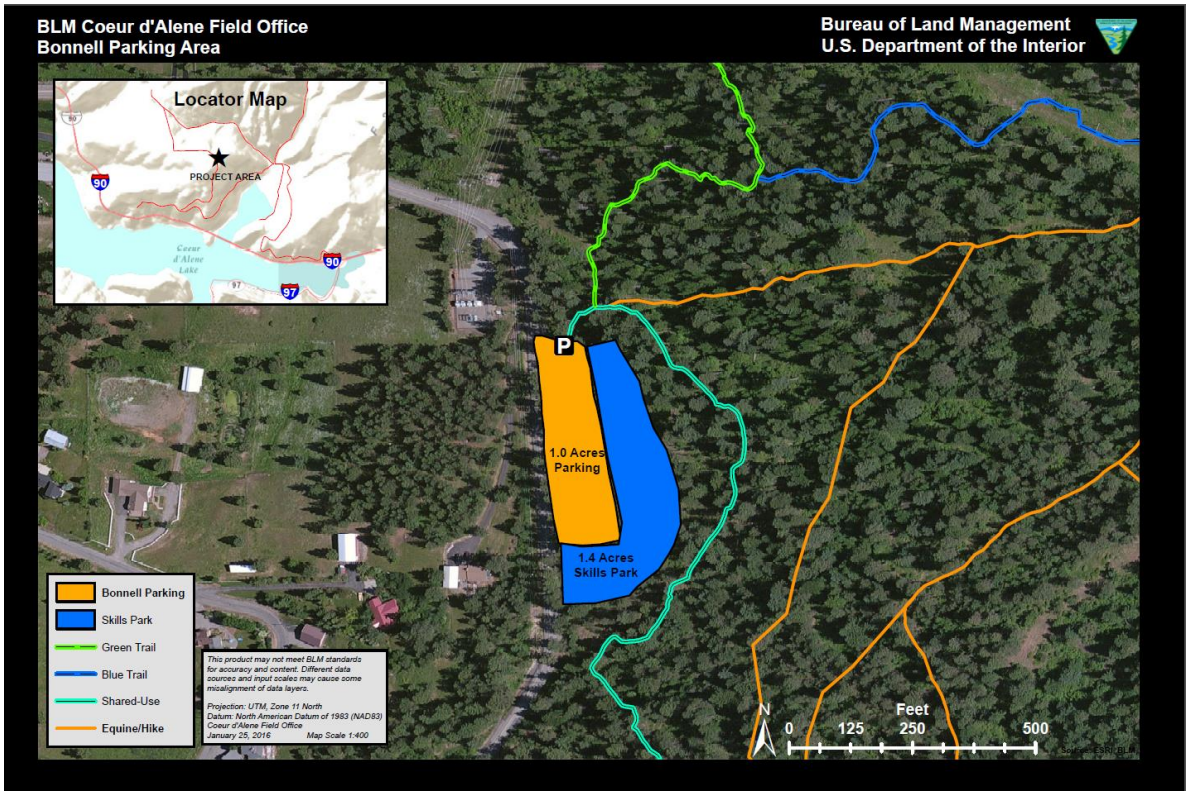


Figure 6. Proposed Parking and Skills Park off Bonnell Road.

The lower ADA/ABA trailhead would be expanded to 0.3 acres while continuing to allow accessible parking to the wildlife viewing platform (see Figure 7).

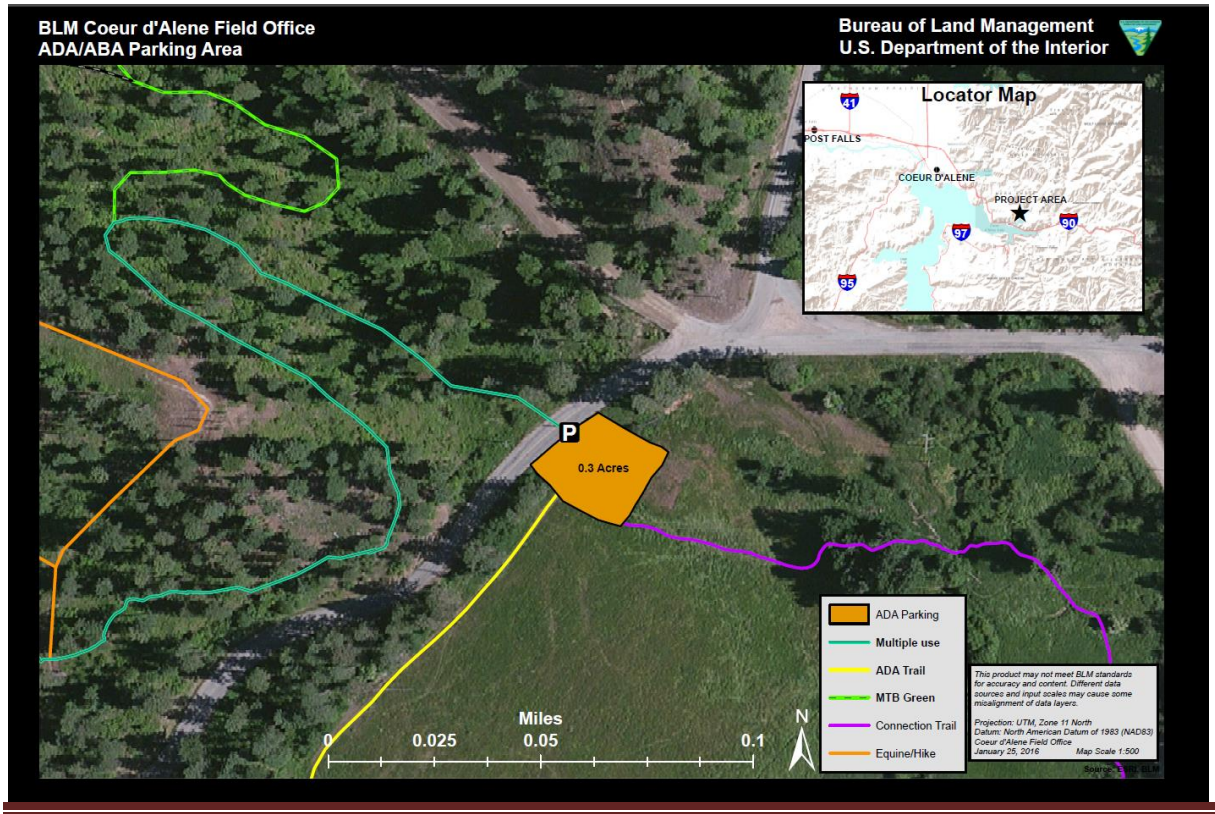


Figure 7. Improved ADA/ABA Parking Area.

The parking area located at the beginning of the Red Trail is limited to the side of the road with minimal room to park. This parking area would be widened to allow more people to park further off the shoulder of the road (see Figure 8).

Figure 8. Proposed Parking on East Yellowstone Trail at the beginning of the Red Trail.

6.1.1 Environmental Design Features

All treatments in the proposed action and in Alternative B would follow established agency management plans, policies, and procedures, including the Best Management Practices (BMP) identified in the CDA RMP (2007) as well as the rules pertaining to the Idaho Forest Practices Act (Idaho Administrative Code, Title 38, Chapter 13). In addition to the treatments included in the Forestry section above (Section 6.1), the following design features would be implemented to avoid or minimize potential impacts to resources:

Air Quality

- Conduct prescribed fires in accordance with the procedures outlined in the *Montana/Idaho State Airshed Group Operating Guide* (Montana/Idaho Airshed Group 2010) in order to minimize air quality impacts from smoke on local communities and individuals.
- Employ dust abatement measures on roads to reduce dust.

Cultural

- Coordination with the District Archeologist will occur in order to protect cultural sites. Buffering and/or avoidance around known sites would occur prior to and during logging operations.

Invasive, Non-native species

- Reduce sources of weed seed and/or plant parts and minimize risk of spreading existing infestations by treating pre-existing weed populations prior to project activities as described for the Integrated Weed and Vegetation Management program in Environmental Assessment #ID-410-2008-EA-224 (BLM 2008a).

- Mechanized equipment would be cleaned by power washing at an approved location before entering public lands. All equipment would be cleaned before leaving the project site if operating in areas infested with weeds. Where mechanized equipment results in a trail wider than desired, the excess width would be rehabilitated with an appropriate seed mix to create desired tread width.

- Monitoring- After fuels treatment activities, employ the Coeur d'Alene Field Office's weed and vegetation management strategy to monitor and treat weed infestations on trails, roads, landings, skid trails, and treatment areas. Future weed treatments may use biological controls, mechanical removal, and/or herbicides after considering the effectiveness of the methods, as described for the Integrated Weed and Vegetation Management program in environmental assessment #ID-410-2008-EA-224 (BLM 2008a).

Rare and Special Status Plants

- The BLM Field Office Botanist will coordinate with the Project Leads and District Fuels staff throughout project implementation, to ensure the pine broomrape occurrences are not negatively impacted. The Field Office Botanist will be on-site during prescribed burn activities as a Resource Advisor, if appropriate.

- Weed treatments will be coordinated with the Field Office Botanist to reduce potential impacts to the rare plant populations. Herbicides that may be used to reduce the weed threats associated with this project should be carefully planned and applied; otherwise, they could have detrimental effects on non-target (especially BLM Sensitive) plant populations.

- The Field Office Botanist will monitor the rare plant occurrences during and after the project is completed.

Safety

- Areas immediately around active treatments would be temporarily closed and signed to ensure public safety during the implementation phase.

Soils and Water Resources

- Forest treatment activities will not occur when soil moisture is greater than 25%

- To be sustainable, proposed trails would require curvilinear design principles to help prevent a fall-line type trail. (A curvilinear trail is one aligned to follow the natural contours of the slope.) This trail design would allow the trail to gain elevation gradually in conjunction with the natural contours of the terrain. This type of design generally minimizes maintenance, preserves the natural resource, and makes use of natural drainage patterns.

- Where practical trails would be built to meet the guidelines illustrated in IMBA's manuals. The trails would be constructed in a fashion that would prevent fall-line type trails in order to minimize erosion.

- Where practical trail construction and corridors would be built in accordance with section six of IMBA Trails Solutions Guidelines. This includes switchbacks, insloped turns, bench cuts, corridor heights and widths, etc.

- Where practical grades would be controlled to create sustainable trails. IMBA's five essential elements of a sustainable trail would be implemented to control grade and prevent erosion. The five essential elements are as follows:

    - The Half Rule: A trail's grade would not exceed half the grade of the sideslope that the trail traverses, with rare exceptions.
    - The Ten Percent Average Guideline: Trails would be constructed such that their *average* grade would not exceed ten percent.
    - Maximum Sustainable Trail Grade: Grade would rarely, if ever, exceed 15 to 20 percent and then only if local conditions (rock armor, etc.) would support the grade as sustainable.
    - Grade Reversals: Incorporate grade reversals (spot at which trail levels out then changes direction for 10 to 50 feet before rising again) to force water to exit the trail at the lowest point before it can gain volume, momentum and erosive power.
    - Outslopes: Trails would be constructed such that lower edge of tread would tilt slightly down and away from the high side, allowing water to sheet across and off the trail rather than down its center.

- Loamy type soils would be targeted for the area where the trails would be built. Silt, clay, and sand would be avoided when possible.

Recreation

- Technical mountain bike trail features would be built in a manner that allows for optional lines. The users would be able to choose to ride the feature or simply stay on the trail. The technical trail features would be constructed to meet the guidelines in the IMBA manuals.

Visual Resources

- Trees harvested within one hundred feet of trail systems and parking areas will be severed at ground level to reduce the visual impacts of stumps following logging operations.

Wildlife

- To reduce impacts to Migratory Birds, vegetation cutting and piling will not occur between April 1 and July 15.

- Snags would be retained for wildlife purposes in accordance with the RMP, as shown in Table 2 below for the appropriate cover type. Snags may be left as individuals scattered throughout the harvest unit or left in unharvested patches of varying sizes within units. Silvicultural prescriptions would emphasize the retention of snags ≥14 inches in diameter across the harvested units.

Table 2. Snag Retention Guidelines for cover type identified in the CDA Resource Management Plan (2007).

Cover Type	Tree Species Typically Represented in Cover Type	Snags per acre
Wet Cold Conifer	Western white pine, lodgepole pine, western larch, grand fir, Douglas-fir	8.1
Dry Conifer	Ponderosa pine, lodgepole, Douglas-fir, grand fir, western white pine	3.3
Wet Warm Conifer (WRC/WH/WWP)	Western redcedar, western hemlock, western white pine	5.4
	Minimum Snag Height	30’

- To provide or improve grouse habitat logs ≥ 14 inches (or largest available) would be maintained for the following cover types specifications:

Cover Type	Logs/acre
Wet cold conifer	10.1
Dry conifer	3.9
Wet warm conifer	7.8

- Any raptor nests that are found by loggers, contractors or field office personnel would be reported to the Field Office Biologist so that a buffer can be flagged. Logging activities would then resume after the nesting attempt is complete.
- High value snags that are a hazard to loggers should be marked and buffered from treatment so that cutting them is unnecessary.

6.2 Alternative B (No Forestry Treatment on Western Portion of the Ownership, No Prescribed Burning and No Parking Off Bonnell Road)

This alternative is the same as the proposed action, except it would include no forestry treatment on the western portion of the ownership and a recreation alternative removing the parking off Bonnell road. All design features would remain the same as in the Proposed Action for both forestry and recreation.

Forestry

This alternative considers timber harvesting only in the eastern portion of the ownership, not incorporating a prescribed burn, (Appendix E: Map 5 *Forestry Alternative B*) and creating a 200 foot fuel break on the western portion of the ownership. Areas not treated would be left as reserve areas. Compared to the proposed action of treating a total of 616 acres, this alternative would only be treating 483 acres (see Table 3 below) within 4 units. Timber harvest would remove approximately 1.6 million board feet from 412 acres. Haul roads for treatment on the eastern portion of the ownership would be the same as described in Alternative A (Appendix C: Map 3 *Forestry-Proposed Action Roads).* All of the techniques and design features included in the proposed action above would be carried through in this alternative.

Table 3. Alternative B: Units, Harvest Methods, Vegetation Treatments and Acres.

Unit	Harvest Method	Vegetative Treatment	Acres
4	Tractor/Short Cable	Variable Density	346
5	Tractor/Short Cable	Selective Cut	67
6	Hand Cutting	200’ Fuel Break	70
8		Reserve Area	268*
		Total Treatment Area	483

*Not included in total treatment area

Recreation

Alternative B would be similar to Alternative A except there would be no one acre improved parking area or 1.4 acre skills park off of the Bonnell Road (Appendix F: Map 6 *Recreation Alternative B*). Additionally, administrative roads discussed in Alternative A would be maintained for future site maintenance (Appendix D: Map 4-*Forestry Administrative Roads).*

6.3 Alternative C (No Action)

Under this alternative, the BLM would not implement forest vegetation treatments, fuels reduction treatments or recreational developments.

7.0 Affected Environment and Environmental Effects

7.1 Scope of Analysis

Affected Environment

The purpose of the affected environment sections is to describe the existing environment potentially affected by the alternatives. The affected environment of this EA was considered and analyzed by an interdisciplinary team of resource specialists. The resources identified and discussed in this chapter were derived from the issues (see Section 5.2.1) and include the

relevant physical and biological conditions that may be impacted with implementation of the alternatives and provides the baseline for comparison of the environmental consequences.

Environmental Effects
The potential consequences, or effects, of all alternatives are discussed after each resources affected environment. Impacts are defined as modifications to the existing condition of the environment and/or probable future condition that would be brought about by implementation of one of the alternatives. The intent is to provide the scientific and analytical basis for comparison of the effects of each alternative.

Impacts can be direct or indirect; direct impacts are those effects that are caused by the action or alternative and occur at the same time and place, while indirect effects are those effects that are caused by or would result from an alternative and are later in time or further removed in distance, but that are still reasonably certain to occur. Cumulative effects are generally assessed using the environmental impacts of past, present, or reasonably foreseeable future actions within the project area.

The impact analyses in the following sections were based on knowledge of the resources and the project area, review of existing literature, information provided by experts and other agencies, and professional judgment.

7.1.1 General Setting
The project is located at Blue Creek Bay within the WFCA. The property contains 751 acres of BLM lands approximately 10 miles east of Coeur d'Alene, ID and is surrounded on all sides by private ownership. High concentrations of houses are located on the western boundary along Bonnell Road and along the western shoreline of Blue Creek Bay.

Within the Blue Creek/Folsom Creek drainage the United States Forest Service (USFS) manages the upper portion of the drainage; the middle is a combination of commercial forest lands and other private lands, while the BLM manages the bottom of the drainage. Combinations of paved and gravel county roads (E. Yellowstone Road and the E. Landings Road) bisect or surround the ownership (E. Yellowstone Trail, Bonnell Road, E. Sunnyside Road, and Folsom Road).

The primary use of the WFCA is for recreational purposes. Currently a developed trial system bisects portions of the eastern ownership (4.2 miles) while a user created trail system bisects the western ownership. A developed trailhead/parking area is located off of East Yellowstone Trail and used primarily to access the upland trail system. A day-use area is located on the southeastern side of the bay with mooring docks, picnic tables and a vault toilet. In addition to the trailhead and day-use area, on the western edge of the meadow a trail leads to a viewing deck.

The project area includes a low elevation meadow at 2,100 feet, comprised primarily of perennial grasses and riparian vegetation, as well as mid-elevation areas (2,200 to 2,800 feet) of mixed conifer forest types. The area encompasses all aspects and slopes varying from 0 to 60 percent.

7.1.2 Related Past, Present, and Reasonably Foreseeable Actions

Human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed vegetation project. As described in the background section, in the past the area was used for a wide variety of purposes from haying and livestock grazing to logging. The channel within the meadow was historically straightened and bermed for hay production. Several range improvements included a stock pond and a log-fence corral was installed in the eastern portion of the area and there is an old barn near the parking area and trail on the west side. There are several projects that have occurred or are planned to occur within the general area of WFCA.

Past Actions

Portions of the Mullan Road occur within the ownership. The road was constructed between 1859 and 1862 and was the first engineered road connecting the Great Plains with the Northwest. Yellowstone Trail, which runs through and adjacent to the area was part of the first highway through North Idaho and was built between 1914 and 1916 (Kootenai County 2016).

Prior to the BLMs acquisition several utility easements were granted to include:

- Buried Phone Cable-runs from western ownership across the meadow into the east side of the ownership.
- Power Transmission lines-several lines bisect the western ownership and continue through the east side of the ownership.

Following the ice storms of 1996 and a series of wind events roughly 1 million board feet of volume were removed on 500 acres in the eastern portion of the ownership. The material removed was primarily wind thrown, broken topped trees, and trees killed by insects.

In 2003, BLM and Eastside Highway District partnered on a project to reduce sediment loading from an actively eroding hillslope adjacent to Sunnyside Road (also referred to as Rocky Canyon). The road and creek were both moved laterally away from the slope and the toe was buttressed with rock. This has substantially reduced sediment input into Blue Creek.

As described in the previous section, the BLM has also constructed some recreational facilities and designated trails on the eastern portion of the area. The BLM also installed barbed wire fencing around portions of the eastern side and locked existing gates to prevent unauthorized motorized vehicle use. These facilities and their effects were described and analyzed by the BLM in and EA in 2008 (BLM 2008b). The BLM has also issued a Special Recreation Permit in the area for a fat bike event which happens in early December. Letter of Agreements have been put into place for Kootenai County Search and Rescue training and for some local groups to conduct environmental education programs.

BLM and Eastside Highway District have partnered on a culvert upgrades where Blue Creek flows under Yellowstone Trail Road (2009) and where Folsom Creek flows under the landing road (2016).

In December 2010 the BLM published a supplementary rule in the Federal Register for use of the WFCA. This rule, which referred to the area as the Blue Creek Bay Recreation Management Area, stated:

1. You must not occupy or use the Blue Creek Bay public lands from one hour after sundown to one hour before sunrise.
2. You must not moor any boat overnight on any BLM-managed structure or shoreline.
3. You must not start or maintain any open campfires, except when completely contained within permanently installed steel fire grates or cooking grills.
4. You must not discharge a firearm (powered by compressed gas or gunpowder) for hunting, target practice or other purposes, except that waterfowl hunters may hunt waterfowl below the high water mark of Lake Coeur d'Alene within Blue Creek Bay.
5. You must not use motor vehicles off county roads.
6. You must not cut or collect firewood.

Across the lake in Wolf Lodge Bay, the BLM recently conducted fuels reduction activities on 74 acres of BLM lands at the Mineral Ridge Recreation Area. Treatments included slashing and piling of small diameter understory tree species (primarily Douglas-fir and grand fir) and the creation of a fuel break to protect people, property, and legacy trees from wildfire, while retaining recreational values and uses of the area. It is anticipated that in the winter of 2016 piles created from slashing will be burnt.

In addition to slashing and piling, in early spring of 2015 approximately 80 hazard trees were removed from the Mineral Ridge recreation area. Snags that were adjacent to trails and infrastructure and that were deemed likely to cause harm to people if they fell were removed.

In 2016, the BLM approved the location of an administrative access road to a designated brush/slash disposal site off of Yellowstone Trail Road.

Present Actions

Gravel and paved County Roads run through and adjacent to the area and are used by local residents, recreational users, and for travel to other areas. Interstate 90 is a major thoroughfare that runs west to east and is within a tenth of mile from portions of the ownership.

Rural trash collection occurs at the intersection of Yellowstone Trail Road and Blue Creek Road and serves the residents in the area.

Residents live along the western shoreline with docks and rural developments to the west and east of the project area; as well as several home sites located along the western ownership

Blue Creek Bay has a high amount of recreational use which includes: boating, fishing, and other water recreational.

7.1.3 Analytical assumptions

- If we provide more recreational facilities and parking areas, use of the area will increase.

- If no vegetation treatment occurs, an intense stand-replacing wildland fire would occur in the future.

7.2 Air Quality

7.2.1 Affected Environment

The analysis area for air quality includes Idaho Airshed No. 11 as defined by the Montana/Idaho Airshed Group (See Figure 9) and adjacent airsheds that may potentially be affected by smoke emissions. Montana and Idaho are currently managing smoke emissions for forest and prescribed burns under the Montana/Idaho Smoke Management Group. The Operating Guide for the

Montana/Idaho Smoke Management Group is based upon the Environmental Protection Agency Interim Air Quality Policy on Wildland and Prescribed Fires. The Smoke Monitoring Unit coordinates prescribe burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized.

Idaho Airshed and Impact Zones

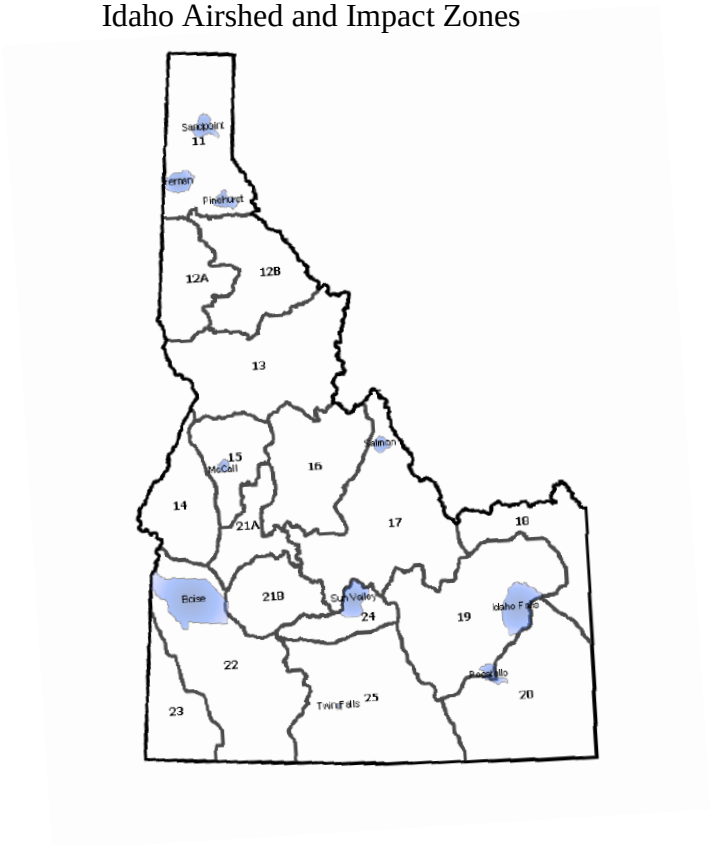


Figure 9. Idaho Airshed and Impact Zones (MT/ID Airshed Group Operating Guide).

Air quality impacts due to prescribed fire smoke result from a combination of emission production and atmospheric dispersion (Sandberg et al. 2002). Dispersion is dependent on meteorological conditions including seasonality, large-scale prevailing wind patterns,

atmospheric stability, and local terrain-influenced weather patterns. The Smoke Monitoring Unit utilizes dispersion forecasts as a tool for making daily burn recommendations to members of the MT/ID Smoke Management Group.

The Clean Air Act requires that the Environmental Protection Agency (EPA) identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. Each state is also required to develop an implementation plan to maintain air quality. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead and particulate matter 10 microns in diameter or smaller (PM 10) and 2.5 microns and smaller (PM 2.5; Table 4). The Idaho Department of Environmental Quality (IDEQ) has included an additional standard for fluorides, bringing the applicable standards in Idaho to seven.

Table 4. National ambient air quality standards for PM 10 and PM 25.

PM_{10}	24-hour average	150μg/m^3
	Annual arithmetic Mean	revoked
$PM_{2.5}$	24-hour average	35μg/m^3
	Annual arithmetic Mean	*12μg/m^3

*On December 14, 2012, the EPA promulgated a revised primary annual PM2.5 NAAQS (78 FR 3086, January 15, 2013). In that action, the EPA revised the primary annual PM2.5 standard, strengthening it from 15.0 micrograms per cubic meter (μg/m3) to 12.0 μg/m3.

The Blue Creek Bay project is located within 0.3 miles southeast of the Fernan Impact Zone and 15 miles west of the West Silver Valley non-attainment area (See Figure 9). Impact zones are created for populated areas where air quality concerns to public health arise as NAAQS are sometimes exceeded or close to exceeding. The EPA designated the West Silver Valley area as nonattainment for the 2012 annual PM2.5 standard. Residential wood combustion in the cold, winter months is most responsible for elevated particulate matter in the area, while prescribed burning in the late autumn and in the spring also contributes substantially. Smoke from wildfires can affect the area in the summer. Smoke from crop residue burning is a negligible contributor to PM2.5 in the Silver Valley.

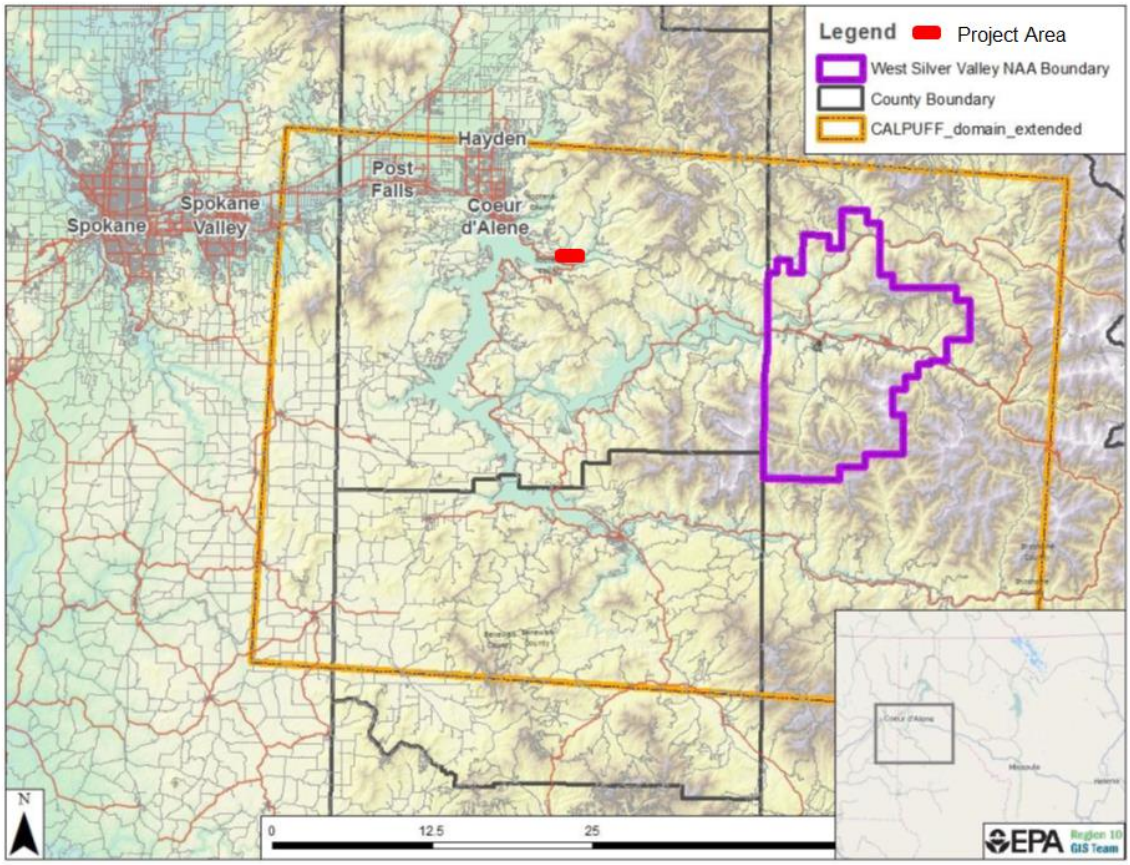


Figure 10. Location of the Blue Creek Bay project area in relation to EPA's Nonattainment boundary for the West Silver Valley Area.

The closest Class I air quality area is the Cabinet Mountains Wilderness, approximately 52 air miles northeast of the project area. Class I areas receive the highest levels of protection under the Prevention of Significant Deterioration (PSD) program. The PSD program is designed to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value.

7.2.2 Environmental Effects from Alternative A (Proposed Action)

The proposed action would require prescribed burning to reduce fuel loadings to an acceptable level. The resulting smoke would affect air quality. Three methods of prescribed burning would be used to accomplish fuel load reduction:

1. Landing pile burning would be used for timber sale activity created fuels. This type of burning concentrates slash in specific locations to minimize activity costs and reduce risk to residual trees. Slash is gathered and piled mechanically throughout the unit or at the landing. Piles are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. Due to the efficiency of fuel consumption in large piles, this type of burning has less effect on air quality compared to underburning slash.

2. Hand pile burning would be used for cleanup of fuels created from the understory thinning and pruning activities in the fuelbreak. Hand piles are generally small and are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. This method produces the least emissions.

3. Underburning would be used to reduce natural fuel accumulations on 57 acres. The objective is to reduce fuel loading while protecting the residual overstory trees from damage due to heat and flames. Choosing cooler prescription windows will limit the amount of fuel that in consumed as well as duration of the smoldering phase. This method of burning produces fewer emissions.

Particulate emissions production was calculated using the First Order Fire Effects Model (FOFEM). FOFEM predicts the quantity of natural or activity fuel consumed by prescribed fire and the resultant emissions. Fuel loadings are derived from forest cover type classifications as represented in the analysis area. FOFEM operates under the assumption that the entire area of concern experiences fire. For discontinuous burns, the results should be weighted by the percent of the area burned. For the purposes of this analysis, it is assumed that 60 percent of the acres to be treated by fire would actually produce particulate emissions.

The assumptions and methods used in FOFEM (1997) for modeling emissions were taken from Reinhardt et al. Emissions production depends both on fuel consumption and on the combustion efficiency of the fire. Therefore, it is important to note that emissions quantities are derived from tons of fuel consumed and not tons of fuel treated. FOFEM models emissions production, not visibility or dispersion. Categories of emissions estimated are PM 2.5 and PM 10. About 90 percent of PM 10 is actually in the PM 2.5 category (Peterson 2001). Idaho and Montana monitor for both categories, therefore the amount of both are modeled in this analysis.
Emissions for pile burn were calculated using the online piled fuels biomass and emissions calculator (Wright et al. 2010).

Table 5. Expected smoke production for the Proposed Action (measured in PM 2.5 and PM 10) by burn type.

Burn Type	Acres treated	PM10 tons/acre	PM10 tons	PM2.5 tons/acre	PM2.5 tons
*Underburn natural fuels	57	0.1287	7.3359	0.1092	6.2244
**Burn landing piles	616	0.1308	80.5728	0.1112	68.4992
**Burn hand piles	33	0.0339	1.1187	0.0296	0.9768

*Emissions calculated using FOFEM
**Emissions calculated using the online Piled Fuels Biomass and Emissions Calculator

The Smoke Monitoring Unit coordinates prescribed burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized. The different types of burning would be conducted during different burn windows, so would not impact the non-attainment area at the same time. Spring burning windows typically occur during warm weather, when there is less of a need for residents to burn wood to heat their homes.

Indirect effects would be a long-term decrease in fuel loading following implementation of the project. Therefore, there is likely to be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur (See Table 6).

Table 6. Comparison of wildfire emissions between the Proposed Action and the No Action (FOFEM).

	Biomass Consumed tons/acre	PM10 tons/acre	PM2.5 tons/acre
Wildfire (Proposed Action)	5.8	0.15	0.177
Wildfire (No Action)	22.2	0.4615	0.545

Mechanical fuel treatments and vehicle travel would increase the amount of dust in the area depending on the time of year, soil moisture, and the amount and kind of vehicle traffic. Treatments using mechanical activities may temporarily affect air quality within and around the project area. The mechanical vegetation treatment would be accomplished using a variety of machines to modify the vegetative biomass in the project area as presented in the proposed action.

The primary effect to air quality from these activities would be the generation of dust on roads from vehicle traffic during dry periods from July to September. Road dust from the proposed vegetation treatments would be limited to the project area and the access roads. Road dust from proposed recreation improvements would be limited to increased vehicular traffic on the main access road. The parking areas would be paved and would not be a source for dust concerns. The primary road through the project area is partially paved, the rest gravel surface and maintained by Kootenai County and is utilized by private residents as well as recreationists. Air quality impacts from dust would be minor and short term with the application of BMP's, including dust abatement.

Dust may have a short term affect to visibility and safety issues related to traffic on project area roads, but dust is not expected to interfere with traffic on local roads. Production of dust is temporary and occurs only while activities are taking place within the project area. It would be the responsibility of the county to provide necessary dust abatement measures on the primary access road, if needed.

7.2.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Direct and indirect effects to air quality of Alternative B would be similar to Alternative A with slight reductions to acres of pile burning, with no understory burning, and thus less smoke production (See Table 7).

Table 7. Expected smoke production from Alternative B (measured in PM 2.5 and PM 10).

Burn Type	Acres treated	PM10 tons/acre	PM10 tons	PM2.5 tons/acre	PM2.5 tons
**Burn landing piles	412	0.1308	53.8896	0.1112	45.8144
**Burn hand piles	70	0.0339	2.3730	0.0296	2.0720

7.2.4 Environmental Effects from Alternative C (No Action)

There would be no direct effects on the existing condition of air quality from this alternative because no pile burning would occur. No particulate matter would be produced and visibility would not be impaired.

Indirect effects would be that fuel loadings continue to increase and wildfires would continue to occur. Wildfires tend to burn much larger acreages than controlled prescribed fire does. Also, wildfires are not planned around other wildfire events or meteorological conditions that would allow for dispersion and transport away from impact zones. Wildfire occurrence without previous fuel reduction is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley and Arbelbide 1997) (see Table 6 above).

7.2.5 Cumulative Effects

The cumulative effects area for air quality is Airshed 11. Consideration of cumulative effects for air quality takes a different approach than for other resources. Past activities in the analysis area don't necessarily require consideration, except in the sense that use of existing roads and facilities may contribute to fugitive dust levels as described above. Present use of and activities in the analysis area are continuing with a current assessment of good to excellent air quality. Locally adverse and cumulative impacts to air quality could be expected if pile burning occurred in conjunction with on-going wildfires or other prescribed burning activities in and adjacent to the airshed. Other potential prescribed burning projects that could have an impact are listed in the beginning of this chapter (see Section 7.1.2). However, design measures and procedures outlined in the North Idaho Smoke Management Memorandum of Agreement are intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed burning to avoid adverse cumulative effects.

Dust impacts would be minimal during burning activities due to the light nature of use of the roads, and minimal vehicles necessary for the project. Should a wildfire occur, substantial smoke, dust and ash would be produced thus affecting the airshed.

<u>No Action</u>

If a wildfire were to occur, the project area could burn. Depending on the intensity and type of fire the vegetation could make the wildfire hard to suppress due to the potential flame lengths and spotting produced. This could, in turn, contribute more smoke emissions particulate matter to cumulative effects compared to the proposed action.

7.3 Cultural Resources

7.3.1 Affected Environment

An on-the-ground cultural resource inventory was completed. Five cultural resources were located and recorded. One site (10KA0179) consists of sections of the Mullan Military Road characterized by deep trenches in the landscape. A historic log cabin, 10KA0646, was also located and is mostly deteriorated. Both of these sites are eligible to the National Register of Historic Places. Site 10KA0652 is a scatter of artifacts including cans and glass. The site is immediately adjacent to the private land boundary. Artifacts apparently have been tossed over the slope partially on BLM. Artifacts appear to continue into the 1960s. The dump is not associated with any historic structures or living areas on BLM. The dump is not considered

eligible to the National Register of Historic Places. Site 10KA0645 is a concrete foundation with some associated historic artifact dumps. The concrete foundation has plumbing and an electrical pole. This site is not eligible to the National Register of Historic Places. 10KA0619 is a corral that used railroad ties as posts. It is in poor condition now. There are no structures or living features associated with site. The site is not considered eligible to the National Register of Historic Places.

7.3.2 Environmental Effects from Alternative A (Proposed Action)

There would be no effect to cultural resources from the proposed action. Tractor and short cable actions are planned around the Mullan Road (10KA0179) and the log cabin, 10KA0646. A 100 foot buffer will be placed around these sites with no logging within the buffer. However, thinning, piling, and burning can occur within the buffer with no impacts to the sites. No debris will be piled on the Mullan Road tread or near the log cabin and burned. Those actions will occur outside of the site buffer. There will be no effect to these sites. Actions around the historic debris dump at site 10KA0652 and site 10KA0645 (concrete foundation) would include thinning, piling, and burning. No piling and burning will occur on the actual sites and the sites avoided. There will be no effect to these sites. Tractor and short cable actions are planned around the corral (10KA0619). This site will be avoided. There will be no effect to this site.

Recreation trail development could affect cultural resources on the west side of the project area, however, design features outlined in 6.1.1 Environmental Design Features, is specifically developed to ensure well planned trail development will not affect cultural resources. Although recreation use may increase in the overall area, it is assumed to be mostly confined to existing trail tread or new tread created by BLM. Therefore, it is not anticipated to affect cultural resources**.**

7.3.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Although a high intensity fire is more likely to occur on the west side under this alternative it is assumed that there will be no significant effect to cultural resources from this alternative. A segment of the Mullan Road is located in this area and a fire burning over the road segment will not directly affect the physical characteristics of the road but could affect the setting of the site by changing the vegetation component of the area. Even with a potential change in vegetation structure it is not anticipated to be significant from the perspective of historic sites management.

7.3.4 Environmental Effects from Alternative C (No Action)

Although a high intensity fire is more likely to occur in the project area under this alternative it is assumed that there will be no significant effect to the Mullan Road from this alternative. A segment of the Mullan Road is located in this area and a fire burning over the road segment will not directly affect the physical characteristics of the road but could affect the setting of the site by changing the vegetation component of the area. Even with a potential change in vegetation structure it is not anticipated to be significant from the perspective of historic sites management.

The log cabin, 10KA0646, could be affected by a wildfire and the deteriorating logs could be destroyed. However, the buried archeological component could be left intact unless the intensity of the fire is so severe it burns deeper into the soil.

7.3.5 Cumulative Effects

Since there are no measurable effects to cultural resources there will be no cumulative effects.

7.4 Fisheries

7.4.1 Affected Environment

The proposed project area is located mainly in the uplands around Blue Creek Bay on Coeur d'Alene Lake. Coeur d'Alene Lake has two major tributaries, the Coeur d'Alene and St. Joe Rivers, and numerous smaller tributaries, including Blue Creek entering at Blue Creek Bay. The project area is located mainly outside of the Riparian Conservation Area (RCA). Riparian Conservation Areas are lands that are likely to affect the condition and/or function of aquatic habitat, and are usually adjacent to streams, ponds, lakes and wetlands.

Thirteen native fishes inhabit the Coeur d'Alene Lake basin: northern pikeminnow (*Ptychocheilus oregonensis*), redside shiner (*Richardsonius balteatus*), cedar sculpin, *Cottus schitsuumsh*, torrent sculpin (*C. rhotheus*), shorthead sculpin (*C. confusus*)[1], speckled dace (*Rhinichthys osculus*), longnose dace (*R. cataractae*), longnose sucker (*Catastomus catastomus*), largescale sucker (*Ca. macrocheilus*), bridgelip sucker (*Ca. columbianus*), mountain whitefish (*Prosopium williamsoni*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and bull trout *Salvelinus confluentus*. There are a variety of nonnative fish species found within the watershed as well, including smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), crappie (*Pomoxis* sp.), sunfish (*Lepomis* sp.), yellow perch (*Perca flavescens*), brown bullhead (*Ameiurus nebulosa*), channel catfish (*Ictalurus punctatus*), northern pike (*Esox lucius*), brook trout (*S. fontinalis*), rainbow trout (*O. mykiss*), chinook salmon (*O. tshawytscha*), and kokanee (*O. nerka*).

Threatened and Endangered Species: Bull trout were federally listed as threatened on June 10, 1998 by the USFWS (63 FR 31647). The USFWS issued a final rule for bull trout critical habitat on September 26, 2005, and on October 18, 2010 issued a revised designation of bull trout critical habitat, which includes Coeur d'Alene Lake.

Bull trout are found primarily in colder streams, although some are migratory in larger, warmer river systems throughout the Columbia River basin (Fraley and Shepard 1989; Rieman and McIntyre 1993, 1995; Buchanan and Gregory 1997; Rieman et al. 1997). Water temperature above 59°F is believed to limit bull trout distribution, which may partially explain patchy distributions within a watershed (Fraley and Shepard 1989; Rieman and McIntyre 1995). Bull trout typically spawn from August to November; spawning areas are often associated with cold water springs, groundwater infiltration and the coldest streams in a watershed (Pratt 1992; Rieman and McIntyre 1993; Rieman et al. 1997).

Currently, within the Coeur d'Alene Basin bull trout are found primarily in the upper portions of the St. Joe River subbasin (USFWS 2015a; USFWS 2015b), which contains spawning and rearing habitats. The current distribution is substantially less than the historical distribution.

[1] The shorthead sculpin has been historically confused with the newly described cedar sculpin; though the shorthead sculpin is currently listed as an inhabitant of the Coeur d'Alene watershed it may not be present.

Bull trout were documented in nearly 60 streams and river reaches throughout the basin over 60 years ago (USFWS 2002), but have not been observed in many of these streams in recent years. Spawning and rearing appear to be concentrated in relatively few tributaries of the St. Joe River subbasin. Surveys conducted in 1994 and 1995, and more recently, have failed to detect the presence of bull trout within the Coeur d'Alene River subbasin. However, in 1998, two bull trout were caught in Black Lake, which is located in the lower portion of the Coeur d'Alene River subbasin and may provide coldwater refugia and a forage base for bull trout (USFWS 2002). Overall, within the Coeur d'Alene Basin, bull trout persist at low numbers in fragmented local populations (USFWS 2002; USFWS 2015a; USFWS 2015b).

Little is known about the role of Coeur d'Alene Lake in providing habitat for bull trout populations within the Coeur d'Alene Basin. Subadult and adult bull trout inhabit Coeur d'Alene Lake, which provides foraging, migration and overwintering habitat (USFWS 2010). Bull trout may use Blue Creek Bay in conjunction with the rest of Coeur d'Alene Lake though this has not been documented. Bull trout are not known or likely to use Blue Creek, which is small, does not have suitable habitat to support bull trout spawning or rearing, and likely has water temperatures too warm to support bull trout for much of the year. Blue Creek is not bull trout designated critical habitat.

BLM Sensitive Species: Two BLM sensitive fish inhabit the Coeur d'Alene Lake basin, westslope cutthroat trout and the newly described cedar sculpin (Lemoine et al. 2014).

Westslope cutthroat trout inhabit Coeur d'Alene Lake and many of its tributaries, including Blue Creek (Streamnet). They spawn mainly in small tributaries from March through July, when water temperatures warm to about 50°F. Westslope cutthroat trout stocks in the Coeur d'Alene Basin exist at a fraction of historic levels due to habitat degradation from activities such as mining, logging, development, and highway construction. Fishing pressure and introduction of non-native fish species has also contributed to reducing cutthroat numbers (USFWS, 1999; DuPont and Horner, 2003). Due to low numbers, the current fishing regulations for westslope cutthroat trout are catch-and-release in the entire Spokane River drainage, which includes Coeur d'Alene Lake and all tributary streams (Idaho Fish and Game website).

Cedar sculpin were recently described in 2014 as a new species using genetic and morphological methods. They have been found at stream sample sites throughout the Coeur d'Alene basin. Because of morphological similarities among sculpin species, cedar sculpin have been historically confused with the shorthead sculpin. Cedar sculpin are common to abundant in cool to cold tributaries with cobble and gravel bottoms (Lemoine et al. 2014) and are probably spring spawners like other sculpin species (Hendricks 1997). They are likely to inhabit Blue Creek. It is not known if they inhabit Coeur d'Alene Lake. The torrent sculpin, a sympatric species, is known to inhabit rocky shoals and beaches of lakes (Hendricks 1997).

Other Fish Species: Many of the other fish species, both native and introduced, inhabit Blue Creek Bay and some likely use Blue Creek. As with bull trout and cutthroat trout, other native fish species have been affected to some extent by habitat degradation and introduction of non-native fish species.

7.4.2 Environmental Effects from Alternative A (Proposed Action)

Riparian Conservation Areas (RCAs) are lands that are likely to affect the condition and/or function of aquatic habitat, and are usually adjacent to streams, ponds, lakes and wetlands. In RCAs, riparian-dependent resources receive primary emphasis, and management activities are subject to specific guidelines. Impacts to fish and aquatic habitat are most likely to occur if actions are conducted within RCAs.

Disturbance from timber and fuels management activities can result in impacts to fish and aquatic habitat. These activities have the potential to cause an increase in sediment and temperature in streams and to decrease the amount of large downed wood in the stream channel and riparian floodplain (Chamberlain et al. 1991; Everest et al. 1985; Meredith et al. 2014; Benda et al. 2003; Rieman et al. 2003; Wondzell and King 2003). However, since these actions are not proposed to occur within RCAs, fish and aquatic habitat would not be impacted. In addition, improving forest health and implementing fuels treatments would reduce the chance of a large or stand replacing fire to occur in the project area, which would likely burn RCAs and could result in severe long-term impacts fish and aquatic resources (Rieman et al. 2003; Dunham et al. 2003; Gresswell 1999).

The proposed trailheads and trails all occur outside of RCAs with the exception of the trail connecting the east and west side trail systems. There are already several user created trails that cross Blue Creek, so encouraging use of only one of these would reduce impacts that are already occurring. Hardening the crossing and/or adding a footbridge would further reduce any sediment moving into the stream and no trees that provide shade or habitat would be removed. Adding trails to the system and increased parking will likely result in more recreational use of the area. However, since most of the use will be concentrated on the trail system, the additional use would not be expected to impact fish and aquatic habitat.

Threatened and Endangered Species: Lake Coeur d'Alene is designated critical habitat for bull trout and bull trout are known to inhabit the lake. Bull trout are unlikely to use Blue Creek, though subadult and adult bull trout may use Blue Creek Bay for foraging and overwintering. With the exception of improving the trail crossing Blue Creek, the proposed action would not occur within any RCAs and is not anticipated to impact fish or aquatic habitat. None of the proposed action would occur within bull trout critical habitat or would be expected to impact critical habitat. The project would have "no effect" on bull trout or bull trout designated critical habitat.

BLM Sensitive Species: Westslope cutthroat trout inhabit Blue Creek and Coeur d'Alene Lake (Streamnet). It is likely that cedar sculpin inhabit the stream and possibly the lake as well. The project is not expected to impact westslope cutthroat trout, cedar sculpin or their habitat because with the exception of improving the trail crossing Blue Creek, the proposed action would not occur within any RCAs and is not anticipated to impact fish or aquatic habitat.

Other Fish Species: Impacts on other fish species are not expected for the same reason described for sensitive species above.

7.4.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Impacts from Alternative B would be similar to those from Alternative A. There would be fewer disturbances due to less timber harvest, road renovation and trailhead construction. However, there may be a greater chance of a large or stand replacing fire occurring due to less forest health and fuels treatments. Alternative B would not be expected to impact bull trout, designated critical habitat or any other fish species.

7.4.4 Environmental Effects from Alternative C (No Action)

Under this alternative no timber harvest, fuels treatments or recreation development would be implemented, so aquatic habitat conditions would remain in their current condition. However under both Alternative A and B the proposed actions were not anticipated to have impacts to fish or to adversely affect bull trout or their designated critical habitat. In addition, not implementing fuels and forest health treatments may result in a greater possibility of a large or stand replacing fire occurring, which could have harmful effects to the Blue Creek watershed and potentially Coeur d'Alene Lake, and affect both fish and aquatic habitat (impacts of fire are discussed above under the proposed action). If extreme impacts occurred to the watershed either due to immediate direct effects of the fire (such as temperatures reaching lethal levels for fish), or indirect effects (erosion and high levels of sediment moving into the stream or removal of streamside vegetation leading to increased water temperatures and reduced quality of aquatic habitat), it is possible that fish populations in the Blue Creek watershed, including westslope cutthroat trout and cedar sculpin, would be reduced. Impacts to Coeur d'Alene Lake could also occur, including adversely affecting bull trout designated critical habitat.

7.4.5 Cumulative Effects

Westslope cutthroat and bull trout stocks throughout the Coeur d'Alene Basin exist at a fraction of historic levels due to habitat degradation from activities such as logging, agriculture, development, and road construction. These activities have all occurred in the Blue Creek Bay Area, along with recreational activities, such as boating, fishing and hiking. Fishing pressure and introduction of non-native fish species have also contributed to reducing bull trout and cutthroat numbers (USFWS 2015a; USFWS 2015b; DuPont and Horner 2003). All these activities are expected to continue in the present and into the future. Mining, which probably has had the greatest impact on bull trout, westslope cutthroat trout, cedar sculpin and other native fish species, will likely have less of an impact in the future due to stronger regulations and ongoing restoration work occurring throughout the Coeur d'Alene Basin. Fishing pressure on bull trout and westslope cutthroat trout has been reduced due to catch and release regulations set by the Idaho Department of Fish and Game, so effects from fishing also should decrease in the future. Both of the action alternatives could incrementally add to these benefits by reducing the possibility of a large or stand replacing wildfire. Since adverse effects from the action alternatives are not anticipated to occur, no adverse cumulative effects are expected for fish or aquatic habitat.

7.5 Forest Vegetation

7.5.1 Affected Environment

Mosaics of almost all of the conifer tree species that occur in northern Idaho are present in the project area. The analysis area has a wide variety of geography and topography, from heavily

forested mountainous areas to relatively flat prairie land to waterfront. Elevations range from 2100 feet up to 2800 feet.

The BLM Coeur d'Alene Field Office has identified current vegetation cover types for BLM managed lands and has correlated them to Gap Analysis Program which mapped existing natural vegetation to the dominant and co-dominant plant species within the area (BLM 2007). Within the WFCA four principal cover types exist and are represented in a mosaic across the area (see Appendix G: Map 7 *Cover Types*). The cover types mostly consist of dry conifer (510 acres), mixed conifer (76 acres), wet/cold conifer (38 acres) and perennial grass (90 acres) types. Vegetation cover types are used to describe the composition of forest vegetation thus relating to the condition (structure, composition and function) of the forested ecosystem.

Dry conifer types were historically dominated by open ponderosa pine forests that were maintained by low intensity fires occurring on average every 5 to 25 years. Fires consumed needle litter and killed understory trees. With the absence of fire due to suppression and early timber harvesting, a shift in composition from ponderosa pine dominated forest to denser forests of Douglas-fir and grand fir forest has occurred. Mixed conifer stands or wet/warm conifer types historically consisted of early seral species, western larch and western white pine; however currently this cover type is dominated by western red cedar, western hemlock and grand fir. Due to high stand densities, root diseases and blister rust this cover type is unhealthy. The wet/cold conifer type historically consisted of western white pine, western larch and lodgepole pine in lower elevations; however, due to introduction of the blister rust disease, logging and beetles over 90 percent of the white pine was lost (Neuenshwander et al. 1999). This cover type is now in poor health due to the loss of the white pine component and is being replaced by more disease susceptible species, primarily Douglas-fir and grand fir.

Quaking aspen is a widely distributed tree however; it only makes up two (2) percent of the Coeur d'Alene Field Office BLM managed lands and is a very small component of the WFCA. Aspen is an important species for wildlife as it provides habitat for birds and forage for ungulates. The species is relatively short lived and highly susceptible to competition from other understory plants and conifer encroachment. Aspen regeneration requires three fundamental factors hormonal stimulation, environment and protection (Shepperd 2001; Jones et al. 2005). Hormonal Stimulation can be through some type of disturbance (fire, mechanical). Environment references conditions necessary for growth and regeneration (increasing sunlight) and protection refers to protecting new aspen suckers from herbivory (fencing).

Vegetation within the project area prior to the acquisition had been disturbed by past forest management practices (logging, road construction, landings) and agricultural practices (haying and grazing); since BLM's management the primary use of the area has been geared towards recreational use (trails, trailheads, etc.).

The present forest composition is showing signs of decline in overall health and has become overstocked with Douglas-fir, grand fir, and small diameter ponderosa pine. The resulting condition is encroachment by small diameter trees into areas that were historically dominated by large diameter, lower density ponderosa pine and western white pine stands. Overstocking has increased fuel loadings, ladder fuels, and increased moisture stress in effect creating hazardous

fuels conditions within the wildland urban interface. Moisture stress and overstocking have weakened the forest defenses and increased its susceptibility to insect attacks and pathogens (Clark et al. 2016), which continue to kill trees, many of which are located near county roads and along recreation trails.

7.5.2 Environmental Effects from Alternative A (Proposed Action)

Forestry

The proposed action would impact 616 acres of forest vegetation in the existing 751 acres of ownership and would transition the forest closer to its historical species mix, density, and vertical structure, making the area more resilient to insects, disease pathogens, drought stress, and wildfire. Immediately following harvest the residual trees should appear healthy with minimal damage from harvest activities.

Pre-Commerical Thinning (PCT)

Currently there are roughly1125 trees per acre in the less than seven (7) inch size class with the primary species being grand fir. With the proposed action trees in the less than seven (7) inch size class would be thinned to a 16 x16 foot spacing leaving approximately 170 trees per acre favoring early seral ponderosa pine, western larch and western white pine. Early serial species would be more resilient to fire and insect and disease pathogens. By thinning when trees are young, diameter growth would be accelerated, a desired species composition would be maintained and there would be an increase of nutrient availability (Weiskittel 2009).

Variable Density Thinning (VDT)

The proposed action would retain approximately 32 trees per acre following implementation with the largest healthiest trees (≥24" diameter) remaining in the stand. Tree species favored (ponderosa pine, white pine and western larch) would be of a historic species mix creating a more fire resilient landscape. A combination of clumps and scattered individual trees based on prescriptions which would mimic clumped distributions and processes found in pre-settlement stands (Brown et al. 2004) allowing for better structure and function within the remaining stand. In thinned areas, growing space would increase following harvest activities allowing for more available light, water and nutrients to the residual trees (Oliver and Larson 1996) in effect creating a more defensible forest should a wildfire occur. By incorporating small scale skips, standing clumps of dead snags could be retained to provide habitat for wildlife, become future coarse woody debris which is important for nutrient recycling, and to maintain heterogeneity in the cover types across the area. Partial harvesting can often intensify root diseases therefore; small gaps (openings in the forest) can be beneficial in areas that have experienced extensive root diseases, primarily in the Douglas-fir and grand fir.

Aspen Release

Quaking aspen is a shade intolerant species that requires light and disturbance to reproduce and thrive. Without some disturbance aspen often deteriorates and dies. Deterioration results in a loss of soil organic material and thickness (Howard 1996) which is important for nutrient recycling. Within the WFCA the existing aspen is showing signs of deterioration where it has become shaded by mature ponderosa pine trees and competing vegetation. The proposed action would encourage aspen recruitment and increase vigor in the existing aspen.

Selective Cut
The dry conifer forest type historically was dominated by ponderosa pine but over time it has become encroached by Douglas-fir and smaller ponderosa pine. In order to maintain a more historic species distribution and an early seral structure, Douglas-fir and smaller diameter ponderosa pine would be removed. Thinning from below would alter the potential fire behavior by reducing ladder fuels and improving vigor in the dominant and co-dominant overstory trees.

Prescribed Fire
Unit 7 is primarily low elevation, south facing, with slopes ranging from 0 to 65 percent, and has a large ponderosa pine component. Silvicultural prescriptions using fire typically are to reduce concentrations of fine, flammable dead wood from logging or windthrow, to enable reforestation, manage understory species and to protect property from fire (Tappeiner II 2007). Once harvesting is complete it is anticipated that the residual stand will be a more open primarily large diameter ponderosa pine stand with low residual ground fuels due to whole tree harvesting. It is recommended that the use of fire not occur until 1-2 years following harvesting to allow the fine fuels left on-site to decompose and to allow trees that were potentially damaged from harvesting to recover.

Recreation
The proposed action of building new trails in the forested environment could potentially damage root structures of trees adjacent to trails depending on the method of trail construction. It is anticipated that the footprint for the parking area located off of Bonnell Road would overlay the landing/staging areas utilized during harvest activities; therefore no additional impacts to the forest vegetation would occur.

7.5.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Forestry
Silvicultural prescriptions in Alternative B would primarily impact the eastern portion of the ownership (540 Acres). Alternative B would continue to increase and trend away from historical species composition, structure and function on the western portion of the ownership. Trees within the western ownership would be less resilient to fire, insect and pathogen activity and aesthetics could be compromised with increase mortality. Self-thinning would likely occur due to competition for resources potentially leaving an increase of standing dead and downed trees. In addition, leaving the western ownership untreated would increase the likelihood of a stand replacing fire due to the abundance of ladder fuels on-site.

Recreation
Impacts from trail building to the forested environment would be the same as with the Alternative A.

7.5.4 Environmental Effects from Alternative C (No Action)

The no action alternative represents a continuation of the trend away from desired forest vegetation conditions. No harvesting activities would occur and trees would continue to compete for growing space, tree crowns would decrease in size and growth rates would be slowed. If no activities occur to increase the proportion of fire-resilient species and such as ponderosa pine, western larch and western white pine, the species composition would trend toward less resilient

Douglas-fir and grand fir. Stands would continue to self-thin and snag numbers would increase. Increased numbers of snags would add to fire danger incrementally, put users at greater risk along trails and provide some habitat for snag associated species. Understory vegetation would decrease in abundance and species diversity due to the lack of sunlight on the forest floor. The crown fire risk would also increase over time as limbs of the understory trees grow into the crowns of the overstory old growth trees.

7.5.5 Cumulative Effects

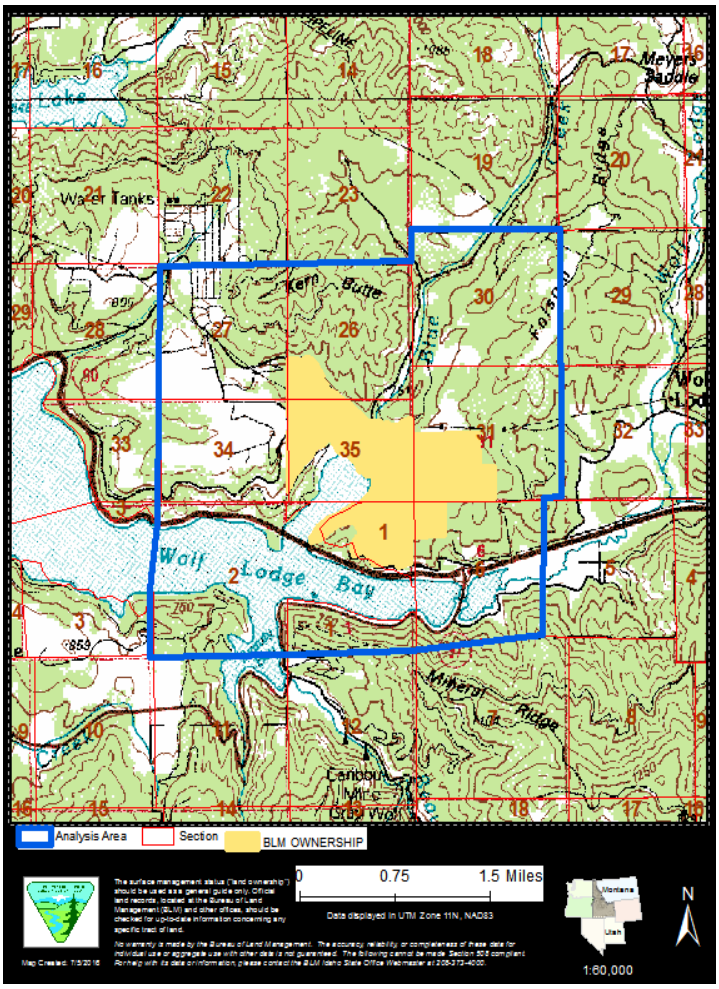


Figure 11. Forest Vegetation Analysis Area

The geographic scope (analysis area) for the vegetation analysis (Figure 10) considers the sections adjacent to and encompassing the project area (5,952 acres). Project level analysis for existing condition and direct, indirect and cumulative effect of the alternatives is the 751 acre block of BLM lands defined in the project area. Based on Kootenai County records the primary ownerships surrounding the project area consist of both residential and commercial properties. Lands adjacent to the western portion of the ownership have seen the most development; typically lands have been used as home sites; however, a substation and powerline parallel the western boundary and bisect portions of the ownership. Forest vegetation has been removed along the 150 foot-wide powerline corridor. Lands to the north and south of the ownership are

primarily forested with scattered home sites. The Interstate 90 corridor and Lake Coeur d'Alene border the sections to the south of the ownership.

Logging activities prior to the BLM ownership have contributed to the shift in species composition on BLM managed lands. By incorporating either of the action alternatives, the area would be better suited to handle the pressures of moisture stress, insect and disease pathogens and wildfire while trending the forest to a more resilient historic species composition.

7.6 Fuels

7.6.1 Affected Environment

Fire Behavior Fuel Models

Scott and Burgan (2005) categorized 40 standard fuel models based on a variety of fuel loadings and distribution that lead to predicted fire behavior outcomes. Fire behavior, such as flame length, surface fire spread, or fire intensity, is dependent on such characteristics as fuel type (e.g. grass, grass-brush, brush, timber litter, timber understory, slash) and fuel loading (size, amount, and distribution). Heavier fuel loadings, such as concentrations of logs or small trees and shrubs, contribute to more intense fire behavior and higher flame lengths. Ladder fuels, in the form of tall brush and young trees in the understory as well as low branches on less fire-resistant species, provide an avenue for surface fire to move upward into the forest canopy thus involving crown fuels.

Fire behavior not only effects the vegetation, but also the ability of firefighting resources to effectively manage or suppress the fire. Flame lengths of 4 feet are considered the threshold for firefighters on the ground to effectively and safely fight fire. Flame lengths above 4 feet require mechanized or aerial firefighting resources. Flame lengths above 8 feet are considered difficult for any firefighting resources to be effective (Andrews and Rothermel 1982).

Fuel conditions in the project area have been classified into 7 of the 40 fire behavior fuel models (Appendix H: Map 89 *Fire Behavior Fuel Models-LANDFIRE 2012*). Approximately 48 percent of the project area is classified into timber fuel models TL3, TL8, TU1, and TU5 (See Table 9), while 52 percent of the project area is currently in a grass or grass/shrub fuel model (GR2, GS2, of SH7).

Four of these fuel models (GR2, TL3, TL8, and TU1) exhibit predominantly surface fire behavior under wildfire conditions, with limited opportunity for fire to get up into the crowns. Fuel model TU5, however, has a high surface fuel loading, in addition to a ladder fuel component that allows fire to move up into and become established in the crowns. Grass-shrub fuel model GS2 and shrub fuel model SH7 also exhibit high flame lengths due to the shrub, or seedling/sapling, ladder fuel component.

Fire behavior was determined for each fuel model using the BEHAVE Plus fire modeling system, under typical fire season weather conditions. Currently, 19 percent of the project area is subject to wildfire flame lengths of 8 feet or greater, where firefighting efforts would be greatly hindered, while only 30% of the project area would exhibit flame lengths below 4 feet, where ground resources are most effective at direct suppression efforts.

Table 8. Current expected flame length* and probability of fire-caused mortality** under typical wildfire scenario.

Fuel Model	Fuel Type	% of area	Flame Length (Ft)	Larch	Ponderosa	Douglas-fir
GR2	Grass	8%	5.7	0	0	0
GS2	Grass/shrub	43%	7.1	16	15	41
SH7	Shrub	1%	17.7	41	80	98
TL3	Timber	<1%	1.2	0	0	0
TL8	Timber	29%	3.9	0	0	0
TU1	Timber	<1%	2.6	0	0	0
TU5	Timber	18%	9.6	41	80	98

*BEHAVE Plus model input includes fuel moistures: 4% 1-hr, 5%10-hr, 6% 100-hr, 30% live herbaceous, 50% live woody; 20ft wind speed 30mph, 35% slope
**80 ft. canopy height, 0.35 crown ratio, 16" dbh, 90 degrees F.

Fire Severity – tree mortality

Tree mortality is used as a measure of fire severity, or stand resiliency, as it represents the ability of a stand to withstand a wildfire. Fire-caused mortality is based on the expected fire behavior, as well as tree species and size class. Direct fire damage including percent crown volume scorched (Stephens and Finney 2002) and bark char have been shown to be key factors in predicting post fire tree mortality (Van Mantgem and Schwartz 2003).

Open ponderosa pine stands on south-southwest facing slopes as well as open dry, mixed conifer stands of ponderosa pine, Douglas-fir, and western larch are typically resistant to the detrimental effects of fire. Occasional trees may succumb to fire, but the stands would remain largely intact. These open stand conditions were historically maintained by low to mixed severity fire, which reduced the surface fuel accumulations, reduced ladder fuels, and prevented the encroachment of less fire resistant species.

Species characteristics, such as bark thickness, root depth, and canopy base height make species such as western larch, ponderosa pine and Douglas-fir resistant to fire damage. Western Larch is most resistant to crown scorch due to the annual replacement of all needles. Douglas-fir is less fire-resistant due to its lower branching habit, which facilitates torching, and shade tolerance, enabling this species to grow in denser stand conditions.

Fire-caused tree mortality was determined for each fuel model using the BEHAVE Plus fire modeling system, under typical fire season weather conditions (See Table 9). Current conditions leading to high fire-caused mortality include smaller average diameter, lower tree height, and high crown ratio (lower limbs). Areas characterized by fuel models with a heavy shrub or small tree component (GS2 and SH7) or high concentrations of dead and down (TU5) would experience high fire-caused mortality. Currently, 20% of the project area is at risk of high mortality (greater than 40%) in the desired ponderosa pine or larch trees and 62% of the project area is at risk of high mortality in the Douglas-fir trees.

7.6.2 Environmental Effects from Alternative A (Proposed Action)

Fire Behavior Fuel Models

Commercial harvest treatments in this alternative would open up canopy fuels, while pre-commercial thinning and understory slashing in the fuel break treatment areas would reduce the ladder fuel component. Piling slash and prescribed burning would reduce surface fuel loading, including 15 acres of private property. These fuel reduction treatments would alter fuel characteristics significantly enough to alter fuel model classifications. Treatments on 616 acres of timber fuel model TU5 would reduce to TU1 and 143 acres of TL8 would effectively move to fuel model TL3.

Removal of the small trees and brush would reduce the shrub component in fuel model GS2 sufficiently to move classification of these areas to grass fuel model GR2, while fuel model SH7 would move to GS2 (See Table 10). Wildfire flame lengths would be less than 4 feet across 82% of the project area, thus providing better opportunities for firefighting resources to directly suppress a wildfire.

Table 9. Post treatment (Proposed Action) expected flame length* and probability of fire-caused mortality** for desired tree species.

Fuel Model	Fuel Type	% of area	Flame Length	Larch	Ponderosa	Douglas-fir
GR2	Grass	8%	9.8	8	7	12
GS2	Grass/shrub	5%	12.8	41	80	98
SH7	Shrub	0%	33.8	41	80	98
TL3	Timber	67%	1.6	0	0	0
TL8	Timber	2%	5.6	0	0	0
TU1	Timber	15%	4.0	0	0	0
TU5	Timber	3%	14.4	41	80	98

*BEHAVE Plus model input includes fuel moistures: 4% 1-hr, 5%10-hr, 6% 100-hr, 30% live herbaceous, 50% live woody; 20ft wind speed 30 mph, 35% slope

*95ft. canopy height, 0.35 crown ratio, 16” dbh, 90 degrees F.

The creation, and maintenance, of the shaded fuel breaks adjacent to private property would provide for more successful fire suppression efforts, thus preventing fire from spreading between the BLM and private property.

Opening up these stands would lead to an increase in solar radiation to surface fuels and an increase in surface winds. Fuel moistures would dry out quicker making these fuels more available to burn, while increased surface winds could cause fires to spread quicker. The resulting fire behavior would see an increase in flame length (See Table 10), although the majority of the post treatment fuel model is a low fuel load timber litter fuel model that exhibits low flame lengths well below the 4’ threshold.

Raymond and Peterson (2005) found that increased fire behavior (i.e. higher flame lengths and faster rates of spread) in these more open stand conditions would result in lower severity due to lower fuel accumulations and less likelihood of crown fire initiation and mortality. Additionally, Graham et al. (2004) found that increased solar radiation along with increased soil nutrient

availability from prescribed burning would promote understory vegetation production in the form of forbs, grasses, and low shrubs. While these live fuels are still green, their higher foliar moisture would have a dampening effect on fire behavior (Agee et al. 2000), but once cured out would contribute to fire behavior.

Fire Severity – tree mortality

The three key drivers of fire behavior and severity are weather, topography, and fuels. Although weather may play a more important role in driving fire behavior, we have the greatest opportunity to influence fuel characteristics through changes in composition and structure. Fire behavior and size that is driven by extreme weather events may be less important than the severity of those fires and fuel treatments should be designed to save those ecosystem elements that have survived historical fires such as the large diameter, fire-resistant ponderosa pine and Douglas-fir trees (Reinhardt et al. 2008; Agee and Skinner 2005).

High probability of fire-caused mortality would be a threat across only 8% of the project area after treatment. The remaining 92% of the project area would see little or no tree mortality as a direct result of fire behavior. This does not account for post fire stress and secondary mortality from insects and pathogens, which can be expected to increase post fire mortality. Commercial thinning would result in release of the overstory trees, increasing tree height and diameter. Understory burning on the south-facing stands would additionally raise the canopy base height by killing the lower limbs of these trees.

7.6.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Fire Behavior Fuel Models

Changes to fire behavior fuel models under Alternative B would be similar to the proposed action, although with no acres treated on the west side of the project area and no understory burning. With the elimination of commercial harvest west of Blue Creek, there would be a 200 foot wide shaded fuel break along the paved road and the BLM property boundary. This fuel break would allow for better fire suppression options to prevent fire from spreading between BLM and private property. With the elimination of the understory burn, surface fuel loadings would not be reduced on 57 acres and no treatment would occur on private property.

Table 10. Post Alternative B treatment expected flame length* and probability of fire-caused mortality** for desired tree species.

Fuel Model	Fuel Type	% of area	Flame Length	Larch	Ponderosa	Douglas-fir
GR2	Grass	8%	9.8	8%	7%	12%
GS2	Grass/shrub	10%	12.8	41%	80%	98%
SH7	Shrub	1%	33.8	41%	80%	98%
TL3	Timber	48%	1.6	0	0	0
TL8	Timber	14%	5.6	0	0	0
TU1	Timber	15%	4.0	0	0	0
TU5	Timber	4%	14.4	41%	80%	98%

*BEHAVE Plus model input includes fuel moistures: 4% 1-hr, 5%10-hr, 6% 100-hr, 30% live herbaceous, 50% live woody; 20ft wind speed 30 mph, 35% slope

*95ft. canopy height, 0.35 crown ratio, 16” dbh, 90 degrees F.

Wildfire flame lengths would be less than 4 feet across 64% of the project area (see Table 11), providing better opportunities for firefighting resources to directly suppress a wildfire, while 23 percent of the project area would still be subject to wildfire flame lengths of 8 feet or greater, where firefighting efforts would be greatly hindered.

Fire Severity – tree mortality

Fuel reduction treatments in Alternative B would result is similar changes to wildfire-caused tree mortality as the proposed action. With fewer acres treated on the west side of the project area, however, high probability of fire-caused mortality would remain a threat across 15% of the project area. The remaining 85% of the project area would see little or no tree mortality as a direct result of fire behavior.

7.6.4 Environmental Effects from Alternative C (No Action)

Fire Behavior Fuel Models

Under the No Action Alternative, both surface litter and ladder fuels would continue to accumulate. As overstory tree species continue to convert from the fire resistant ponderosa pine and western larch toward less fire resistant fir species, increased crown closure and ladder fuels would increase the likelihood of crown fire initiation. Studies have shown that the no treatment option is ineffective in reducing fire severity (Stephens and Moghaddas 2005).

Grass and brush litter would continue to build up in the non-timbered areas. Timbered stands would continue to move toward TU5 fuel conditions. Resulting fire behavior would increase as would opportunities for fire to move upward into the crowns. Wildfires would have greater opportunities to escape control efforts and burn larger areas, extending onto private land and toward houses.

Fire Severity – tree mortality

Higher tree mortality would result from more severe wildfires, and surviving trees would be predisposed to insects and disease mortality (Barrett 1994). As overstory tree species continue to convert from the fire resistant ponderosa pine toward less fire resistant fir and spruce species, mortality would increase as these thin-barked, dense crowned, shallow rooted species are less able to withstand even low severity fires.

7.6.5 Cumulative Effects

This proposed action along with timber harvest and other fuel reduction treatments on adjacent private property would cumulatively reduce the intensity and severity of wildfires burning through the Blue Creek watershed. These treatments tie in with other projects on adjacent lands and the proposed action, and may enhance fire suppression efforts and decrease the overall wildfire severity. Any future development near the project area would benefit from reduced fire risk under the action alternatives because of the added fire protection these alternatives offer. This project, in conjunction with other fuels reduction treatments, would contribute to the improvement of Fire Regime Condition Class (FRCC) across the landscape.

Although the effects of global climate change are not known at the local scale, it can be inferred that conditions in the region of the proposed action will trend toward warmer, drier conditions. This trend would slow down decomposition rates of biomass, leading to increased buildup of

surface fuels. Climate change may also extend the length of fire season, leading to increased fire activity. It can be assumed, therefore, that fuels reduction treatments, particularly within the wildland-urban interface will become even more critical in the future.

The No Action alternative would have no immediate effect on fuel conditions in the project area. However, fuel loadings would accumulate, increased stand density and ladder fuels would continue to increase, and less fire resistant species would eventually dominate most stands. The result is that more of the landscape could sustain fires with greater crown fire potential, and increased tree mortality. Over time fire suppression options would become even more limited, increasing the risk of property and resource damage, and firefighter and public injury.

7.7 Invasive, Non-Native Vegetation

7.7.1 Affected Environment

Invasive weeds threaten our public lands by outcompeting native vegetation and adversely affecting wildland plant and animal communities, damaging watersheds, and increasing soil erosion (Asher, J. and C. Spurrier 1998). Weeds can negatively alter ecosystem processes and impact forest health, sustainability and productivity (Levine et al. 2003; Moser et al. 2009). Historic activities in the project area (primarily roads, logging, and agriculture) created disturbances allowing the invasion of noxious weeds. The majority of the current weed populations are closely associated with these past activities. Main roads, old logging roads and skid trails are common areas to find noxious weed populations. Past agricultural activities (hay production, etc.) have introduced weeds into the meadow adjacent to Blue Creek. Despite these activities, the majority of the Blue Creek Bay property is weed free or has only minor weed infestations. Existing weed populations have been treated regularly for the past decade using both herbicide and biological controls under the BLM decision for the 2008 Coeur d'Alene Field Office Programmatic Environmental Analysis for Vegetation Treatments. These efforts have resulted in an overall reduction in noxious weeds in the area based on staff observations. Inventories of weed populations for the Blue Creek Bay property were conducted as recently as 2011. Listed noxious weeds identified in the project area are listed in Table 11 below.

Table 11. Listed noxious weed species found within the project area.

Spotted knapweed	*Centaurea maculosa*
Common tansy	*Tanacetum vulgare*
Dalmatian toadflax	*Linaria dalmatica ssp. dalmatica*
Meadow hawkweed	*Hieracium caespitosum*
Common mullein	*Verbascum thapsus*
Canada thistle	*Cirsium arvense*
Sulfur cinquefoil	*Potentilla recta*
Oxeye daisy	*Chrysanthemum leucanthemum*
Yellow toadflax	*Linaria vulgaris*
Bull thistle	*Cirsium vulgare*
St Johnswort	*Hypericum perforatum*
Orange hawkweed	*Hieracium auranticum*
Rush skeletonweed	*Chodrilla juncea*

7.7.2 Environmental Effects from Alternative A (Proposed Action)

The proposed 616 acres of vegetation treatments, 6 to 11 miles of new trails, and new parking areas would likely have a direct effect by increasing the localized invasive plant invasion into the project area. Vegetation treatments and related activities including road maintenance, hauling, landing construction including tractor skidding, cable yarding, slash reduction, pre-commercial thinning, fuels reduction and prescribed burning would increase the risk of weed expansion into forest areas. These activities would remove existing vegetation, disturb soils, and increase light to the forest floor, all factors that favor weeds. These same activities can potentially provide transport of weed seeds and plant parts into these disturbed areas. Weeds may also be transported into the project area from offsite weed populations, potentially introducing weeds species that are new to the project area. Vehicle washing described in the design features will minimize the potential for weed spread from off-road vehicles.

The proposed prescribed burning is in a ponderosa dry forest types above East Yellowstone Trail. Broadcast burning in these habitat types has the potential to promote weed invasions through disturbances that increase light and nitrogen (Hunter and Omi 2006).

Established populations of spotted knapweed, rush skeletonweed and Dalmatian toadflax are present in the proposed prescribed burn area. The rocky outcrops and patchy fine fuels in this area would likely result in patchy burn pattern. Fine fuels tend to burn quickly at low temperatures leaving soil seed banks largely intact. There are likely to be significant areas of weed left unconsumed by fire. These remaining weeds and the soil seed bank will provide a seed source that will likely facilitate weed invasion into newly disturbed areas. The combination of resource addition (light and nitrogen), decreased competition, and available seed source have potential to facilitate weed invasion (DeLuca and Zouhar 2000). Herbicide treatments in this area are very difficult due to the steep rocky terrain. Treatments would likely be limited to establish biocontrol insects in parts of the proposed prescribed burn area.

The proposed 6 to 11 miles of recreation trail and trailhead construction would likely have a direct effect by increasing the localized invasive plant invasion into the immediate area. Trail construction disturbs the soil creating available sites for invasive plant establishment. The trailhead construction will likely result in increased invasive species localized to the disturbed construction site. Minor populations of invasive plants exist at the proposed trailhead site. Minimizing the removal of trees and native vegetation during design and construction will reduce the likelihood of weed invasion and/or establishment. Short-term results would likely be an increase in invasive plants following construction of trails and trailheads.

Indirect effects would be caused by increased trail traffic and possible ongoing ground disturbance and possible introduction of new invasive species into the area. Once established, trails also provide a conduit for invasive species spread. Weed seeds or other reproductive plant parts maybe inadvertently carried into new areas by cyclists, equestrian use, hikers, pets and/or wildlife. Monitoring of trails and trailheads will identify areas to be treated. Long-term results due to proposed recreation activities will likely be no net increase or a decrease in invasive species due to increased monitoring, treatments and minimization of unregulated ground disturbing activities.

7.7.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Impacts from forestry treatments described in Alternative A would not occur in the Western portion of the Project Area. Without forestry treatments in the western portion of the project area, fuel loading would continue to increase over time and with it increased risk of severe fire. A severe fire would remove competing vegetation and create areas of exposed soils leaving a burned area primed for noxious weed invasion. Noxious weed populations exist on BLM lands as well as on private lands adjacent to the project area. These populations of noxious weeds would likely provide a weed seed source and increase the likelihood of increased weed establishment following a fire. The increased fuel loading and existing weed populations combine to create a potential for weed infestation of burned areas following a fire event.

Impacts from treatments in the eastern portion of the project area would remain as described in Alternative A with the exception of prescribed burning impacts. No prescribed burning would allow weeds to continue to expand along the dry west-facing slope above Yellowstone road. However the rate of weed spread would be significantly less than the rate of weed spread following the prescribed fire proposed in Alternative A.

No parking area construction off Bonnell Road would reduce ground disturbance in the area and result in less opportunities for weed establishment. Impacts from trail construction and use would remain as described in Alternative A.

7.7.4 Environmental Effects from Alternative C (No Action)

No action would result in current population of weeds continuing to expand along roads and existing trails. In dry conifer forests weeds can expand from existing populations into forested areas often spread by wildlife and/or human activity such as recreational use. In wet warm conifer areas, assuming little to no disturbance, expansion of weed populations into forested areas is unlikely due to low light levels reaching the forest floor.

No action in the project area would result in increased fuel loading and with it increased risk of severe fire. A severe fire would remove competing vegetation and create areas of exposed soils would leave a burned area primed for noxious weed invasion. Noxious weed populations exist on BLM lands as well as on private lands adjacent to the project area. These populations of noxious weeds would likely provide a weed seed source and increase the likelihood of weed establishment following a fire. The increased fuel loading and untreated weed populations combine to create a potential for weed infestation of burned areas following a fire event.

7.7.5 Cumulative Effects

The cumulative effects analysis area is the blue creek watershed because noxious weeds are a regional issue and weed infestations occur on adjacent lands. There are many factors in the analysis area that contribute to the spread of noxious weeds including: logging, wildlife, wildland fires, recreation, roads and other uses in the watershed area. It is anticipated that new weeds will continue to invade public lands and other lands from various sources. Existing infestations on BLM lands will continue to be treated aggressively until they are controlled, contained, or eradicated.Past events such as road-building and use; logging; and recreational activity have contributed to weed invasion on BLM and non-BLM lands. Where left untreated, these weeds may have persisted and continued to threaten native plant communities; although in areas where plant canopy has provided sufficiently shaded conditions, weeds may have not established or decreased in extent over time. Where effective treatment has occurred, weeds have

been either eradicated or their spread into native vegetation was curtailed. Ongoing and reasonably foreseeable actions on non-BLM land which would increase the threat of weed invasion into native plant communities include road-building and use; logging; fire; wildlife, and recreational activity.

The short term effects of the proposed action may result in increased weed establishment and spread in areas of ground disturbance. Over the long term, established trails may provide avenues for weed seed dispersal into the project area.

Alternatively, the trails will provide increased access for weed control activities such as monitoring and treatment. The control efforts undertaken by BLM on public lands would reduce noxious weeds in the watershed. None of the alternatives would appreciable accelerate the spread of noxious weeds over the existing trend.

Noxious weed control efforts in the project area would be conducted as part of the Inland Empire Cooperative Weed Management Area (IECWMA). These cooperators have noxious weed control responsibilities and interests on adjacent and co-mingled lands in the area. Uncontrolled weed populations in one jurisdiction greatly affect the ability of other land managers to control weeds on lands they administer. The IECWMA promotes an integrated weed management program throughout the area that includes public relations, education and training in the noxious weed arena, along with coordination of weed control efforts and methods, and sharing of resources.

7.8 Public Health and Safety

7.8.1 Affected Environment

Interstate 90 (I-90) is a main traffic artery that travels east and west from the Coeur d'Alene area. I-90 receives a high amount of traffic and can become congested quickly. The project area is adjacent to I-90 with an exit that leads to the WFCA via two lane Kootenai County maintained roads. Several roads (E. Yellowstone Trail, E. Sunnyside, E. Bonnell and the Landing Road) provide access through and around the project area and vary in surface types, from paved to gravel. These roads have blind corners, few pullouts and often no shoulders. The roads are highly used by local residents that live in the area, by bicyclists and by the public that come to the WFCA to recreate and access Lake Coeur d'Alene.

7.8.2 Environmental Effects from Alternative A (Proposed Action)

The proposed vegetation treatments would increase logging traffic on the roads used daily by the local residents and recreationalists. The increase in logging traffic could result in a higher risk of traffic accidents with large trucks; however, only qualified commercial drivers would be hauling logs from the site to reduce the risk of traffic accidents. Additionally, in order to protect the public during hauling operations, dust abetment measures would be implemented to reduce the impacts of excess dust on affected roadways and traffic warning signs would be utilized.

Visibility along I-90 and the county roads would temporarily be affected from the proposed prescribed burn. With the location of the burn being along the southern end of the property, smoke is likely to cross the Interstate and County roads hindering driver visibility. Due to the high traffic on the road throughout the year, a reduction in visibility would increase the risk of a traffic accident.

Portions of the hillside proposed for burning are very steep and rocky. Rocks are often dislodged and tumble to the county road. During burning activities firefighter personnel could be at risk due to falling rocks and reduced visibility. Following burning, the roadway is likely to have an increase in falling rocks due to lack of vegetation securing rocks on the hillside.

With more trails and parking areas proposed, recreation use is likely to increase. An increase in recreation use would also increase the amount of traffic on the local roads such as Yellowstone and Bonnell. Some of the roads that could see an increase in traffic have narrow travel surfaces with steep unprotected edges.

7.8.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

With the reduction of harvest acres fewer log trucks would be operating thus reducing the exposure of log trucks on the roadways. All dust abatement and safety measures would remain the same for Alternative B.

Prescribed burning would not occur; therefore there will be no issues with visibility due to smoke and vegetation would remain intact reducing the potential for increased rocks on the road.

The west side of the property would likely see an increase in use with the construction of a new trail system. Parking is limited to the shoulder of Bonnell Road, and more people would be likely to park on the shoulder of the road to access the new trails from the top. With no parking area, visitors would be forced to park on narrow shoulders within the road right-of-way, thereby increasing the risk of traffic related incidences.

7.8.4 Environmental Effects from Alternative C (No Action)

No forestry treatments would occur, therefore no log truck activity would occur on the roadways and there would be no risk to the public. Without treating the dead and dying trees, mortality would continue to take place increasing the amount of dead trees (snags) near established trails thereby increasing exposure of recreational users.

7.8.5 Cumulative Effects

Overtime, continued population growth of the surrounding Coeur d'Alene/Spokane area would contribute to greater visitation and use of the WFCA. Such a shift could result in more traffic type accidents along with potential for recreation activity related accidents. According to the Idaho Transportation Department in 2014, 77% of fatal motor vehicle accidents occurred on rural roadways. Both Alternative A and B would address parking and trail use, with the anticipation of increased use of the roadways this could impact public safety by increasing drivers on rural roadways.

7.9 Recreation

7.9.1 Affected Environment

The WFCA is located around Blue Creek Bay of Lake Coeur d'Alene which offers a variety of day-use non-motorized recreation opportunities which include hiking, mountain biking, horseback riding, wildlife viewing, water front activities, etc. The WFCA is located near Coeur d' Alene, ID and is adjacent to Blue Creek Bay on Lake Coeur d' Alene. With the WFCA being

close to the city, and within a short commuting distance, opportunities to visit the site to recreate are high.

The hiking trails consist primarily of looped trails with several opportunities to view the east end of Lake Coeur d'Alene. The trails are primarily used by the public to experience a forest setting and feel close to the environment where trees, plants, and animals are viewed in their habitat. The general public, schools, and other organized groups regularly use the site for outdoor activities and environmental education. The parking areas allow for large groups to access the trail system with amenities e.g., trash receptacles and restrooms available.

The WFCA has three trail heads currently being used as access for day-use recreation. The sites include graveled parking, vault toilets, information kiosks and signs, outdoor amphitheater, docks, and a picnic area located on the old log landing road. The picnic site includes picnic tables, trash receptacles, and grills with an ADA/ABA accessible dock.

The area receives visitors all year with visitation heavier in late spring, summer, and fall when conditions are relatively dry. The blue trail's counter data shows the winter months averaging 450 visitors per month with the visitor counts rising to 775 visitors per month in the summer (See Figure 11, 2016 Blue Trail Visitor Counts).

The WFCA's existing recreation improvements were planned in 2009 through the Blue Creek Bay Recreation Project Plan Environmental Assessment (EA). Later in 2011 supplementary rules were implemented due to concerns for public health and safety, and to provide long-term public recreational access to the property (see Section 7.1.2).

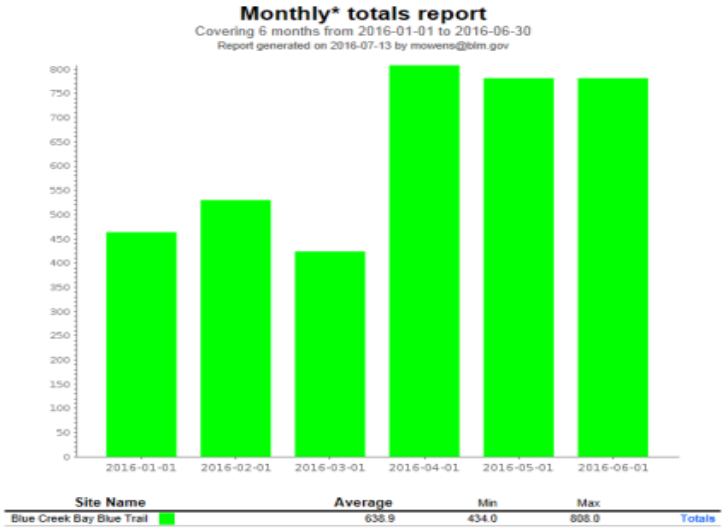


Figure 12. 2016 Blue Trail Visitor Counts

7.9.2 Environmental Effects from Alternative A (Proposed Action)

The WFCA is a popular recreation site within close proximity of Coeur d' Alene. Due to the popularity of the area, visitors are likely to show up at the trailheads and be in the area during project implementation when portions of the site are closed. For these visitors to find similar recreational opportunities on BLM lands they would need to visit other nearby recreation sites such as the Mineral Ridge Trailhead, Beauty Bay Recreation Site, or nearby Forest Service trails. These potentially displaced visitors would be informed and directed about other trails in the area via maps, bulletins, word-of-mouth, etc. The fuel and forestry projects would be accomplished in phases, and with the large size of the WFCA, portions of the WFCA could remain open. Leaving portions of the WFCA open would help minimize visitor displacement. The visitor impacts and displacement would be limited to the time and area within the phase and sections being treated. Once the sections are treated, and it is safe for recreating, the site would be reopened. Therefore,

impacts would not be significant with the consideration of long-term benefits of forest health and infrastructure protection.

With increased trails, parking and infrastructure the potential for more visitor-use increases. Therefore, the amount of traffic in the Blue Creek Bay area would potentially go up. The traffic could also potentially increase on the Yellowstone and Bonnell Roads due to recreationalists shuttling the trail systems. There would also be an increase in recreation opportunities with the expansion of trails and parking. The trail expansion would have designations to help reduce user conflicts.

Due to the visitation at the WFCA a significant amount of routine maintenance is needed. The RMP classifies the site as a Maintenance Level 2 (ML 2: Moderate Maintenance Intensity). The RMP states (p.48) that, "Recreation facilities will be maintained in good condition (defined as safe, clean appearing, and functional for the intended use level and purpose) at the indicated maintenance level." (BLM 2007) The Proposed Action would help protect the trails, facility infrastructure, and surrounding forest from wildfire. The Proposed Action would also help protect the scenic and recreational values from the dangers of wildfire and forest health related issues.

The areas treated near the trail would provide for future opportunities to add environmental education on forest health and recovery.

7.9.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Impacts would be the same as those identified under the analysis for the proposed action with the exception of the Bonnell Parking being removed. Recreationalist would either continue to park on the shoulder of Bonnell road or park at one of the other trailheads to access the trails on the west side. Mountain bikers would have to travel uphill on the multiple-use trail to access the downhill mountain bike only trails.

7.9.4 Environmental Effects from Alternative C (No Action)

The site would continue to see visitors to the area with the current forest condition. The No Action Alternative would leave the fuel load as it is which increases the risk of a stand-replacing wildfire or decrease in forest health. These outcomes would lead to decreased recreation in the area and damaged infrastructure at the trailheads. Recovery may take decades for the forest habitat to regenerate. It would also take years to rebuild the recreation area due to the costs associated with replacing developed infrastructure if damaged or loss. The user-created trails would continue to be used, and none of the benefits from the recreation improvements would occur.

7.9.5 Cumulative Effects

Newly developed trailheads and trails with: delineated parking, informative kiosks, hardened trails, restrooms, located near urban areas, and paved access, would likely attract recreationists to the areas increasing the use.

Recreation activities occurring in the vicinity of the project area involve a broad spectrum of pursuits ranging from dispersed and casual recreation to organized, BLM-permitted group

uses. Typical recreation in the region includes scenic driving, hiking, wildlife viewing, horseback riding, mountain biking, picnicking, and photography. The region also includes other BLM recreation areas such as the Mineral Ridge trail that receives thousands of visitors per month and is part of the National Trails System.

Interstate 90 is a major traffic artery through the Lake Coeur d'Alene area. This Interstate follows portions of the lake and runs adjacent to Blue Creek Bay. Recreation sites along the lake are known to be moderate-highly developed providing parking, restrooms, hardened trails along with other amenities for recreationalists e.g., boat launches, wildlife viewing platforms, etc. The WFCA also provides opportunities for those seeking more organized or packaged recreation experiences with its diversified recreation opportunities. Thus, in the long term, the forestry treatments and recreation developments would improve opportunities for recreation in close proximity to Coeur d'Alene.

7.10 Socio-Economics

7.10.1 Affected Environment

The study area for social and economic effects of the proposed project encompasses Kootenai County (841,600 acres) and includes approximately 363,000 acres of public land (federal, tribal, and state) (Kootenai County 2010) . Over the last five years Kootenai County's population has risen 8.6% according to the US Census Bureau (2015) with the majority of growth occurring in Coeur d'Alene. Since the City of Coeur d'Alene is the closest major city to the project area, consideration with regards to future development and recreation demands will be considered.

The City of Coeur d'Alene's Comprehensive plan (2007) identifies four goals and objectives for the city over the next twenty years. The first two goals include: "supporting polices that preserve the beauty of the natural environment" and "promoting opportunities for economic growth". Year-round outdoor recreational opportunities that provide scenic view and vistas are considered silent economic drivers for the community.

By providing recreational opportunities, such as designated trail systems, communities often see economic boosts through increased tourism. The Outdoor Industry Association in a recent study displayed that Outdoor recreation is a large and critical sector of the American economy. The recreation market has many avenues to generate income. The outdoor industry pumps $646 billion in direct spending into the American economy which fuels traditional sectors like manufacturing, finance, retail trade, tourism and travel. The economic benefits of outdoor recreation in Idaho are: 6.3 billion in consumer spending, 77 thousand direct Idaho jobs, $1.8 billion in wages and salaries, and $461 million in state and local tax revenue (Outdoor Industry Association 2016). "Communities and counties near public lands outperform areas without public lands in economic performance measures including employment, income growth, and property values" (National Wildlife Federation 2013). Coeur d'Alene is a recreation destination for many travelers, and having attractive recreation areas brings more visitors who spend outside dollars into the local economy.

The discussion below estimates "real" dollars that would be derived from the project.

While the number of times that a dollar is cycled through the community is not projected, each dollar winds up benefitting several people and/or businesses as it is used to cover wages, supplies, operating expenses, living expenses, etc.

7.10.2 Environmental Effects from Alternative A (Proposed Action)

Forestry

The project would contribute to the local economy by providing jobs needed to accomplish the work described in the Proposed Action and by providing forest products (estimated 2 million board feet) to local sawmills and other manufacturers ranging from Kootenai County south to Benewah County and east to Shoshone County (depending on who purchases the various forest products derived from the project area).

The various forest products that would result from implementing the Proposed Action range from saw logs, studs from hew wood, hog fuel for cogeneration plants, pulp, chips for strand board, posts, poles, biomass and firewood. Due to the volatility of the wood product market, an accurate estimate of the type of forest products, quantity of forest products and the value of these products cannot be made. However, saw logs and hew wood quantities can be estimated as these are the most common forest products to arrive at an estimated forest product value. This estimated value would reflect the potential minimum value of forest products which would be removed from the project area based on the criteria in the proposed action.

Using July 2016 average delivered log prices for sawlogs and hew wood, it is estimated that the value of saw logs and hew wood removed from the sale area would be approximately $800,000.00. Value is determined by delivered log price. This is the amount a mill pays to loggers and/or land owners for wood delivered to the mill. Most often the basis for payment is either board feet or tons. No estimate of quantity is being made of other than for forest products that would be removed from the project area. However, any other forest products removed from the project area, such as biomass, would provide additional economic support to the local community. It is difficult to arrive at a total value for all forest products and to estimate how much more economic value is poured into the local economy from these manufacturers. For purposes of this discussion, it was assumed that two-thirds of the final product value covers the cost of getting it to the manufacturer (in this case delivered log price). Based on the above discussion, the sale of forest products would add another $50,000 to $75,000 to the local economy.

Recreation

Coeur d'Alene would benefit from having more outdoor recreational opportunities close to the community. There are businesses that rely on income generated from outdoor recreation related tourism. In addition, those businesses that provide food and lodging would also benefit if more visitors desired to recreate in the Coeur d'Alene area. Communities and homes near trail systems are sought after by new home buyers. They are an amenity that brings value economically and physically. In 2008 the National Association of Homebuilders stated, "Trails consistently remain the number one community amenity sought by prospective homeowners." Then later in 2013 stated, "Three community features would seriously influence the purchase decision of at least half of all buyers: walking/jogging trails 60 percent…" (National Association of Homebuilders 2013)

The Proposed Action Alternative is expected to enhance opportunities for wildlife associated recreation, which may include such activities as birding, wildlife viewing and improved walk-in access for archery hunting. While backyard birders are the most prevalent form of birding, many birders travel more than a mile from home to visit public lands. The network of trails in close proximity to population centers would facilitate birding and other wildlife viewing opportunities. Birders and other wildlife associated recreation can bring money into the local economies on a variety of goods and services for trip-related expenditures including food, lodging, and transportation. In 2011, the USFWS completed a comprehensive survey, which revealed that over 90 million U.S. residents 16 years old and older participated in wildlife-related recreation. During that year, 33.1 million people fished, 13.7 million hunted, and 71.8 million participated in at least one type of wildlife-watching activity including observing, feeding, or photographing fish and other wildlife in the United States (USFWS 2011 and USFWS 2011-1).

7.10.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Forestry

The project would still contribute to the local economy by removing approximately 1.6 million board feet on the eastern portion of the ownership, however; with the reduction harvest acres and volume removed it is anticipated that approximately $200,000 would be lost to the local community.

Recreation

Impacts would be the same as those identified under the analysis for the proposed action with the exception of the Bonnell Parking being removed. Recreationalist would either continue to park on the shoulder of Bonnell Road or park at one of the other trailheads to access the trails on the west side.

7.10.4 Environmental Effects from Alternative C (No Action)

Forestry

The economic benefits from Alternative A and B would not occur.

7.10.5 Cumulative Effects

Forestry

It is difficult to quantify monetary benefits from the private, State, BLM and USFS managed lands in the cumulative effect area due to volatility of delivered log prices. The proposed project is expected to bolster the economy of the area by providing additional raw material to manufacturers, creating or increasing jobs. Increased supply of raw material would help hold down prices for finished products.

Recreation

The Coeur d'Alene, ID and Spokane, WA areas receive outside money through tourism and tourism related activities. These areas will likely see benefits from the increased use of the trails by people that live outside the area. An authorized trail network that functions well is appealing to recreationalists, therefore boosting the amount of traveling outdoor enthusiasts to stop in the area to recreate.

7.11 Soils and Water

7.11.1 Affected Environment

Water Quality

The mean annual precipitation in the project area is 25 inches per year. Primary drainages within the project area are Blue Creek, Sunnyside Creek and Folsom Creek. The latter two are intermittent tributaries and are conveyed through culverts under East Yellowstone Trail to their confluences with Blue Creek. In addition, there are several springs, seeps and ephemeral channels within the project area.

These streams have been heavily impacted by many past and present factors including: straightening and berm construction along Blue Creek to create a hay field, livestock grazing, road construction, timber harvest, flooding, and residential development. There have also recently been activities and projects within the vicinity that have improved water quality by reducing sediment input to Blue Creek Bay (see Section 7.1.2 above).

Soils

As described in the NRCS soil survey (USDA 2002) soils on the project area are generally classified as deep and well-drained loams. Landforms range from ridges to mountain slopes, with stony loams, to silt loams in the meadow and drainage ways. They consist of weathered material derived from meta-sedimentary bedrock, or from basalt. All have a mantle of volcanic ash and loess. The hazard of water erosion is rated as moderate in surface and severe in subsoil. Other potential hazards related to the proposed action are described below.

Previous road building, development, and timber harvest activities have impacted soils in the project area (see Section 7.1.2).

Potential for Damage by Fire

Prescribed burning is a restoration practice that is primarily designed to help return the natural fire cycle to the landscape. Properly carried out on suitable sites, burning can be a very effective and cost efficient treatment method to help restore the desired composition of plant species in an ecological site, reduce fuel loading, rejuvenate sprouting browse species and stagnant grass plants, release nutrients into the soil, and prepare an ash seedbed for artificial or natural seeding.

Within the project area, all of the soil types have a “low” rating for susceptibility to potential damage by fire.

Potential for damage by fire, as defined in the soil survey, “involves an evaluation of the impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer. The potential damage ratings are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope.” (USDA 2002) "Highly susceptible" indicates that the soil has one or more features that are very favorable for soil damage by fire (USDA 2002). The ratings are directly related to burn severity (e.g. a low-moderate severity burn will not result in water repellant layer formation).

Susceptibility to compaction
Compaction tends to reduce water infiltration which affects plant production and composition, increases runoff which generally increased erosion rates, and affects organisms living within the soil. Compaction is predominantly influenced by moisture content, depth to saturation, percent of sand, silt, and clay, soil structure, organic matter content, and content of coarse fragments.
The project area soils are rated as "low resistance" to compaction, which indicates that the soil has one or more features that favor the formation of a compacted layer.

Soil compaction associated with logging occurs in response to pressure exerted by machinery. The risk for compaction is greatest when soils are wet. Compacted soil usually allows less water to infiltrate, resulting in greater overland flow, with greater energy to transport soil particles, resulting in increased erosion. Soil texture affects the potential for soil compaction, which also can reduce plant productivity. In general, finer-grained soils can withstand less soil compaction before rooting restrictions occur (Megahan 2004).

7.11.2 Environment Effects from Alternative A (Proposed Action)

Water Resources, including Water Quality
The proposed action would result in short term and minimal impacts to water quality. Re-establishment of grasses and shrubs in the first year after completion of timber hauling will typically reduce temporary surface erosion, provided proper drainage BMPs are applied. The 2.6 miles of haul roads that would be maintained post- harvest would only be used for administrative use. Generally, under this limited frequency and type of use, although increased over existing conditions, with re-establishment of grasses, surface erosion from these roads would be minimal. Use of no- harvest buffers will also effectively limit sediment delivery efficiency to streams from harvest activities as well as recreational trails.

The timber harvest activities would minimize impacts to soil and water quality through contract stipulations and BMPs, including: restrictions on operating when soil moisture is greater than 25%, proper spacing of skid trails; limiting tractor yarding to slopes of 45% or less, and installing waterbars and other drainage measures as recommended by the hydrology or fisheries specialists.

Due to the drainage characteristics described in the Affected Environment, the BMPs and contract requirements described above, as well as the wide, untreated buffer area between the ground disturbing activities and any water courses, sediment delivery to a stream is unlikely.

The possibility of a large stand replacing fire occurring is reduced under this alternative, this would result in a reduced potential of post-fire soil loss and sediment delivery to the stream channels in the project area.

Soils
Reconstruction of roads would have the greatest impact on soils, followed by tractor and cable logging. In addition, construction of parking areas would result in a loss of soil productivity.

Megahan et al. (2004) summarizes the reported soil disturbance from various logging systems in the Pacific Northwest and British Columbia; he found an average of 21 percent from tractor logging, 13 percent from ground cable logging, 8 percent for skyline logging, and 4 percent for

aerial logging. Prescribed burning generally would have a much lower impact. Road and skid trails would contribute most to cumulative erosion per acre of ground disturbance, but erosion would decline to negligible levels after decommissioning.

Much of the tractor ground is located near a ridge top where gentle slopes and rock outcrops would minimize soil displacement, erosion and overland transport. The prescribed burns will be of low to moderate intensity to reduce the potential for fire damage to the soil and subsequent erosion.

An exception would be the proposed broadcast burn in unit 7: portions of this unit are prone to rock fall directly on to East Yellowstone Trail. There is very little vegetation other than grass to stop or slow a rolling rock. The lower portion of the slope dips steeply towards the road. Burning would exacerbate the existing danger of falling rocks and increased surface erosion.

This alternative would reduce the potential of a stand-replacing fire and the related impacts to soil, such as physical alteration of soil structure and development of hydrophobic layers, as well as effects from mechanized suppression activities and subsequent salvage logging.

7.11.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Water Resources, including Water Quality

Effects to water quality would be similar to those described for Alternative A above, except there would be no effects from prescribed burning, and the untreated 135 acres would remain vulnerable to stand-replacing fire and its effects.

Soils

Effects to soils would be similar to those described for Alternative A above, except there would be no effects from prescribed burning, and the untreated 135 acres would remain vulnerable to stand-replacing fire and its effects. Also, there would be less effects to soil (compaction) without construction of the parking area on Bonnel Rd.

7.11.4 Environmental Effects from Alternative C (No Action)

Water Resources, including Water Quality

No timber harvest, burning or road construction would occur; consequently, soil and water quality would be unchanged from current conditions. The possibility of a large stand replacing fire occurring is slightly higher under this alternative, which could result in a substantial increase in soil loss and sediment delivery to the stream channels in the project area.

Soils

Under the No Action alternative**,** no soil compaction or displacement would occur as a consequence of road reconstruction, timber harvest, or fuel reduction activities. Existing soil compaction and displacement would persist with very slight natural recovery of surface layers of compacted soils.

The continued accumulation of dead and down fuel loads could contribute to increased potential for locally severe fire effects on soil, including physical alteration of soil structure and development of hydrophobic layers. If wildfire occurred, mechanized suppression activities and

subsequent salvage logging could create severe soil impacts, depending on fire characteristics and administrative decisions.

Reasonably foreseeable future natural disturbances and land use actions that would affect soils in the analysis area include: road use by passenger vehicles; fire suppression; mountain bike and equestrian use of roads and trails; and powerline corridor maintenance.

7.11.5 Cumulative Effects

Water Resources, including Water Quality

Within the Blue Creek watershed, historic and recent activities that affect water quality (such as past stream alteration, logging, road construction, grazing and wildfires (see Section 7.1.2) continue to occur, although at diminishing intensities. Public roads continue to encroach on Blue Creek, Sunnyside Creek, and Folsom Creek, limiting the size and proper functioning of their flood plains, elevating sediment delivery to the streams and Blue Creek Bay. The proposed action and Alternative B would contribute only short term and minimal increase to the existing sediment conditions. Under Alternative C, should a stand-replacing fire occur, the impacts identified above would constitute a major contributor to cumulative impacts to water quality.

Soils

Past and present activities affecting soil resources would be similar to those identified for water quality. The parking area and permanent road construction and improvements would result in small additional area of lost soil productivity, slightly less under Alternative B due to no construction of Bonnell parking area. Loss soil productivity from temporary road construction would be mitigated by road reclamation following project activities. Under Alternative C, should a stand-replacing fire occur, the impacts identified above would constitute a major contributor to cumulative impacts to soil resources.

7.12 Vegetation Communities, including Special Status Plant Species

7.12.1 Affected Environment

Vegetation Communities, including Special Status Plant Species

A mosaic of plant communities currently grows in the project area, primarily due to differences in plant growth requirements; soil type/geology; moisture gradient; changes in slope aspect; and disturbance history, particularly fire, logging, and small-scale agriculture. The driest sites support primarily shrub and/or herbaceous plants, with only widely-spaced trees present, though tree density is increasing, as the interval between disturbance events has lengthened. In general, warm, dry forest habitats in the project area are dominated by a mixture of ponderosa pine, Douglas-fir, and shrubs and herbaceous species typically found in northern Idaho. However, where ecological succession has resulted in more moderate forest stand conditions, especially as the tree canopy moves toward closure, species with a higher moisture requirement, such as grand fir, have successfully established. Plant density also has increased where the fire return interval has lengthened, resulting in more ingrowth of small-diameter trees and shade tolerant species. These habitats can be vulnerable to invasion and spread of weeds, which compete with native species for growing space, light, water, nutrients, or pollinators. Section 7.8 describes the existing condition and trend of invasive species in the project area. Project area upland forest communities that occupy warm, moist sites are characterized by the presence of grand fir, western redcedar, western hemlock; and associated shrub and herbaceous species. Where

succession has re-started after recent disturbance, such as a fallen tree, these areas may have become quite dense with sapling and pole-sized trees as well as site-adapted shrubs. The forest communities at Blue Creek Bay have been impacted by a variety of disturbances including insect and disease outbreaks, and extreme weather events. The project area also includes riparian, wetland, aspen, and meadow (formerly used as a hayfield) communities.

Idaho BLM Special Status Plants

The Idaho Natural Heritage Program database was searched for known occurrences of rare plants in the project area. Field work has been done the past two years at Blue Creek Bay.

No water howellia (*Howellia aquatilis*-threatened) individuals, populations, or potential habitat occur in the project area. This species will not be affected and there is no further discussion about it in this document.

No individuals or populations of Spalding's catchfly (*Silene spaldingii*-threatened) were found in the project area, although suitable habitat occurs in Unit 7 in the grass-dominated and open Ponderosa pine communities on the ridgeline above East Yellowstone Trail and Interstate 90. (USFWS 2007) Shrubs and trees are invading portions of this habitat due to change in the natural disturbance regime, which has allowed ecological succession to proceed. Portions of these drier habitats also have been invaded by weeds, usually where disturbance has occurred.

No whitebark pine (*Pinus albicaulis*-candidate) individuals, populations, or potential habitat occur in the project area. This species will not be affected and there is no further discussion about it in this document.

Bank monkeyflower (*Mimulus clivicola*) is a member of the figwort or snapdragon family. A population has been documented about five miles southeast of the project area in the vicinity of Red Horse Mountain. This is a tiny annual plant found only in north and central Idaho, and far eastern Oregon. This species generally occupies sunny, steep slopes, growing on bare mineral soil among shrubs and scattered trees. Bank monkeyflower appears to be somewhat tolerant of smaller-scale disturbance such as that which is associated with game trails. No bank monkeyflower individuals or populations have been found in the project area, but potential habitat occurs in the grass- and shrub-dominated plant communities and driest, open forest stands. (Lorain 1991)

Clustered lady's-slipper (*Cypripedium fasciculatum*) is a perennial, terrestrial, wild orchid. In Idaho, this species usually blooms from May through June. Clustered lady's-slipper mainly grows in shaded, moist to dry western redcedar forests and occasionally in grand fir forests. A small population occurs within the project area, and a second, smaller population grows within the Mineral Ridge recreation site. The locations of both populations indicate that this species can also occur in drier seral stands of Douglas-fir, often underneath larger shrubs. This species grows from elevations of 1,700 to 4,600 feet. (Lichthardt 2003; Hammet 2008)

Deerfern (*Blechnum spicant*) is a perennial, evergreen fern, which usually grows in moist, shaded forests. This is a wide-ranging species, occurring in the boreal regions of both western and eastern hemispheres. In North America, deerfern is chiefly found west of the Cascade

Mountains of the Pacific Northwest but does extend south into northern California. Disjunct populations are known from northern Idaho, including the Deception Creek area northeast of the project area. No deerfern individuals or populations occur in the project area, though potential habitat occurs in the more moist forest stands. (USDA Forest Service 2015)

Pine broomrape (*Orobanche pinorum*) is a plant that lacks chlorophyll and obtains its nutrients by parasitizing other plants. It occurs only in western North America, from northern California to Oregon and north to central Washington and through northern Idaho (Ellis et al. 1999). Pine broomrape is uncommon throughout Idaho, Washington, and British Columbia but is apparently secure in Oregon. In Idaho, it is a root parasite of oceanspray shrubs (*Holodiscus discolor*). (NatureServe 2015) Two small occurrences of this plant have been found in the project area.

7.12.2 Environmental Effects from Alternative A (Proposed Action)

Vegetation Communities, including Special Status Plant Species

Vegetation Communities

The proposed action would change the species composition, vertical structure, and density of forest vegetation on approximately 616 acres through selective harvest, thinning, mechanical fuels treatment, burning, and reforestation.

Harvest Operations, Thinning, and Mechanical Fuels Treatment

Some site vegetation would be killed (for example, trees that are cut; ingrowth that is thinned) or injured during project operations (for example, retention trees marred by logging equipment or by felling activities). Reducing the average number of trees per acre in the project area would open the forest canopy and favor plant species adapted to warmer, drier growing conditions, while other shade-tolerant plant species would be negatively impacted, such as by sun scalding. (Hagle et al. 2003) Thinning dense trees would reduce the intense competition for water, sunlight, and nutrients which the desired tree species and size classes are currently experiencing. Conifer tree species composition would shift toward those species favored for retention, as described in the Proposed Action, and toward those early seral species that would be planted during reforestation efforts. Shade intolerant vegetation species would proliferate in the gaps between trees following treatment, until altered by ecological succession or future disturbance. (Cooper et al. 1991; USDA Forest Service 2015) Due to succession, the fuelbreak discussed in Section 7.2.2 would require periodic thinning of the understory to help retain its fire-break characteristics. The larger diameters western white pine and western larch on the north and east sides of the main ridgeline are fire-dependent, seral species. Historically, periodic, stand-replacing fire or other disturbance occurred to remove competing vegetation and allowed western white pine and western larch to establish and persist (Cooper et al. 1991; USDA Forest Service 2015). Because the natural fire regime has been disrupted in the project area, harvest, thinning, and mechanical fuels treatment would be used to re-create the stand conditions which favor these two species. (BLM 2007)

Removal of smaller diameter tree in-growth and intermediate and suppressed trees, as well as the salvage harvest of trees affected by insects and disease, would visibly change the current forest structure. Retention and management of larger diameter trees would maintain and develop the large tree structural component, especially in the units where large ponderosa pine, western white pine, and western larch trees are already present. Where thinning occurs, spacing between

residual trees would reduce crown contact, and would create openings initially dominated by shade-intolerant shrub and herbaceous species, until re-planting or natural regeneration of trees occurs. Retaining larger woody debris on the forest floor would be important for tree seedling establishment, soil carbon cycling, nutrient and water storage, and animal activity. The post-treatment structure of harvested and thinned areas would change as ecological succession proceeds or when a future disturbance occurs. (Cooper et al. 1991; Smith and Fischer 1997; BLM 2007)

On the acreage designated for cable logging, vegetation would be injured or killed where the cable tower system is set up, along the cable corridors themselves, where individual trees are cut, and where trees are stockpiled in landing areas. Logging with ground-based equipment would cause more ground disturbance and injury to plant communities, when compared with cable logging. However, measures such as restricting skid trails and yarding corridors to appropriate spacing intervals, respectively, and minimum necessary width, plus using designated landings, would concentrate the most intense impacts into certain areas, helping reduce more widespread disturbance to vegetation. Impacts to vegetation also could be reduced if tractor operations occurred on two feet or more of snow; even operating over frozen, snow-free ground probably would not reduce damage to the above ground portions of non-target understory plants. Removal of trees within root disease "centers" can intensify the disease through fungus colonization of stumps and roots of harvested trees. These areas then provide food bases for a pathogen, allowing it to infect and kill other nearby trees. However, without any management actions, root disease centers continually regenerate with brush species followed by susceptible tree species, which are subsequently killed at relatively young ages. Not all conifer tree species are equally susceptible to root disease; therefore, planting disease tolerant species in root disease areas following harvest would help break the cycle of continued regeneration of susceptible tree species and return productivity to the site. This strategy promotes restoration of disease-resistant species composition in the project area by favoring trees that are less susceptible to root disease, such as ponderosa pine, western larch, and western white pine. (Idaho Dept. of Lands 2015)

Vegetation and ground disturbance associated with harvesting and mechanical fuels treatment would create sites favorable for weed invasion and would produce conditions that allow more sunlight to reach the forest floor. Therefore, weeds, which currently occupy sites in or adjacent to the units and tend to do extremely well in warmer, drier environmental conditions, may spread or at least maintain their present level of infestation. However, inventory, treatment and monitoring of the project area and access roads would reduce potential impacts to native vegetation from weeds. Treatment of project-related noxious weed infestations, especially, would assist re-establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators. (BLM 2007)

Treatment Using Fire

Live plant response to treatment with fire, particularly underburning, depends on many factors, including soil and duff moisture, plant vigor, phenological state (for example, dormant; flowering; releasing seed) at time of burning, and fire severity (Agee 1993; Smith and Fischer 1997). Response also depends on stand history. As organic material accumulates between fire events, seedlings and new rhizomes of some species become established in the organic horizons,

where they are more vulnerable to fire than plants established in mineral soil (especially if heavy fuels have accumulated) (Smith and Fischer 1997).

Mature ponderosa pine and western larch trees have several fire-resistant characteristics such as very thick, insulating bark, relatively deep roots, and open foliage which increase chances of surviving lower intensity fire (Smith and Fischer 1997); therefore, lower intensity fire may be lethal to only small-diameter saplings and seedlings. Either species may be vulnerable to fire if pitch has collected around old fire scars, or fires burning in deep surface fuels or deep duff affect the fine roots (Smith and Fischer 1997).

Douglas-fir trees also develop fire-resistant bark as they mature, so only seedling, sapling and small-pole size trees may be vulnerable to lower intensity surface fire. However, the resistance offered by a thick layer of bark may be offset by shallow roots susceptible to fire damage, growth of closely spaced branches along the trunk, and pitch-streaked lower trunks (Agee 1993; Smith and Fischer 1997).

Mature western white pine trees have moderately thick bark, moderately flammable foliage, and self-pruning lower limbs, which provide this species with moderate fire resistance. White pine is more susceptible to fire when it grows in dense stands; is festooned with lichen growth; and due to its characteristically resinous bark. Young western white pine trees have thin bark, which does not provide fire resistance. (USDA Forest Service 2015)

In comparison, other tree species in northern Idaho such as subalpine fir, grand fir and western redcedar do not possess characteristics that protect them as well from fire and, therefore, are less resistant to its effects and are more likely to suffer mortality from burning. (USDA Forest Service 2015)

Lower intensity fire may not be lethal to many of the shrub and herbaceous species that occur in the action area. It is recognized that some plants or their means of reproducing themselves, such as seeds, may die as a result of fire treatments, but it is anticipated that site populations adapted to fire would survive, and some species' growth actually would be enhanced (USDA Forest Service 2009). Although aerial portions of fire-tolerant shrubs or herbs may be killed, the plants would survive by resprouting from roots, stems, rhizomes, or stored seed (Smith and Fischer 1997; USDA Forest Service 2009). Fire may also remove competing vegetation, facilitating regeneration by decreasing competition for light, water, nutrients, and pollinators.

As fire intensity increases, though, impacts to vegetation would be expected to become more severe. For example, areas of dense tree regeneration and heavy fuels resulting from disease-caused mortality would increase potential for higher intensity fire. (Smith and Fischer 1997). Also, fuels outside of root rot “pockets”, such as down logs, rotting stumps, or piled, thinned trees would produce more concentrated fire intensity that would kill or injure nearby live plants. Where fuels are piled and burned, the concentrated intensity of fire would kill plants directly under the piles, and kill or injure plants immediately adjacent to the piles. Over time, burn pile sites within project units would likely be recolonized by surviving seed and adjoining, surviving native vegetation, but additional replanting or seeding may be necessary to inhibit post-burn weed invasion. Soil beneath burn piles located at landings may be compacted, which could

inhibit plant re-growth, though certain native pioneer species, as well as weeds, may be able to produce a sparse, post-burn vegetative cover.

Over time, sites in the project area treated with fire would likely be reseeded or recolonized by surviving native vegetation, although replanting or seeding may be necessary to inhibit post-burn weed invasion. Microsites in the native plant community that do not recover within one to two years following burning, perhaps due to more severe fire effects, would continue to be vulnerable to weed invasion or expansion.

Project features such as burn intensity, combined with site characteristics such as plant community response to fire, would contribute to a post-project mosaic of species, structures, and densities. For example, common native plant species that are less tolerant of burning or opening of the forest canopy may not be as well-represented in the post-treatment plant community, resulting in a change in the composition of site habitats over time. Establishment of new populations or persistence of existing weed infestations could also alter this mosaic. The post-project mosaic would change as ecological succession proceeds or a future vegetation disturbance occurs.

Treatment with fire perpetuates dominance by tree species that are resistant to both fire and root disease, especially the pine species and western larch. Conditions ideal for the spread of root disease tend to develop in forests where fire exclusion and selective logging have increased dominance by Douglas-fir and the true firs. (Smith and Fischer 1997) Therefore, burning that approximates historic fire frequencies converts stand composition back to early successional stages and is an effective tool for managing root disease (Rippy et al. 2005). The amount of root disease in the project area would likely be reduced as a result of burning. Removal of understory vegetation, small-diameter in-growth, as well as shade tolerant trees by burning would reduce competition for water, nutrients, and sunlight, which would increase the vigor of the remaining trees.

Bark beetles prefer stressed trees to vigorous trees, especially in dense stands where the target tree species dominates (Smith and Fisher 1997). Injuries to trees caused by burning can also affect the tree's ability to withstand attacks by insects and pathogens. Stress to trees caused by fire-damaged roots, cambium or foliage can weaken the tree and predispose it to attack by bark beetles and root pathogens. (Demars and Roettgering 1982; Rippy et al. 2005; Hood et al. 2007). Trees weakened by fire can contribute to increased beetle populations; however, less damaged, surviving trees would have better defenses to withstand bark beetle attacks because reduced competition for water and nutrients increases overall tree health.

Treatments using fire can create areas of vegetation and ground disturbance which are vulnerable to weed invasion, especially where post-burn conditions allow more sunlight to reach the forest floor. (USDA Forest Service 2015) Therefore, weeds, which currently occupy sites in or adjacent to the project area and tend to do extremely well in warmer, drier environmental conditions, may spread or at least maintain their present level of infestation. However, inventory, treatment and monitoring of the project area would reduce potential impacts to native vegetation from weeds. Treatment of project-connected noxious weed infestations, especially, would assist re-

establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators (BLM 2007)

Reforestation

Re-introduction and maintenance of ponderosa pine, western larch, and western white pine in the project area would aid re-establishment of diverse, resilient, and resistant forest vegetation. (Cooper et al. 1991,; Smith and Fischer 1997; USDA Forest Service 2015) Managing for seral tree species would require subsequent actions to discourage re-growth of species such as grand fir, western redcedar, and Douglas-fir.

Road Construction/Renovation/Decommissioning

Plants growing along the road segments to be used during this project would be injured or killed by clearing and/or construction. Equipment and vehicle use of the roads, plus periodic maintenance, would discourage vegetation from re-establishing, although a swath of lower stature plants would eventually re-grow adjacent to the road running surface. Reducing the number of miles of maintained road to just what is needed for administrative use once the project is completed would reduce the longer term ecological and economic (maintenance costs) impacts associated with permanent roads.

Opening existing road segments that are blocked by brush or down logs, for example, would disturb plants that have established since the road corridor was last actively maintained. Road renovation of existing roads, plus blading and maintenance of roads during the life of the project, would disturb any vegetation that may have encroached onto the road surface since maintenance was last done. Use and maintenance of the existing roads would deter vegetation from re-colonizing and closing-off the corridors.

Construction, renovation, use, and maintenance of roads in order to implement the project would disturb plant communities and soils along the road corridors, increasing the threat of weed invasion and/or expansion. Weeds presently growing in the project area would have newly disturbed areas into which they could expand. Passenger vehicles and equipment, off-highway vehicles, wildlife movement, or wind currents could transport weed seed or fragments from existing infestations into native vegetation communities within the project area. Weeds may out-compete and displace desirable, native vegetation, altering plant community composition, structure, and function both in the present and future.

However, inventory, treatment and monitoring of project roads would reduce potential impacts to native vegetation from weeds. Treatment of project-connected noxious weed infestations, especially, would assist re-establishment of native vegetation in disturbed areas by reducing competition for sunlight, water, nutrients, and pollinators. In addition, road closures implemented at the end of the project would keep full-size and trail-size vehicles out of recently disturbed areas and help limit weed invasion and spread. Gates or barriers would need to be monitored periodically to reduce the possibility that they have been breached or bypassed, allowing vehicles to transport weeds into closed areas.

Recreation

Impacts associated with building the proposed trail systems would be similar to those discussed for roads; but on a smaller, narrower scale. The impacts would be greater on the west side of the project area than the east side, because more miles of trails would be designated there. Establishing a connector trail through the meadow would create a permanent, maintained corridor where there is presently an informal route. Whether newly established or being enlarged, actions related to the parking areas would kill vegetation that currently grows at those sites. Establishment of the skills park also would impact existing vegetation at that location, but would not completely clear the area of plants.

An expanded recreational trail system is likely to bring more people into the project area, as they use the proposed parking areas, trailheads, and trails; which could increase the risk of introducing or spreading weeds. However, implementing Design Features related to weed management would help to minimize impacts from weeds due to this increased use.

Idaho BLM Special Status Plant Species

Impacts to Spalding's catchfly potential habitat in Unit 7 would be similar to those described under "Vegetation Communities". Before the 20th Century, these dry sites were characterized by frequent underburns that eliminated most tree regeneration, thinned young stands, and perpetuated open stands dominated mainly by ponderosa pine. Fire exclusion has altered the historic fire regimes in these stands and has increased fuel loadings. Underburning, often in combination with partial cutting, can be used to maintain vigorous, open ponderosa pine stands (Smith and Fischer 1997), which in turn, creates habitat conditions which benefit Spalding's catchfly. The potential habitat in the project area does contain some weed infestations, and treatment with fire might maintain or expand them. However, inventory, treatment and monitoring of weeds in the project area would reduce potential impacts to suitable habitat for Spalding's catchfly by decreasing competition for sunlight, water, nutrients, and pollinators.

The proposed action would not affect bank monkeyflower, or deerfern individuals or populations, though potential habitat for each of these species would be disturbed by harvest, thinning, or burning treatments. Effects to potential habitat would vary according to individual species' ecological requirements. For example, bank monkeyflower thrives in open canopy, bare mineral soil environments and would likely benefit from a project that "opens up" a forest stand. In contrast, a species such as deerfern which grows in shady habitats may be more sensitive to canopy removal.

The clustered lady's-slipper population would be buffered from project actions; therefore, no direct effects would be expected. An indirect effect to this population, which could occur due to the expected increase in recreational use, would be from people attracted to the game trail/social trail that follows the main ridgeline north of East Yellowstone Trail road and Interstate 90. During the growing season, mountain lady's-slipper (*Cypripedium montanum*), which co-occurs with the rare species is quite showy, and might attract curious observers. The potential impacts to clustered lady's-slipper would be from trampling (injure or kill) or collecting (remove entire plant(s) from population).

Data describing pine broomrape's response to disturbance are scarce. Rare species monitoring by the U.S. Forest Service during the first year after a wildfire in north-central Washington included pine broomrape; however, preliminary results concerning this species' response to disturbance were inconclusive, and the study was not funded in subsequent years. (Harrod et al. 1997; Harrod pers.comm. 2009) Its host plant, oceanspray, is described in the Fire Effects Information System database (USDA Forest Service 2015) as being favored by disturbance. The database states that oceanspray prefers open sites; is a "light- demanding, early successional" species; and is promoted by disturbances that open the canopy. Based upon the regenerative abilities of oceanspray, it is possible that the obligate root parasite pine broomrape also exhibits some resiliency similar to that of its host. Because of the uncertainty surrounding this species, close coordination would occur between the Field Office botanist and two Project Leaders during project implementation, so that effects to the broomrape plants would be minimized.

Regarding the possibility that weeds would invade or expand into habitat for each of the special status plant species discussed in the preceding paragraphs, unfortunately, while timber harvest or prescribed fire can be used as a management tool to restore historic fire regimes and promote desirable tree species, the disturbance created by these activities can favor invasive species. (USDA Forest Service 2009, 2015) Weeds are highly competitive and can often out-compete native vegetation, especially on recently disturbed sites. (BLM 2007) However, proposed post-project monitoring and weed treatment would reduce deleterious effects of weedy species on populations and/or potential habitat for bank monkeyflower, clustered lady's-slipper, deerfern, and pine broomrape.

In conclusion, each of these species has slightly different habitat requirements and responses to disturbances, which makes management of their diverse habitat needs challenging. However, project design features would decrease harvest, thinning, and fuels treatment impacts, ensuring that the BLM does not contribute to the need to list bank monkeyflower, clustered lady's-slipper, deerfern, or pine broomrape as threatened or endangered.

7.12.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Vegetation Communities

Forestry treatment impacts would be similar to those described for Alternative A, except they would occur on fewer acres. Burning would still occur in Unit 7 and impacts would be similar as those described for Alternative A. Impacts to common, native plant communities and rare plants from a wildfire may be more severe due to the amount of fuels accumulated in unthinned areas, and possibly spread beyond the boundaries of the proposed action. A wildfire has the potential to be stand-replacing but may also create a mosaic of burned and unburned vegetation, depending upon factors such as variation in fire behavior. A wildfire in the project area could affect a greater number of acres than the proposed action, putting more acres at risk from weed invasion.

Recreation development impacts would be similar to those described for Alternative A, minus the impacts from an improved parking area on Bonnell Road.

Idaho BLM Special Status Plant Species

Recreation development impacts would be similar to those described for Alternative A, minus the impacts from an improved parking area on Bonnell Road.

7.12.4 Environmental Effects from Alternative C (No Action)

Vegetation Communities and Idaho BLM Special Status Plant Species

Plant succession would continue toward the potential natural community, where possible, in the absence of disturbance. Over time, sites in the area capable of supporting more dense forest vegetation would become dominated by shade-tolerant species, until a future disturbance such as logging, wildfire, insect infestation, disease, or weather event creates openings in the forest community. Undesirable numbers of Douglas-fir and grand fir trees vulnerable to insect and disease outbreaks would continue to compete with ponderosa pine, western larch, and western white pine. Insect and disease outbreaks would continue within the project area. Weeds would still remain in and adjacent to the project area and compete with desirable native species.

Although no management actions would occur in suitable habitat for Spalding's catchfly, ecological succession would continue to proceed, resulting in more tree invasion and less favorable environmental conditions for both the catchfly and bank monkeyflower. However, as succession proceeds, habitat for shade tolerant rare species such as clustered lady's-slipper, Constance's bittercress, or deer fern would persist and possible expand into more acreage. No harvest or burn treatment would occur near the pine broomrape plants; however, as succession proceeds, a reduction would occur in the early successional habitat favored by its host plant, oceanspray, which could, in turn, affect the broomrape plants.

Impacts to common, native plant communities and rare plants from a wildfire may be more severe due to the amount of fuels accumulated in unthinned areas, and possibly spread beyond the boundaries of the proposed action. A wildfire has the potential to be stand-replacing but may also create a mosaic of burned and unburned vegetation, depending upon factors such as variation in fire behavior. A wildfire in the project area could affect a greater number of acres than the proposed action, putting more acres at risk from weed invasion.

7.12.5 Cumulative Effects

The analysis area for vegetation communities and Idaho BLM Special Status Plant Species is defined as the Blue Creek drainage (8 square miles) plus about two square miles of the "face" or slopes north and east of and above Interstate 90—about 6400 acres.

Alternative A, Proposed Action

As summarized in Section 7.1.2, past land use practices and disturbances in the analysis area have influenced the species composition, vertical structure, and density of existing plant communities, including rare plants. Invasive and/or introduced species have established in the analysis area. Currently, various stages of ecological succession are present due to past disturbances.

Present human-caused and natural disturbances in the analysis area which affect vegetation include homesite development; road building, use and maintenance; trail use and maintenance; firewood cutting; recreational activities; fire; wind blow-down events; and insect and disease outbreaks.

Reasonably foreseeable future actions and natural disturbances in the analysis area include road building, use and maintenance; trail use and maintenance; firewood cutting; recreational activities; fire activity; wind blow-down events; and insect and disease outbreaks. The fuel break segments proposed for the project area would also need to be thinned periodically to retain their fire-break characteristics.

Ongoing and future vegetation-disturbing activities in the analysis area would continue to promote a mosaic of plant communities in various stages of ecological succession. The variety of successional stages would provide the diverse habitats needed to support rare species such as bank monkeyflower, pine broomrape, and pine broomrape, though habitat condition would be degraded by the presence of weedy species. Ecological succession would proceed where vegetation is left undisturbed and would influence vegetation species composition, vertical structure, and density. Plant communities that revert to earlier ecological succession stages due to disturbance such as insect infestation or disease would begin the process of maturing all over again and include habitat characteristics favorable for rare species like bank monkeyflower and pine broomrape. Ongoing and proposed activities that impact vegetation would open up sites favorable to weed invasion due to ground disturbance and/or reduction of tree canopy cover. Where left untreated, weeds would continue to threaten native plant communities, including Idaho BLM Special Status Plant Species.

Alternative A, the proposed action, would treat approximately 751 acres of about 6,400 acres of vegetation in the analysis area; therefore, this project is unlikely to contribute cumulative effects to common, native plant communities, bank monkeyflower, clustered lady's-slipper, deerfern, or pine broomrape; due to the relatively small area of disturbance and its staggered timing of implementation, when compared to the overall analysis area.

Alternative B
In comparison to the proposed action, Alternative B would affect about 541 acres of 6,400 acres.

No Action Alternative
Under this Alternative, zero acres of vegetation in the project area would be disturbed by vegetation treatment. Vegetation composition and structure on adjacent lands in the analysis area could be altered by a future wildfire. The number of acres burned and severity of fire effects would be dependent upon many variables, including whether or not any treatments have been implemented to lessen the severity of those fire effects. Fires on these lands could also spread to untreated vegetation in the project area. Where left untreated, weeds would continue to threaten native plant communities, including rare plant populations.

7.13 Visual Resource Management

7.13.1 Affected Environment

The Coeur d'Alene RMP designated the landscape in and around the project area as Visual Resource Management (VRM) Class II. The objective for this management class is to retain the existing characteristic landscape. The level of change to any of the basic landscape elements due to management activities should be low and not evident. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic

elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

There are numerous locations from which people are likely to observe the project area. For this analysis the BLM selected four locations, or key observation points (KOPs), from which the highest number of people are likely to observe the project area and that also provide a range of views representative of those from other locations. The locations of the KOPs are depicted in Figure 13.

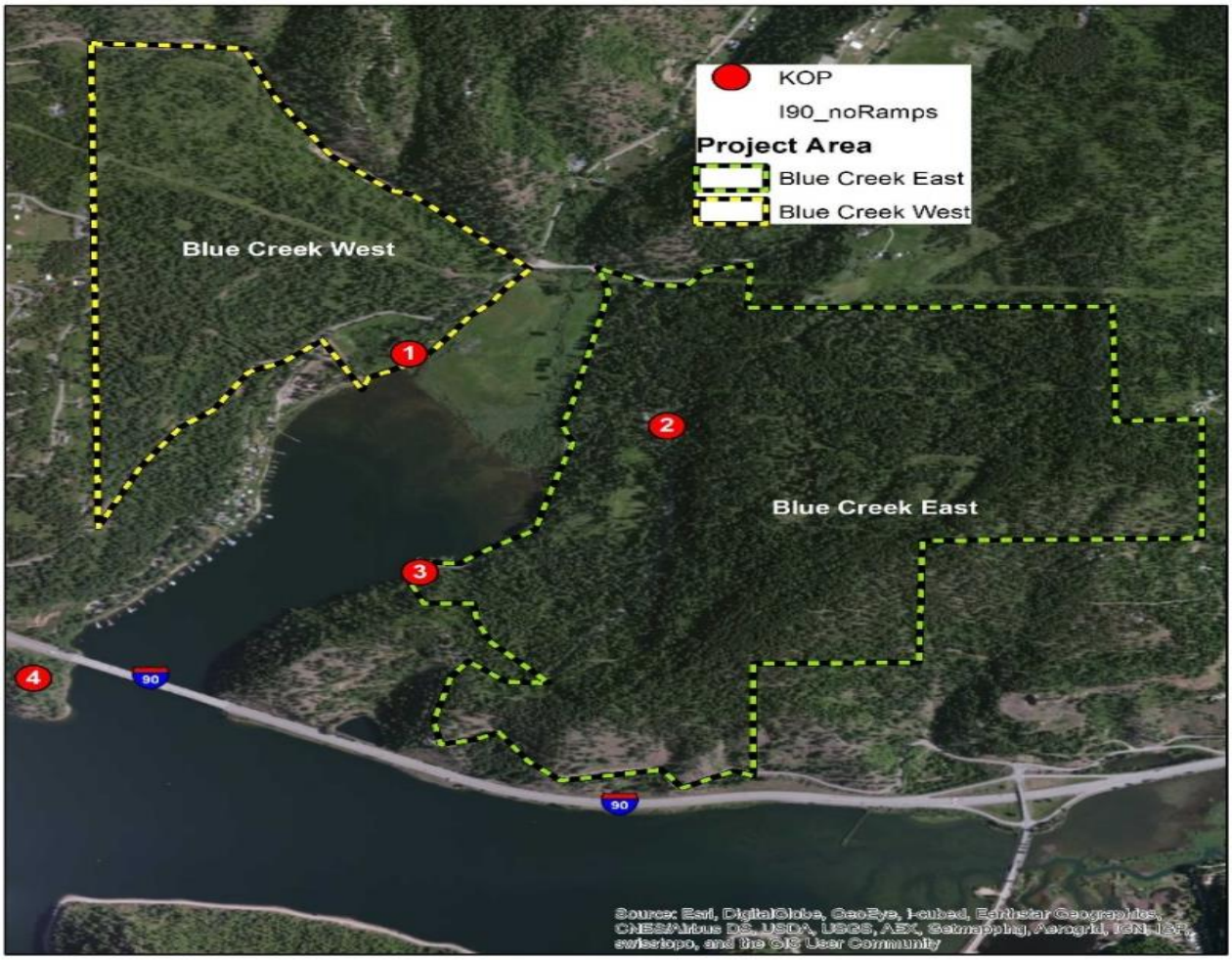


Figure 13. Key Observation Point Locations.

KOP-1 is located at the viewing platform north of Blue Creek Bay near the intersection of Sunnyside Road and East Yellowstone Trail. From this KOP only the eastern portion of the project area is visible. The landscape consists of the blue-black water of Blue Creek Bay, the curved shoreline meeting the light green-yellow grass and shrubs of the meadow with the dark green vertical conifers with occasional openings providing the backdrop and ridgeline horizon. The boat launch on the east side of the bay is also visible. Figure 14 shows a portion of the view from KOP-1.

Figure 14. View of Project Area from KOP-1.

KOP-2 is located at the parking area and trailhead east of Blue Creek Bay adjacent to East Yellowstone Trail. This KOP is within the eastern portion of the project area. Looking eastward, the project area is immediately in front of the observer. Beyond the parking area and facilities tall green-yellow grass, some ferns, and sparse shrubs merge with the edge of the reddish-brown vertical trunks and coarse dark green crowns of conifers. Looking westward, across the gray gravel parking area and adjacent gravel road, the near view is similar to the eastward view. Beyond this the dark green conifers of the ridgeline on the west side of the project area provides the backdrop and form the horizon. Figure 15 shows the westward view from KOP-2.

Figure 15. Westward View from KOP-2.

KOP-3 is located at the parking area and the landing boat dock on the east side of Blue Creek Bay at the end of Landing Road. This KOP is on the western edge of the eastern portion of the project area. Looking eastward the view is very similar to the eastward view from KOP-2 described above. Looking westward, the blue-black water of the bay dominates most of the near view. Across the bay green lawns, multi-colored houses, and docks are visible. Beyond them and to the north, the hills rise above covered with coarse dark green conifers. The trees are less dense in some areas on the hills and lighter green-yellow understory or red-brown soil is visible through irregular openings. Figure 16 shows the westward view from KOP-3.

Figure 16. Westward View from KOP-3.

KOP-4 is located at the Higgins Point day-use picnic area south of Interstate 90, southwest of Blue Creek Bay. Only the western portion of the project area is visible from this KOP. Looking toward the northeast, first the gray linear interstate highway is visible. Then the blue-black flat water of Blue Creek Bay dominates the view. Light green grass and irregular shrubs, along with light brown soil occur along the irregular shoreline and meadow. Hills in the project area rise above the shoreline and are covered with dark green coarse conifers with occasional openings that reveal light green understory and light brown soil. Figure 17 shows the view of the project area from KOP-4.

Figure 17. View of the Project Area from KOP-4.

7.13.2 Environmental Effects from Alternative A (Proposed Action)

The proposed action would meet the RMP objective for VRM Class II in the long term. The vegetation treatments would mostly involve removal of smaller diameter trees, with some thinning of the overstory and opening the canopy. Where overstory trees are removed, more of the light green understory grass and shrubs would be seen. The fuel break would include removal of more vegetation increasing the view of the understory. However, none of this would be distinct from the surrounding landscape and would not attract the attention of the casual observer. Burning of slash piles and implementation of the prescribed burn would result in smoke that would likely be highly visible and attract the attention of any observer. However, this would only last 2 to 3 days while burning occurs. Exposed soil and gravel from improvement and use of linear haul roads would contrast with the surrounding natural setting, but this would be less intrusive to the viewer after some roads are reclaimed and vegetation regrows. Indirectly, the vegetation treatments would reduce the risk of intense stand-replacing wildland fire which would have more dramatic effects on the visual landscape (see discussion in Section 7.13.4 below). The recreational improvements and uses would not likely be observable, except in the immediate vicinity of the improved trails or parking areas. However, since there are already facilities and roads adjacent to these areas, the improvements would not contrast with the rest of the landscape.

From KOP-1 (Viewing Platform) the irregular canopy openings created by vegetation treatments on the eastern portion of the project area would be visible, making lighter green understory visible, contrasting slightly with the vertical dark green conifers. However, these would not

contrast with the larger landscape which already includes irregular openings exposing the understory and soils. It is unlikely that any of the recreation improvements would be visible from this KOP, except possibly a portion of the connector trail that would run across the northern portion of the meadow. However, most of the trail would be hidden by grass and shrubs and would not distract a viewer.

From KOP-2 (BLM Parking Area and Trail Head) the effects on the westward view would be similar to those described for KOP-1. However, looking eastward, the stumps and removal of vegetation would be visible. However this would be only temporary and would become less noticeable once the understory vegetation and new shrubs begin to grow. Also, trees harvested within one hundred feet of trail systems and parking areas will be severed at ground level to reduce the visual impacts of stumps. If there are any slash piles near the parking area, these would also attract attention and contrast with the natural setting of the forested background. However, the number of piles would be reduced by whole-tree yarding, and the piles that are left would only be temporary until burned. Any trail improvements or signs would not likely be noticeable. Two existing trails already connects to this point.

From KOP-3 (BLM Boat Launch) looking westward the effect would be similar to that from KOPs 1 and 2 (westward). Looking eastward the effect would be similar to that described for KOP-2 (eastward). Recreation improvements would not be visible.

From KOP-4 (Higgens Point) the effect would be similar to that described for KOP-1, except slightly less due to the greater distance from the project area.

7.13.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

The impacts would be similar to those from the proposed action, except that eastward views from KOP-2 and KOP-3 would not be affected.

7.13.4 Environmental Effects from Alternative C (No Action)

While the effects from vegetation treatments described above would not occur, there would be an indirect effect of increased potential for occurrence of intense stand-replacing wildfire. Should this occur, the viewshed from all KOPs would change dramatically due to removal or charring of most of the trees. This would take decades to recover.

7.13.5 Cumulative Effects

The project area is surrounded by privately owned forested lands and residences, visible from all KOPs. Some adjacent land owners have already conducted treatments similar to those under the proposed action. It is likely that other private land owners would implement vegetation treatments over the next few years on their lands. Depending on the types of treatments, the effects on visual resources could be similar to, or more severe than those in the project area. However, these too would likely blend with the rest of the landscape and not attract attention. If adjacent land owners burned slash piles from vegetation treatments at the same time as the BLM burns slash piles from the proposed action, there would be more smoke obscuring the view from some KOPs, attracting attention from all observers. However, as previously stated this would likely only last a few days until burning is completed. Also, give the visible development that

exists in the area (e.g., exiting roads, residences, and boat docks) the proposed facilities, such as parking areas and trails, would not appear out of place or attract attention.

7.14 Wildlife

7.14.1 Affected Environment

The Blue Creek Bay project area includes a variety of habitat types. From dry coniferous forest to lake shoreline and a wetland meadow the diverse vegetation communities support an equally diverse array of wildlife species. (See Vegetation Communities and Forest Vegetation Sections 7.12 and 7.5)

North and east-facing slopes generally have more dense forest stands which provide thermal and hiding cover for big game species such as elk and white-tailed deer. These stands are also suitable for other wildlife species that prefer more closed canopy forests such as pacific wren, northern goshawk (nesting habitat), Hammond's flycatcher, and cordilleran flycatcher. South and west facing slopes are generally drier and warmer and have a more open forest structure with dominant tree species being ponderosa pine, Douglas-fir, larch, and grand fir in the understory. These types of stands provide habitat for species like dusky flycatchers, western tanager, calliope hummingbird, and pygmy nuthatch. These sites also provide forage for big game species throughout the year, depending on the elevation of the site.

The meadow and lake habitat, which lies between the east and west sides of the proposed forest vegetation treatments, includes riparian plant communities like black cottonwood, willow, hawthorn, and other shrubs that provide important food sources for many birds, as well as other wildlife. The meadow area is largely composed of non-native grasses such as reed canary grass. However, even degraded meadow habitat provides nesting areas for species such as mallards, song sparrows, and savannah sparrows.

Because forest insects and disease are already present on the site, there are many snags available to wildlife that require cavities. Bats, birds, and other mammal species such as flying squirrels that use snags for a portion of their life-cycle are present on the site. Larger diameter trees can also be found throughout the project area. These will become valuable future snags. An inventory of wildlife trees was conducted in 2014. Appendix I: Map 9 *Inventoried Snag Locations* shows the locations of snags and other high-value wildlife trees found during the survey. In 2016, surveys were conducted to determine if the proposed project area is currently meeting the objectives for logs per acre as outlined in the Fish and Wildlife Section of the RMP. Plots that were 1/10 acre in size were surveyed on both the west and east side portions of the project area and many of the survey points were not meeting the standards outlined in Section 6.1.1 Environmental Design Features.

Moist areas resulting from springs and man-made ponds, as well as riparian areas associated with perennial and intermittent streams provide valuable habitat for salamanders, bats, and numerous other wildlife species.

The impact of human uses on wildlife in the project area is fairly significant, and more so on the east side of Blue Creek Bay. The proximity to Coeur d' Alene makes the area fairly popular for recreation, though Blue Creek Bay receives a fraction of the use that nearby Mineral Ridge has.

Because recreational opportunities have only recently been developed and improved, there is not as much use of the project area as one might assume. Much of the use is by local people living adjacent to or nearby the project area. The current use is limited to hiking, horse-riding, hunting, and biking. BLM lands on the east side of Blue Lake have the highest levels of public use for recreation (See Recreation Section 7.9). More developed trail systems, signage, and parking areas currently concentrate use of the Blue Creek Bay site on the east side. While the west side has undeveloped trails, access to this area is largely limited to local use by people living nearby. Horse-riding, hunting, and hiking are the most common activities in this area. Motorized access is not allowed except on County maintained roads and access to administrative roads is controlled by gates. The power line intersects the project area on the east and west sides and full size vehicle access is needed for power line maintenance.

Activities on surrounding lands also impact wildlife within the project area. Historic timber harvest has altered the structure of forests near the project area. As a result, adjacent forest stands are largely younger in age with fewer mature, large diameter trees. Canopy cover on adjacent lands is lower than the canopy cover within the project area. The greatest current impact to wildlife in the surrounding area is habitat loss from home development and fragmentation resulting from roads and home sites. Roads and trails within and adjacent to the project area serve as vectors for the spread of weeds which degrade wildlife habitat (Mace et al. 1996; McLellan and Shackleton 1988; Van Dyke et al. 1986; and Rost and Bailey 1976).

Table 12. Summary of the Special Status Species that may be found in the project area.

Species	Likely to Inhabit	Uncommon-May Inhabit or potential habitat	Encountered on Site Visit	Not present/no suitable habitat
Grizzly bear** (*Ursos arctos horribilis*)				X
Canada lynx** (*Lynx Canadensis*)				X
Woodland caribou** (*Rangifer tarandus*)				X
Wolverine** (*Gulo gulo*)				X
Bald Eagle*** (*Halialeetus leucocephalus*)			X	
Northern Goshawk*** (*Accipiter gentilis*)	X			
Flammulated owl*** (*Psiloscops flammeolus*)		X		
Cassin's finch*** (*Haemorhous cassinii*)	X			
Lewis's woodpecker*** (*Melanerpes lewis*)		X		
Common nighthawk*** (*Chordeiles minor*)	X			

Species	Likely to Inhabit	Uncommon-May Inhabit or potential habitat	Encountered on Site Visit	Not present/no suitable habitat
White-headed woodpecker*** (*Picoides albolarvatus*)		X		
Willow flycatcher*** (*Empidonax traillii*)			X	
Fringed Myotis*** (*Myotis thysanodes*)		X		
Townsend's big-eared bat*** (*Corynorhinus townsendii*)		X		
Long-eared myotis*** (*Myotis evotis*)	X			
California myotis*** (*Myotis californicus*)		X		
Hoary Bat*** (*Lasiurus cinereus*)		X		
Silver-haired bat*** (*Lasiurus noctivagans*)		X		
Long-legged myotis*** (*Myotis volans*)		X		
Western small-footed myotis*** (*Myotis cilliolabrum*)		X		
Yuma myotis*** (*Myotis yumanensis*)	X			
Little brown myotis*** (*Myotis lucifigus*)	X			
Coeur d' Alene Salamander*** (*Plethodon idahoensis*)		X		

***Type 2 Special Status Species or IDFG species of Greatest Conservation Need
** Threatened, Endangered, Proposed, or Candidate Species

Threatened and Endangered Species

There are currently three federally protected wildlife species that occur in north Idaho. Grizzly bear (*Ursus arctos*), woodland caribou (*Rangifer tarandus*) and Canada lynx (*Lynx canadensis*). All except the caribou are listed as Threatened under the Endangered Species Act. The woodland caribou is an Endangered species. No listed species have been documented on the site.

Woodland caribou require high elevation old growth forest and a sufficiently developed lichen community for winter survival (Servheen and Lyon 1989). The project is not suitable habitat for

caribou and does not hold potential for becoming suitable habitat for this species because of the elevation and the potential vegetation community. This species will not be included in the analysis of effects.

Canada lynx are highly associated with both late and early succession forest stands. Early successional, densely stocked stands provide foraging habitat, while mature forest stands act as potential denning habitat (IDFG 2005; Ruggerio et al. 1994). Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (Interagency Lynx Biology Team 2013). This area is not within a Lynx Analysis Unit or considered to be Lynx Habitat. This species will not be included in further analysis.

The project area lies approximately 40 miles southwest of the Cabinet Yaak Recovery Zone and more than 100 miles from the northwest of the Bitterroot Ecosystem which have been outlined as areas important to the recovery of grizzlies throughout their historic range (USFWSa 2012). Currently the project area is considered to be "unoccupied" by grizzlies (USFWSb). However, one young male was killed inadvertently near Rose Lake in 2010 (18 miles away). Otherwise, no grizzlies have been verified in this area in several decades or more. Grizzly bears are flexible in their habitat requirements. Their main habitat requirement is sufficient prey, forage, thermal cover, and denning habitat. These things can be fulfilled in a variety of habitat types ranging from mountain meadows, high elevation alpine and subalpine habitats, and mid to low elevation coniferous forests (Snyder 1991). The project area is not within a Grizzly Bear Management Unit and is not considered Core habitat.

Wolverines were recently determined to be not warranted for protection under the Endangered Species Act (USFWS 2014). However, a lawsuit decision in 2016 requires that the USFWS review the listing decision again. Thus we are including this species in the analysis for this project. A wolverine was documented near St. Joe Baldy (44 miles away) in 2003 (IDFG 2003). In addition, three Idaho Fish and Game employees reported tracks and/or sightings in the Silver Valley Area in 1981, 1986, and 2003. Because of their large home range sizes and the very long dispersal distances of juvenile males, it is possible a wolverine may pass through or use part of the project area. Knowledge of wolverine habits, habitats, and behaviors is increasing every year. Some general assumptions about this species include that they are negatively associated with roads and clear cut forest stands (Hornhocker and Hash 1981; Hash 1987; Copeland et al. 2007). The high density of existing roads, the rural development, and the consistent use by people for recreation and resource extraction make the habitat in project area and vicinity marginal at best. There is no historical or potential denning habitat in the project area.

It is possible that grizzly bear or wolverine may pass through or temporarily use the site, but it is not likely that either of these species would inhabit the site with any regularity as habitat for both

would be considered marginal because of the high degree of human development and disturbance.

BLM Type 2 and Idaho Species of Greatest Conservation Need

Very often, species that are habitat specialists are BLM Special Status (Type 2) Species or Idaho State Listed Species of Greatest Conservation Need (SGCN). Their populations tend to be less secure because loss of their specialized habitat results in more dramatic population declines and higher rates of extinction (Smith 1992). With its variety of habitat types, the project area may be occupied by several of these Special Status Species.

Some of the species listed in Table 13 prefer denser, interior forest stands. While some require more open, mature forest with an abundance of large trees. Other species are primary or secondary cavity users, so they require snags. A summary of the life histories of the Special Status Species that may be found in the project area is provided below.

Birds

While not all of the species described below have been found in the project area, there may be suitable habitat for these species or vegetation treatments may create suitable habitat for these species.

Bald Eagles are fairly common in north Idaho now. But populations were in steep decline and the species was listed under the Endangered Species Act until 2004. This raptor hunts fish on the lakes and rivers of North Idaho and will also feed on waterfowl and scavenge dead animals. Pairs mate for life and reuse the same nest year after year. There are no documented nesting pairs within the project area, but they can often be found on the shoreline of Blue Creek Bay, particularly in winter. Important habitat components for this species include large diameter trees with large horizontal branches for perching and hunting from. Live large diameter trees that can support the large nests that eagles build are also required for breeding success.

Northern Goshawks are forest raptors that nest in relatively dense forest stands with canopy closure greater than 75% (Moser 2007). Goshawk territories can be as large as 420 acres and require a mixture of high canopy cover forest for nesting and open forest, or small forest openings for foraging. Goshawks prey on smaller bird species and small mammals such as tree squirrels. Goshawks return to their nests as early as March or early April and egg laying can begin shortly after. Pairs maintain 1-8 nests in a territory and may use alternate nests in sequential years. (Rodewald 2015) Research indicates that forest treatments can be conducted in goshawk nesting habitat without negative impacts if at least 39% of the territory maintains the 70% forest cover standard (Squires and Reynolds 1997 and Moser and Garton 2009). However, none of the 2014 Forest Vegetation Inventory (FORVIS) plots conducted in the project area met the canopy cover requirements of 70 percent. Nevertheless, the project area does provide some of the denser forest stands within the analysis area. And while it is possible that some areas proposed for treatment might meet the 70 percent canopy cover standard, it is unlikely that the project area would meet the 39% of the total territory area threshold referenced above. Thus project area currently provides foraging habitat and marginal, or possibly unsuitable, nesting habitat for goshawks.

Flammulated Owls are a small migratory owl that eats insects, mice, shrews, and other small vertebrates. However, their diets are almost entirely insects, especially crickets, moths, and beetles. They hunt at night, gleaning insects off of vegetation. This explains their migratory behavior. This species prefers mature pine forests where it nests in cavities created by woodpeckers.

Cassin's Finches feed primarily on tree buds and seeds, and they mix with other montane finches such as crossbills and siskins. Cassin's Finches live in evergreen forests in the mountains up to about 10,000 feet elevation. In winter, they may move to lower elevations. They feed heavily upon seeds of pines and quaking aspen.

Lewis's Woodpeckers are unique because they catch insects in the air during the breeding season and stores mast (e.g., seeds, acorns, and corn) during the winter. According to the Idaho Draft State Wildlife Action Plan (IDFG 2016), "breeding sites generally occur in burned ponderosa pine forests, cottonwood riparian forests, and aspen groves. This species appears to prefer nesting in large diameter, well-decayed snags in relatively open forests with a well-developed understory. Nests are sited in natural cavities or abandoned nest of primary excavators".

The *White-headed Woodpecker* can be found in pine-dominated forests in the mountainous regions of the West. In its northernmost range, this species typically inhabits dry coniferous forests dominated by ponderosa pine. Historically this species would have been more common in the Idaho Panhandle. But the gradual conversion of mature pine forest into mixed coniferous densely stocked forest has made much of the habitat in north Idaho unsuitable. Preferred forest stands are typically multistoried and open-canopied mature and old-growth ponderosa pine. They will also use recently burned or logged areas where large pines remain. Healthy populations of this species are an indicator of the quality of mature ponderosa pine habitats, which are used for breeding, roosting, and foraging. This species requires an abundance of large-diameter pines, relatively open canopy (50–70%), and availability of snags and stumps (mostly high-cut) for nest cavities (IDFG 2016).

Common nighthawks typically nest on the ground in open forests, logged or slash-burned areas of forest, woodland clearings, and rock outcrops. The Common Nighthawk is a crepuscular (dawn and dusk) forager that feeds on flying insects such as moths, beetles, and caddisflies. This species may forage in large groups (IDFG 2016).

Willow Flycatchers are closely associated with riparian shrub habitat, as their name implies. This species migrates to north Idaho for the nesting season where it breeds in moist shrubby areas often with standing or running water. Willow flycatchers are aerial insectivores that capture insects in the air or glean them off of plants (Rodewald 2015).

<u>Bats</u>

The bat species in Table 13 are habitat specialists because they require roosting and hibernating habitats that are very specific in their temperature and airflow requirements (Adams 2003). Often bat population sizes and demography, roosting sites, and life history requirements are not well known. This lack of knowledge leads most wildlife and land managers to take a more conservative approach when it comes to actions that may impact these bat species or their

habitats. Some species that use snags, loose bark, cavities, or foliage for roosting may also be present on the site. Hoary bats are migratory and roost in the foliage of live trees. Silver-haired bats are also migratory and roost in small colonies in trees. California myotis (myotis is a type of bat) prefer dry conifer sites, and they may use this site for foraging. They may also roost under loose tree bark (Adams 2003). The fringed myotis, which is relatively rare in north Idaho, is most likely to be found in low elevation ponderosa pine. Little is known about its roosting habitat requirements, but snags are one likely source in spring, summer, and early fall (Adams 2003). Townsend's big eared bat may use this site for foraging and roosting. Man-made structures may be used during the summer months as well (Adams 2003). The long-legged myotis and long-eared myotis are both forest dwelling bats that use snags, caves, mines, and sometimes structures as roosts (Adams 2003). This site may provide both foraging and roosting habitat for these two species.

Migratory Birds

A variety of habitats in the project area provide foraging and nesting habitat for numerous neo-tropical migrants in spring and summer and resident birds throughout the year. These habitats include mixed coniferous forests, the shrubby forest understory, sunny forest openings with grasses and shrubs, wet and dry meadows, and riparian plant communities. Birds may nest in coniferous trees, from near to ground level up to the highest branches. They may be secondary cavity nesters, or nest on the ground.

Western tanager, Swainson's thrush, pine siskin, MacGillivray's warbler, orange crowned warbler, evening grosbeak, Hammond's flycatcher, red-breasted nuthatch, black-capped chickadee, pileated woodpecker, black-capped, mountain and chestnut- backed chickadees, Chipping sparrow, brown creeper, and Townsend's warbler were among the species documented during several site visits to the forested portions of the project area.

The meadow area north of the lake and between the east and west sides of the project area includes seasonally flooded habitat adjacent to the lake shore. Thus in fall and spring this area is important to migrating and nesting waterfowl. The riparian habitat that borders the meadow as well as the meadow itself support species like cedar waxwing, song sparrow, northern flicker, gray catbird, belted kingfisher, red-tailed hawk, and yellow warbler.

While many migratory bird species may be found on the project site, this analysis will focus on those species of particular concern, including BLM Type 2 species and Idaho Fish and Game SGCN.

Amphibians

The Coeur d'Alene salamander (*Plethodon idahoensis*) is associated with three habitat types; waterfall spray zones, springs and seeps, and stream edges. In wet weather they may be found under leaf litter, logs, and bark (IDFG 2005). The type locality for this unique endemic is just across the lake in Wolf Lodge Bay. Forest sites where they have been documented have at least 25% canopy cover but can be highly variable in cover type; from ponderosa pine to hemlock (Montana Fish, Wildlife, and Parks 2009). Because they respire through their skin, the most important habitat component for the Coeur d'Alene salamander is moisture and humidity (IDFG

2005). On the project site, this species would be located in perpetually wet areas, such as a seep, spring, creek, or waterfall spray zone.

Other Wildlife

There are several ponds within the project area. Some of the smaller ponds are seasonal, while the larger, deeper ponds have at least some water throughout the year (presumably the ponds are manmade). But regardless, they now provide habitat for amphibians such as spotted frogs (*Rana pretiosa*) and are an important water source for other animals like bats, deer, birds, and small mammals.

Sign of elk (*Cervus Canadensis*), moose (*Alces alces*), deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*) were found throughout the project area. These species are generalists and can be found in a wide array of vegetative communities from brushy clear cuts, to dense forests with little understory. Rocky Mountain elk prefer winter habitat that is composed of 60% forage and 40% cover (Thomas et al. 1979). Areas with high canopy cover and little forest understory would not be considered productive foraging areas, but they are valuable as security areas and thermal cover areas during winter months. (Peek et al. 1982). South-facing slopes with vigorous brush fields and nearby escape cover, provide vital winter range for elk, while high elevation brush fields provide equally important transition range providing nutrition that elk need to improve their body condition prior to winter (Innes 2011). Peek et al. (1982) found that elk tend to use forage areas within 1200 feet of cover. The low elevation of the project site, combined with the high levels of human development around BLM lands make this area particularly valuable to big game, especially white-tailed deer.

This project site provides necessary habitat components for wolves (*Canis lupus*), mountain lion (*Puma concolor*), bear, ruffed grouse (*Bonasa umbellus*), wild turkey (*Meleagris gallopavo*), bobcat (*Lynx rufus*), and numerous small mammal species like raccoons (*Procyon lotor*), skunks (*Mephitis mephitis*), and coyotes (*Canis latrans*). These species utilize many vegetation communities and their presence is often influenced by the presence of humans. Areas with significant human disturbance are less likely to be used by many wildlife species (Steidl and Powell 2006).

7.14.2 Environmental Effects from Alternative A (Proposed Action)

Vegetation Treatment and Fuels Treatments

The following table indicates the medium to long term effects of the project on Special Status Species resulting from the forest treatment prescription outlined in Alternative A. For the purposes of this analysis, medium to long term is defined as from 2-30 years after project implementation. Discussion of the medium to long term effects and short term impacts of project implementation are described in more detail below.

Table 13. Medium to long term effects of Alternative A on Special Status Species in the project area.

Species	Positive Effect	Neutral or No Effect	Negative Effect
Grizzly bear**		X	
Wolverine**		X	
Bald Eagle***	X		
Northern Goshawk***			X
Flammulated owl***	X		
Cassin's finch***	X		
White-headed woodpecker***	X		
Lewis's woodpecker***	X		
Common nighthawk***		X	
Willow flycatcher***			X
Fringed Myotis***		X	
Townsend's big-eared bat***		X	
Long-eared myotis***		X	
California myotis***		X	
Hoary Bat***		X	
Silver-haired bat***		X	
Long-legged myotis***		X	
Western small-footed myotis***		X	
Coeur d'Alene salamander***		X	

** Threatened, Endangered, Proposed, or Candidate Species
***BLM Type 2 Species or Idaho Species of Greatest Conservation Need

Indirect and Direct Effects- Threatened, Endangered, and Candidate Species

It is possible that grizzly bear or wolverine may pass through or temporarily use the site during dispersal, but it is not likely they would inhabit the site with any regularity.

The project area could potentially provide habitat for grizzly bear and wolverine because these two species are a fairly general in their habitat requirements. However, the high density of existing development around the project area and the consistent use by people for recreation make the habitat in project area and vicinity marginal at best. If a grizzly bear or wolverine did pass through the area at the time of implementation, they would likely be disturbed enough to leave. This is highly unlikely, but if it did occur, it would not result in any significant or long lasting impact to the animal. Any effects to the animal would be of very short duration and low to moderate intensity. Changes to habitat from the proposed vegetation treatment outlined in Alternative A would neither benefit nor have negative indirect impacts to the transitional habitat that may be present in the project area.

No denning habitat for either species is found within or near the project area. Also no significant impact to forage or prey availability would occur if Alternative A were implemented. No new

roads would be constructed or opened to the public as part of this alternative and thus no negative impacts would be expected from implementation of Alternative A.

Direct and Indirect Effects on BLM Type 2 and Idaho Fish and Game Species of Greatest Conservation Need

Birds

Direct impacts to Special Status bird species are largely related to human disturbance and vegetation and snag removal. Repeated disturbance can cause nesting birds to abandon their nests or increase the likelihood of nest failure. Likewise, removal of vegetation where birds are nesting would destroy nests and result in mortality to offspring and potentially adults (in the case of cavity nesting birds).

Because no vegetation would be removed between April 1st and July 15th direct impacts to many birds would be avoided during the nesting season. This design feature in the prescription should help avoid the loss of nests, eggs, and nestlings for the vast majority of birds in the project area. Some species may attempt a second clutch and their nest may still be active after July 15th. Also it is possible some cavity nesting resident species may initiate their nest attempt before April 1st. In this case, loss of eggs and nestlings would be expected. However, this should only apply to a small proportion of nesting birds as most nest attempts have been completed by July 15th and do not start before April 1st (Bird Studies Canada 2013) (See Appendix J: *Northern Continental Divide Nesting Calendar*).

Indirect effects to special status birds are dependent upon how the silvicultural prescription modifies habitat. Removing diseased and dying trees and reducing canopy cover would support the growth of dominant large diameter trees. Preferred tree species for retention in this Alternative include ponderosa pine, larch and large diameter Douglas fir. Removal of smaller diameter shade tolerant trees would reduce competition for the tree species that are preferred by Lewis's woodpecker, white-headed woodpecker, and flammulated owl for nesting cavities. In addition, retaining and promoting the dominance of large pine trees would provide a necessary food source for Cassin's finch, white-headed woodpecker, and Lewis's woodpecker. Implementing the snag objectives outlined in Objective FW 2.2.1 of the RMP and in the Environmental Design Features Section of this document will preserve nest cavities and retaining large diameter pines will ensure the future availability of suitable snags for nesting for these species.

If there are goshawks nesting in the project area, they may be impacted by logging activities. Adults may begin laying eggs in late April or early May. The breeding season from egg-laying to fledging is about 80 days. It is possible that nesting attempts for this raptor may continue beyond July 15th (Rodewald 2016). If the nest is not found prior to tree falling the nest could be destroyed or the individuals could be disturbed enough that the likelihood of survival for offspring would decrease. The RMP prescribes a buffer of 100 yard for any active raptor nest. So evidence of nesting should be reported by the logger, contractor, or field office personnel to the biologist so a buffer can be flagged. Logging activities would then resume once the nesting attempt is complete.

Negative indirect impacts to the Northern Goshawk can be expected in the project area. Goshawks prefer interior closed canopy forests for nesting (Moser 2007; Rodewald 2015). Goshawks nest in closed canopy forests on moderate slopes (Moser 2007). Moser (2007) found timber harvest did not affect territory re-occupancy post timber harvest, as long as more than 39% of the 420 acre territory contained potential nesting habitat. Because much of the surrounding private lands have either been harvested in the past, have been converted to agricultural uses, are now home sites, much of the adjacent habitat is not suitable for goshawk nesting. This Alternative would impact about 616 acres of forested habitat which does not meet the standard of 70% canopy cover recommended for goshawk nesting habitat. However, the project area does represent some of the highest canopy cover left within the analysis area and forests would likely move toward suitability if left untreated. Thus treatments in the project area that open up the forest canopy would further reduce suitability and future suitability for nesting. Even the variable density thinning prescribed in Alternative A is unlikely to leave enough untreated forest to create the 39% closed canopy cover that this species prefers. The project area would transition to foraging for this species habitat, which is already in greater abundance within the analysis area (Rodewald 2015).

While silvicultural treatments would not be implemented in habitat for willow flycatcher the lower landing road which follows the shoreline of Blue Creek Bay would be used for transporting equipment and hauling logs. The provision that does not allow tree falling or vegetation removal between April 1st and July 15th does not disallow equipment staging or hauling of logs. If these activities were to occur during the nesting season for willow flycatcher, disturbance of nesting adults may result in decreased nest success. The area of impact for this species is so limited that at most 1-2 pairs would be impacted if they are present.
As a habitat generalist, the common nighthawk is unlikely to be impacted by the proposed silvicultural treatment in Alternative. The dates for harvest should avoid impact to nesting nighthawks within the project area.

Bald eagles would not be negatively impacted by this Alternative. The retention of large diameter trees would maintain suitable nesting and perching sites for this species. Disturbance to bald eagles may occur during implementation but would not occur during the nesting period. Any active nests found in the project area would be buffered to avoid disturbance to adults and offspring.

Bats

In the short term, bats like the myotis species listed in Table 14 that use dead or dying trees as roosting sites would be negatively affected during implementation of the project. Mortality is likely for those roosting in a harvested tree. Some bats may escape as the tree is falling. Over the medium to long term, enough snags would be retained and sufficient recruitment of new snags resulting from insects and disease would provide roosting habitat needed to support bat populations in the project area. The proposed vegetation prescription in Alternative A would not substantially impact bat foraging habitat. The bat species likely to be found within the project area are generalists when it comes to foraging and the proposed vegetation removal is not likely to significantly impact the availability of insect prey for bats.

Amphibians

Negative impacts to the Coeur d'Alene salamander would be avoided by stream and pond buffers and road construction standards. This alternative includes stream buffers for intermittent and perennial streams and a 75 foot buffer for ponds where vegetation would be untreated. If new and existing roads are not properly constructed or maintained, then erosion into streams may increase as a result of logging activity. This would decrease habitat quality for aquatic species that use low- sediment stream habitats. This Alternative does not include construction of new roads and all roads would be closed to public use after implementation. As proposed, the project should have little to no impact on any aquatic species, including the Coeur d'Alene salamander.

Direct and Indirect Effects- Migratory Birds

Vegetation removal would not occur between April 1st and July 15th. This design feature would significantly reduce direct impacts to migratory birds nesting in the project area. There would be no loss of nests, eggs, or nestlings during this time period and no disturbance to adults. There could be some birds that attempt a second clutch and these birds may have active nests after July 15th. These birds would be negatively impacted by vegetation removal. However, limiting logging activities during the specified time period would cover the first nest attempt for the vast majority of migratory bird species within the project area.

Indirect effects on migratory birds would vary throughout the project area. Where one species may be negatively affected by forest canopy reduction, another species may benefit. For example, aggressive tree removal negatively affects pacific wren, Townsend's warbler, and Hammond's flycatcher (Rodewald 2015). However yellow warbler, orange-crowned warbler, and MacGillivray's warbler would benefit from tree removal once the shrub community responds to increased sunlight and decreased competition with trees (Rodewald 2015). Removing smaller diameter shade-tolerant trees would hasten the growth of the existing dominant trees. This would benefit species like pygmy nuthatch and calliope hummingbird. Opening the canopy should also benefit any existing hardwood trees like birch and aspen. The targeted treatment to expand existing aspen stands would have benefits to many wildlife species such as red-naped sapsucker, northern goshawk, and flammulated owl (Rodewald 2015). None of the vegetation treatments in this alternative are expected to negatively affect migratory bird populations. Though individual birds may be impacted, effects would not rise to the level of negative impacts to the local or regional population.

Impacts to cavity nesting birds are discussed in the section below.

Indirect and Direct Effects- Other Wildlife Species

Raptors

Raptor species, such as Merlin, Sharp-shinned Hawk, Barred Owl, and Great-horned Owl that are nesting during implementation may be disturbed by logging activities. Owls, in particular, may begin courtship and nesting activities as early as March. Actions 2.3.1 and 2.3.2 in the Resource Management Plan require that forest structure and activities around any active raptor nests in the project area be buffered by 100 yards. This would reduce disturbance and habitat impacts until nesting is completed. However, if active nests are not found prior to implementation, eggs and nestlings may be lost if the nest tree is cut down. This likelihood can be further reduced by postponing logging as long as possible during the nesting season

throughout the project area. Prohibiting tree falling until after July 15th would increase the likelihood that raptors have fledged their chicks before nest trees are felled. Any raptor nests that are found by loggers, contractors or field office personnel would be reported to the Field Office Biologist so that a buffer can be flagged. Logging activities would then resume after the nesting attempt is complete.

Cavity Users

Short-term direct impacts to cavity dependent wildlife would occur at the time of harvest- when birds, bats, and other small mammals like flying squirrels may be using the cavities for nesting or roosting. Prohibiting logging between April 1st and July 15th should mitigate most of the losses for resident and migratory birds, as many species would have had at least one nesting attempt by that time. Other wildlife species, mostly small mammals, would likely die if they are inside cavities and a snag has to be felled.

Removal of dead and dying trees would have short term indirect impacts on cavity nesters, such as woodpeckers that use these insect infested trees as a food source and nesting habitat. However, retention of snags as proposed and as directed by the Coeur d'Alene Field Office Resource Management Plan should provide enough cavity availability to accommodate primary and secondary cavity users. In addition, mortality of trees due to root rot, insects, and disease would ensure a continuous supply of dead and dying trees for cavity dependent wildlife. Minimizing the loss of large diameter snags that must be cut by loggers for safety reasons, and minimizing post project loss of snags due to blow down, would reduce the potential negative impacts to cavity users. High value snags that are a hazard to loggers should be marked and buffered from treatment so that cutting them is unnecessary.

Big Game

Opening up the canopy and reducing tree density would reduce thermal cover and security cover for big game. At the same time this would create more productive foraging areas for deer, elk, and moose. Productive forage where cover is scarce has reduced value if hiding and thermal cover is in short supply (Peek et al.1982). For portions of the project area that are adjacent to private lands lacking in cover due to historic timber harvest, tree removal is not likely to benefit big game in this forage rich environment.

The proposed prescriptions for harvest would take mostly small diameter trees, and leave large healthy trees. Use of the variable density prescription would leave some patches of untreated forest and also create small forest openings which benefit many wildlife species, including ungulates. Some level of canopy cover would remain and recovery of brush in the understory would not eliminate hiding cover entirely. Retaining cover as islands between trails and high use areas would give deer and elk secure areas to avoid human disturbance. Overall, there would be a loss in thermal cover for big game animals.

In general, elk avoid roads with human activity and avoid disturbances created by active logging operations (Skovlin et al. 2002). Elk avoid areas near roads open to motorized vehicles across a variety of seasons, landscape conditions, and geographic regions. Elk generally avoid habitat adjacent to roads, particularly during calving and hunting seasons and during the rut. Ensuring

that new and existing roads are effectively closed would help maintain security of elk in the project area.

Wolves and other predators of big game such as mountain lion and black bears may find increased numbers of prey or a better hunting environment where cover has been reduced if prey stay in the area and use newly created and rejuvenated forage sites.

Other Wildlife

Logs provide habitat for animals like salamanders and invertebrates that are a food source for other wildlife. Logs are also used by ruffed grouse for courtship displays during the nesting season.

Because much of the project area is not meeting the standards for logs per acre outlined in the RMP, no firewood should be removed by the logger or the public. Cutting and leaving trees that are 14 inches or greater in diameter would help the area achieve the standards. Logs greater than 14" diameter would be retained in areas that are currently not meeting the standards outlined in the RMP. In areas that have an abundance of snags (exceeding the objectives in the RMP) smaller snags (closer to 14 inches dbh) may be cut and left to fulfill the logs/per acre requirement if the area is deficient.

Cover Type	Logs/acre
Wet cold conifer	10.1
Dry conifer	3.9
Wet warm conifer	7.8

Prescribed Burning and Fuels Reduction Treatments

Indirect and Direct Effects- Special Status Species

Effects of prescribed burning and fuels reduction treatment are very similar to other vegetation removal methods described above in the silvicultural treatment section. Equipment and human disturbance would cause some animals to leave the area temporarily. It is unlikely that grizzly bear or wolverine would be present in the project area during implementation and no direct impacts to these two species are expected as a result of fuels treatments. Changes in habitat from fuels treatments would not dramatically change the character of the habitat that could be used by grizzly bears or wolverine if they were passing through the site.

Only small diameter fuels (8 inches and less) would be removed by slashing and construction of the fuel break and slashing would occur outside of the nesting season for most birds. Therefore no impacts to SGCN or Type 2 species are expected to result from these activities. Likewise, no mortality to any Type 2 Species or SGCN would be expected from implementation of broadcast burning, piling, or pile burning. Large diameter trees and snags used by cavity nesting birds should not be impacted by broadcast burning. If there are high value snags in the broadcast burn area, fuels would be pulled away from the tree to reduce the likelihood of the snag burning and falling over. Smoke may irritate and disturb nesting birds and roosting bats, but the disturbance would be temporary. No fuels treatments would be conducted within the riparian buffers, thus no impacts to Coeur d'Alene salamander are expected.

Changes to habitat as a result of the proposed fuels treatments would restore white-headed woodpecker, Lewis's woodpecker, and flammulated owl habitat. In addition, maintaining large diameter pine and reducing the likelihood of a stand replacing fire that could kill large pines would benefit Cassin's finch.

Migratory Birds

If slashing, fire line construction, and burning occur during the nesting season, many birds would lose their nests, eggs, and nestlings. Species that nest on the ground, in shrubs or prefer shrubby habitat for foraging would be directly and indirectly negatively impacted by fuel break construction, slashing and piling, and broadcast burning. Slashing vegetation will take place outside of the nesting season for most bird species and so no direct impacts would be expected from these activities. However, if prescribed burning is implemented in spring, as it often is, widespread nest loss and abandonment can be expected. Examples of species most likely to be impacted include spotted towhee, ruffed grouse, song sparrow, chipping sparrow, yellow warbler, cedar waxwing, and gray catbird (Kaufman 1996). Delaying these activities as much as possible (until after July 15th) or implementing broadcast burning prior to April 1st would best protect nesting resident and migratory birds.

The removal of small trees and brush has the potential to destroy habitat for some species and create habitats for others. Refer to the effects section for Silvicultural Treatments for greater detail on the indirect effects of habitat changes. In general, fuels treatments would favor those bird species that prefer a more open understory and a more open canopy. Initially there would be little understory left available for nesting and hiding cover. This would especially affect ground nesting and shrub nesting bird species like spotted towhees, ruffed grouse, song sparrows, warblers, and dark-eyed juncos. Within about three years shrub species would recover and the habitat would again become suitable for many ground nesting birds species.

Other Wildlife Species

Initially fuels treatments would negatively impact deer and elk. The loss of hiding cover and the disturbance to fawning habitat may have direct impacts on the survival of white-tailed deer in particular. Hiding cover would be restored in most cases within 3-5 years. Existing brush would have higher forage value once burned, benefitting deer and elk. Where the understory has not been vigorous because of shade, burning would induce vigorous growth of the shrub, forb, and grass understory (Innes 2011; Hooker and Tisdale 1974).

Active raptor nests would be disturbed during implementation of burning. However, impacts are not expected to rise to level of mortality or reduced nesting success. Small mammals may experience high levels of mortality if they are using piles for cover or cannot escape broadcast burning. This could indirectly impact other species that prey on small mammals like owls and raptors. However, populations of small mammals would be expected to recover quickly and the broadcast burning area is small enough that population level impacts to raptor prey would not be expected.

Direct and Indirect Effects of Recreation Developments- All Species

Alternative A includes significant recreational developments on the west side of the project area. In addition, a trail would be constructed at the northern end of the meadow crossing Blue Creek

and connecting the east and west side trail systems. The direct impacts resulting from trailhead and trail construction are largely vegetation removal and wildlife disturbance during construction. During construction trees, shrubs, grasses, and forbs would be removed to create compacted surfaces for human use. While the amount of habitat removed would not be significant, wildlife present during construction would be displaced, either temporarily or permanently. Deer, elk, and other large animals would likely leave the area but may return shortly after construction depending on the subsequent level of recreational use.

To reduce impacts to migratory birds and Special Status Birds, trail and trailhead construction would not occur between April 1st and July 15th. This would allow most nesting birds to complete their nesting effort prior to vegetation removal.

The indirect impacts of recreational developments are far more significant to wildlife than the direct impacts of trail construction. While much of the area already receives moderate recreational use, public use of the area is likely to increase as recreational opportunities increase and knowledge of the improved recreation opportunities increases. All wildlife species are susceptible to disturbance and the impacts to the species vary by species, individual, time of year. While some wildlife may be unaffected, it is reasonable to say that very few species benefit from the increased presence of humans in their habitats.

The east side trail system is already well developed and trailheads were constructed to facilitate use of the area. Further improvements proposed in Alternative A are likely to increase use of this portion of the project area. Though increases here are not expected to be as dramatic as increases that would occur on the west side of the project area where little to no developed recreation exists.

The west side and the meadow, in particular, would be most impacted by changes in human disturbance to wildlife. Currently there are no formal recreational developments in this portion of the project area. Development of mountain biking trails, and trails for use by hikers and horse-riders would result in far more human disturbance to wildlife in this portion of the project area.

In response to increased disturbance, larger animals would move to more secluded habitats when recreation levels are high. During daylight hours, for example, deer and elk may stay in islands of higher cover habitat farther from trails. At night, use of habitat adjacent to trails would likely increase. Some animals may choose to leave the area entirely for all or portions of the year when use is particularly high (summer and fall).

Smaller animals like birds may continue to use habitat adjacent to the new trail networks and trailhead developments. However, nesting success for these species may decrease if they are continually disturbed and have to leave the nest. This would leave young more vulnerable to predation, to perishing from harsh environmental conditions, or decreased body condition due to interrupted feeding sessions.

While hunting and trapping use within the WFCA is not particularly high currently, it is possible that a more developed trail network could result in higher use by hunters and trappers. However,

the area is so accessible currently, it is not expected that this type of use would increase significantly and it could even decrease as hunters and trappers typically prefer to use areas that are lower in human traffic, where user conflicts are less likely, and wildlife are less disturbed.

In addition to disturbance, public lands users also bring with them other unwelcome guests when it comes to wildlife. Many hikers bring their dogs with them and often they do not obey leash laws. Dogs chase and harass wildlife and in some cases kill wildlife while out on public lands. Another unwelcome impact of increased use by humans is the continual flow of weed seeds into an area. Weed seeds hitchhike on shoes, mountain bike tires, on horse hooves and in horse droppings. Logging activities often result in the introduction of weeds throughout project areas and recreational users are likely to do the same as the often do not stay on trails. See Section 7.8 for a detailed discussion regarding the potential for introduction and spread of invasive species and noxious weeds. Weeds degrade wildlife habitat by replacing important food sources and out competing native vegetation used as cover for wildlife species.

7.14.3 Environmental Effects from Alternative B (No Forestry Treatment of Western Portion of Ownership, No Prescribed Burning and No Parking off Bonnell Road)

Indirect and Direct Effects- All Species

All the impacts described under Alternative A would continue to apply to this proposal for *east side* of the project area where the vegetation treatment prescription and recreation developments would remain unchanged.

On the west side, only a fuel break would be constructed. Impacts to wildlife from the construction of the fuel break are described in more detail under the effects of Fuels treatments for Alternative A. If no forest treatment is conducted in this portion of the project area, the habitat characteristics would remain unchanged until forest insects, disease, or wildfire change the forest stand. The area would continue to provide more hiding and thermal cover for big game animals. Those wildlife species that prefer a more closed-canopy forest would benefit from Alternative B. Species such as northern goshawk, Townsend's warbler, and Hammond's flycatcher would continue use the area. Those species that prefer a more open forest structure with dominant large trees would not benefit from Alternative B. Species that prefer a more open understory with lower canopy cover and larger diameter trees like flammulated owls, brown creeper, and white-headed woodpecker would not colonize this portion of the project area in the future. Instead they would find suitable habitat on the east side of the project site, or in surrounding areas.

This Alternative includes all of the recreational developments outlined in Alternative A except no parking area on Bonnell Road. The one acre area described in Alternative A would not be impacted and no habitat would be lost. It is also possible that the levels of recreation would be different if there were no parking on Bonnell Road. Certainly the level of disturbance to the proposed parking area and the surrounding habitat would be less because use would be more transitory. Rather than parking, staging, unloading equipment and reloading equipment use would be largely limited to hikers, bikers, and horse riders passing nearby on trails in the area. The disturbance to wildlife would continue at levels higher than are currently occurring but not as high as if there were an official parking area and trailhead there.

For the remainder of the project area all direct impacts to wildlife from recreation would remain the same. Because there would be no tree harvest, and only a fuel break on the west side under this proposal, there would be more cover available to wildlife. This would lessen the impacts of increased disturbance resulting from increased recreational use by giving animals more places to hide from users.

7.14.4 Environmental Effects from Alternative C (No Action)

Without recreation improvements proposed in Alternatives A and B, Alternative C has the least likelihood of increasing recreation within the project area. This would be a benefit to *all wildlife species*. While some tolerate human presence better than other, some like the goshawk, are particularly sensitive to human disturbance, especially during nesting. A lower the level of human presence, would result in a lower likelihood of mortality and/or stress for many wildlife species. The negative impacts of increased recreation are discussed in detail under the analysis of effects for Alternative A.

<u>Endangered, Threatened, or Candidate Species</u>

Grizzly bear would be the most likely to use or pass through the project area. However, the current project area is less than suitable habitat for grizzlies because of the high level of human presence, development, and disturbance.

The "no action" alternative would eliminate the possibility of any direct effects to dispersing grizzly bears in the unlikely event one was in the project area. If no forest is thinned and no prescribed burn occurs, ungulates would not benefit from more productive forage on the landscape and grizzly bears would not indirectly benefit from increased ungulate use and possibly increased ungulate numbers. Conversely, no cover would be reduced in areas that are already somewhat lacking in this habitat element. Portions of the area may experience less use by ungulates if cover is not present near forage.

Increased recreational use would be a negative impact to grizzly bears and wolverines if they were dispersing through project area. Human bear conflicts often result in a higher likelihood of mortality for bears and the disturbance to these two species would increase stress levels. So while the chance of human encounters with these two species is very low, the probability would be even lower if recreation levels stayed the same as they are now. Use of the area is expected to increase as the population surrounding Coeur d'Alene increases. However, the "no action" alternative would not further increase recreational use because no improvements to recreation opportunities would be made.

<u>BLM Type 2, SGCN and Migratory Birds</u>

Mortality to wildlife due to machinery and tree falling, as well as disturbance from human activity, would not occur under the No Action alternative.

If the No Action alternative is selected, an increase in the number of dead and dying trees is expected. As a result, the likelihood of a stand-replacing fire would also increase. Those wildlife species that require snags, prefer more dense forest stands, and rely on forest insects would be positively affected if this alternative was selected. For example, pileated woodpeckers would have a higher density of insect infested trees to forage in, as well as numerous available cavities to choose from. Northern goshawks prefer a more densely stocked closed canopy forest,

and Alternative C would result in more of this type of habitat. Benefits to these species would be negated in the long term if a stand- replacing fire were to occur that reduced large diameter trees in the project area.

Where there is less forest cover available nearby, "no action" would benefit those species requiring more forest cover where it is already lacking. Examples include northern goshawk, pacific wren, and Townsend's warbler.

Special Status Species that prefer more open stands with large diameter pine trees and a brushy understory or the presence of hardwoods would not benefit from selection of the "no action" alternative. Examples include red-naped sapsucker, flammulated owl, MacGillivray's warbler, and yellow warbler.

Other Species

If the "no action" alternative is selected, none of the negative or positive effects described in Alternatives A or B would influence ungulate habitat, habitat for raptors, or other wildlife species. Unless a stand-replacing fire was to impact the project area, the forest would continue to age. Dominant trees would continue to get larger, but at a slower rate because of competition with shade tolerant trees increasing in the understory. Species that prefer a more dense forest with a closed canopy would benefit from these changes. Pacific wren is a good example of a species that would be positively impacted by such changes. There would be no direct disturbance or mortality to migratory birds.

Table 14 below, illustrates the projected medium to long-term effects on the special status species that would occur if no action is taken. This analysis does not assume that a stand-replacing fire would eventually occur and summarizes effects to habitat. It also does not consider the impact to wildlife of lower levels of recreational use in the project area.

Table 14. Projected medium to long-term effects on Special Status Species with No Action Alternative.

Species	Positive Effect	Neutral or No Effect	Negative Effect
Bald Eagle		X	
Northern Goshawk*	X		
Flammulated owl			X
Lewis's Woodpecker			X
White-headed woodpecker			X
Cassin's finch		X	
Common nighthawk		X	
Fringed Myotis*		X	
Townsend's big-eared bat*		X	
Long-eared myotis*		X	
California myotis*		X	
Long-legged myotis*		X	
Western small-footed myotis*		X	
Coeur d' Alene Salamander*		X	

*Special Status Species, ** Threatened, Endangered, Proposed, or Candidate Species

7.14.5 Cumulative Effects

Alternative A-Proposed Action

The cumulative impacts analysis area for wildlife is the Blue Creek watershed. Blue Creek is the main tributary flowing into Blue Creek Bay, and drains an area of approximately eight square miles. The watershed is mountainous and forested with limited residential development extending for several miles upstream of the project location. Elevations range from 2,150 feet at the site, up to 4,050 feet near Kelly Mountain. This area encompasses 8 square miles (5120 Acres) and was selected to incorporate the large ranges of big game species and carnivores, without being so large as to dwarf potential impacts to species with very small ranges like song birds, reptiles and amphibians.

Portions of the analysis area and vicinity represent a highly disturbed and significantly modified landscape. Aggressive logging on adjacent private lands, conversion of forest to agricultural uses and home sites, the power line, noise, pollution, movement barriers, and traffic hazards from Interstate 90, and the human activity associated with the town of Coeur d'Alene have all resulted in significant disturbance to and modification of habitat. Historic and continuing activities in the action area that have impacted wildlife populations include logging and forest health projects, wildfires, forest pathogens, prescribed fires, mining, recreation (consumptive and non-consumptive), road and trail building, and rural and urban development along Blue Creek Bay and nearby East Yellowstone Trail and Wolf Lodge Bay. All of these activities have the potential to negatively affect wildlife species, while some have positively benefited wildlife species.

Logging and forest health projects temporarily increase disturbance and may permanently increase access to hunters and recreationists. These projects have the potential to both positively and/or negatively affect wildlife species depending on their habitat requirements. For example, northern goshawk would be negatively impacted by aggressive tree cutting in a dense forest stand, whereas big game animals and McGillivray's Warblers would benefit from opening the forest canopy in some areas.

Reasonably foreseeable actions in the analysis area include timber harvest where merchantable timber remains, forest health projects, and further fragmentation of habitat by development of home sites and rural forest conversion to agricultural uses. Consumptive and non-consumptive recreation can be expected to increase over time as the permanent and seasonal population of Coeur d'Alene and surrounding areas continues to grow. Forest insects and disease will continue to cause tree mortality in the analysis area. If no action is taken, these trees will eventually fall and regeneration of early seral species would be expected.

In general, the loss of interior unfragmented and mature forested habitat is a concern for species like northern goshawk in the analysis area. If a catastrophic fire is avoided because of the reduction of dead and dying fuel proposed in Alternative A, the benefit of the project could outweigh the reduction in cover. The reduction in cover would be far less than a reduction seen after a forest fire. Otherwise the effects of this project on interior forest species is negative and these species are likely to decrease over time in the analysis area.

White-headed woodpecker, Lewis' woodpecker, and flammulated owl are species that prefer more open, mature, dry site forests. Alternative A should benefit these species. If large trees are retained in future forest projects and developments in the analysis area, these species will benefit over time. Likewise, if large pines are left as reserve species in future projects that impact forest stands, Cassin's finch will benefit within the analysis area as well.

If large trees are not retained and future harvest is aggressive, leaving little to no canopy cover, species that prefer very open forest stands or open brush fields are likely to increase in the analysis area. Continued forest projects that reduce the canopy and the eventual loss of trees due to insects and disease will make habitat more suitable for these species.

Alternative A would have cumulative effects on Special Status Species or migratory bird populations in the analysis area. Dense forest stands are unlikely to increase within the analysis area, given the reasonably foreseeable actions. The forest treatments proposed would prevent the project area from becoming suitable or more suitable for goshawk nesting. In addition, migratory bird species that prefer denser forest would have reduced habitat availability in the analysis area, which currently provides little habitat of this type. The project would impact about 616 acres of the area of impact represents about 1 northern goshawk territory. Meanwhile, suitable habitat for 4 other special status species (Lewis's woodpecker, white-headed woodpecker, flammulated owl and Cassin's finch) would be maintained or restored if Alternative A is implemented. Given small scale of the project, coupled with the already disturbed landscape, and the impacts of the proposed project, the cumulative impacts to special status species and migratory birds are not expected to rise to the level of significance.

Alternative B

The cumulative effects for this alternative are very similar to those for Alternative A. The main difference is that more interior forest would be maintained under this alternative, supporting those wildlife species that prefer this habitat type. Reasonably foreseeable actions described under this section for Alternative A will ultimately result in lower availability of unfragmented interior forest habitat. So for those species, such as northern goshawk, Alternative B would be best as far as the impacts of the Alternative coupled with reasonably foreseeable actions. However, some Special Status Species would not benefit from the restoration of habitat on the west side of the project area that would benefit from the additional forest treatments proposed in Alternative A. The forest on the west side of Blue Creek Bay would continue to be impacted by insects and disease. Shade tolerant species would continue to fill in the canopy and understory of the existing stand and this habitat would continue to be unsuitable for white-headed woodpecker, Lewis's woodpecker, and flammulated owl. While the Special Status Species and migratory bird species (and their habitats) that are analyzed in this document would be affected by any of the Alternatives, the scale of the project and the number of individuals that would be affected would not rise to the level of cumulative impacts to the regional population.

Alternative C-No Action

Habitat changes from vegetation treatments would not occur under the 'No Action" alternative. The benefits to species that require large diameter open, and mature pine forests would not occur and these species would continue to decline in the analysis area. Conversely, the loss of interior forest habitat would not occur and this would benefit northern goshawks. Under the no action

alternative the eventual build-up of fuels would continue and could potentially result in a stand-replacing fire. This result would be negative for all species. Regardless of any eventuality, given the size of the project and the impacts of implementing "no action", coupled with the reasonably foreseeable actions in the analysis area; negative effects do not rise to the level of cumulative impacts to any Special Status Species of migratory bird species within the action area.

8.0 Tribes, Individuals, Organizations, or Agencies Consulted

Tribal Consultation
Coeur d'Alene Tribe

Persons and Agencies Consulted
Backcountry Horseman
Coeur d'Alene District Resource Advisory Committee
Congressional Representatives
- Honorable United States Congressman Raul Labrador, Judy Morbeck
- Honorable United States Senator Mike Crapo North Idaho Representative, Karen Roetter
- Honorable United States Senator James Risch, Sid Smith

Jane (Fink) Veltkamp
Idaho Conservation League
Kootenai County Commissioners
Representatives from the local mountain biking community

9.0 List of Preparers

Name	Title	Resource
Debbie Paul	Forester	Project Co-lead, Forestry
Mitch Owens	Outdoor Recreation Planner	Project Co-lead, Recreation
LeAnn Abell	Botanist	Vegetative Communities: Threatened, Endangered, and Sensitive Plants
Doug Evans	Natural Resource Specialist	Invasive, Non-native Plant Species
Carrie Hugo	Wildlife Biologist	Wildlife Threatened, Endangered, and Sensitive Animals Migratory Birds
Scott Pavey	Planning and Environmental Coordinator	Visual Resources
Kristin Sanders	District Fire Use Specialist	Fuels, Air Quality
David Sisson	Archaeologist	Cultural
Mike Stevenson	Physical Scientist	Hydrology/Soils
Cindy Weston	Resource Coordinator/Fisheries Biologist	Fisheries

10.0 References Cited

Bureau of Land Management. 2007. Coeur d'Alene Approved Resource Management Plan and Record of Decision. U.S. Department of the Interior, Bureau of Land Management, Coeur d'Alene, ID. http://www.blm.gov/id/st/en/prog/planning.html

Bureau of Land Management. 2009. Blue Creek Bay Recreation Project Plan Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Coeur d'Alene, ID. http://www.blm.gov/id/st/en/prog/planning.html

Bureau of Land Management. 2008a. Integrated Weed and Vegetation Management Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Coeur d'Alene, ID. http://www.blm.gov/id/st/en/prog/planning.html

Bureau of Land Management. 2008b. Blue Creek Bay Recreation Project Plan Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Coeur d'Alene, ID.

Kootenai County. (2016) *History of Kootenai County.* Coeur d'Alene, ID. http://www.kcgov.us/community/history/

Air Quality

Peterson, J.L. 2001 Regulations for Smoke Management. Pages 61 – 74 in *Smoke Management Guide for Prescribed and Wildland Fire, 2001 Edition*. C.C. Hardy, R.D. Ottmar, J.L. Peterson, J.E. Core, and P. Seamon, eds. National Wildfire Coordination Group, PMS-420-2.

Quigley, T. M., and S. J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the interior Columbia Basin. USDA Forest Service. Volumes I-V. Pacific Northwest Research Station. General Technical Report PNW-GTR-382. 303pp.

Reinhardt, E.D., R.E. Keane, and J.K. Brown. 1997 First Order Fire Effects Model: FOFEM 4.0 User's Guide. USDA Forest Service, Intermountain Research Station Gen. Tech. Rep. INT-GTR-344. 65pp.

Reinhardt, E. 2003. Using FOFEM 5.0 to estimate tree mortality, fuel consumption, smoke production, and soil heating from wildland fire. USDA Forest Service, Missoula Fire Sciences Lab, Missoula, MT. 6pp.

Sandberg, D.V., R.D. Ottmar, J.L. Peterson, and J. Core. 2002. Wildland Fire in Ecosystems: Effects of Fire on Air. Gen. Tech. Rep. RMRS-GTR-42 vol. 5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 79p.

Wright, C.S., C.S. Balog and J.W. Kelly. 2010. Estimating volume, biomass, and potential emissions of hand-piled fuels. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 23 p.

Fisheries

Benda, L., D. Miller, P. Bigelow and K. Andras. 2003. Effects of post-wildfire erosion on channel environments, Boise River, Idaho. Forest Ecology and Management 178: 105-119.

Buchanan, D.M., and S.V. Gregory. 1997. Development of water temperature standards to protect and restore habitat for bull trout and other cold water species in Oregon. Pages 1-8 *in*

W.C. Mackay, M.K. Brewin and M. Monita (eds). Friends of the Bull Trout Conference Proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Calgary, Alberta, Canada.

Chamberlain, T. W., R. D. Harr and F. H. Everest. 1991. Timber Harvesting, Silviculture, and Watershed Processes. *In* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19:181-205.

Dunham, J. B., M. K. Young, R. E. Gresswell and B. E. Reiman. 2003. Effects of fire on fish populations: landscape perspectives on persistence of native fishes and nonnative fish invasions. Forest Ecology and Management 178: 183-196.

DuPont, J. and N. Horner. 2003. Regional fisheries management investigations, Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-28, Job c-2, 2003 Performance Report, Cutthroat Trout Trend Assessment. Boise, Idaho.

Everest, F. H., J. R. Sedell, N. B. Armantrout, T. E. Nickelson, S.M. Keller, J.M. Johnston, W. D. Parante, and G. N. Haugen. 1985. Chapter 10: Salmonids. In E.R. Brown ed. Management of Wildlife and Fish Habitats in Forests of Western Washington and Oregon. 1985. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, and U.S. Department of Interior, Bureau of Land Management.

Fraley, J.J. and B.B. Shepard. 1989. Life history, ecology and population status of migratory bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. Northwest Science 63:133-143.

Furniss, M.J., T.D. Roelofs, and C. S. Yee. 1991. Timber Harvesting, Silviculture, and Watershed Processes. *In* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19:297-323.

Gresswell, R. E. 1999. Fire and Aquatic Ecosystems in Forested Biomes of North America. Transactions of the American Fisheries Society 128: 193-221.

Hendriks, P. 1997. Status, distribution and biology for sculpins (Cottidae) in Montana: a review. Montana Natural Heritage Program. Helena, MT. 29 pp.

Lemoine, M., M. K. Young, K. S. McKelvey, L. Eby, K.L. Pilgrim, M.K. Schwartz. 2014. Cottus Schitsuumsh, a new species of sculpin (Scorpaeniformes: Cottindae) in the Columbia River Basin, Idaho-Montana, USA. Zootaxa. 3755(3): 241-258.

May, C.L. and R. E Gresswell. 2003. Large wood recruitment and redistribution in headwater streams in the southern Oregon Coast Ranges, U.S.A. Can. J. For. Res. 33(8): 1352-1362.

Meredith, C., B. Roper and E. Archer. 2014. Reductions in Instream Wood in Streams near Roads in the Interior Columbia River Basin. North American Journal of Fisheries Management, 34:3, 498-506.

Murphy, M. L. and K. V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. N. Am. J. Fish. Manage. 9: 427-436.

Pratt, K.L. 1992. A review of bull trout life history. Pages 5 - 9 *in:* Howell, P.J. and D.V. Buchanan, eds., Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis, Oregon.

Rieman, B.E. and J. D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. USDA Forest Service, Intermountain Research Station, GTR INT-302, Ogden, Utah.

Rieman, B.E. and J. D. McIntyre. 1995. Occurrence of bull trout in naturally fragmented habitat patches of varied size. Transactions of the American Fisheries Society 124(3): 285-296.

Rieman, B.E., D.C. Lee, and R.F. Thurow. 1997. Distribution, status, and likely future trends of bull trout within the Columbia River and Klamath River basins. North American Journal of Fisheries Management 17:1111-1125.

Rieman, B. E., D. Lee, D. Burns, R. Gresswell, M. Young, R. Stowell, J. Rinne and P. Howell. 2003. Status of native fishes in the western United States and issues for fire and fuels management. Forest Ecology and Management 178: 197-211.

U.S. Fish and Wildlife Service (USFWS). 1999. Status Review for Westslope Cutthroat Trout in the United States. U.S. Fish and Wildlife Service. Portland, Oregon and Denver, Colorado.

U.S. Fish and Wildlife Service (USFWS). 2002. Chapter 1, Introduction. 137p. *In*: U.S. Fish and Wildlife Service. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). 2010. Bull Trout Critical Habitat Justification: Rationale for Why Habitat is Essential and Documentation of Occupancy. U.S. Fish and Wildlife Service, Idaho Fish and Wildlife Office, Boise, Idaho, Pacific Region, Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). 2015a. Recovery Plan for the coterminous United States population of bull trout (*Salvelinus fontinalis*). Portland, Oregon. xii + 179 pages.

U.S. Fish and Wildlife Service (USFWS). 2015b. Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus fontinalis*). ii + 179 pages.

Wondzell, S. M. and J. G. King. 2003. Postfire erosional processes in the Pacific Northwest and Rocky Mountain regions. Forest Ecology and Management 178: 75-87.

Forestry

Brown, R. T., Agee, J. K. and Franklin, J. F. (2004), Forest Restoration and Fire: Principles in the Context of Place. *Conservation Biology*, 18: 903–912.

Clark, J.S.; Iverson, L.; Woodall, C.W. and others. 2016. The impacts of increasing drought on forest dynamics, structure, and biodiversity in the United States. *Global Change Biology* 22:(7) 2329-2352.

Franklin, J.F.; Berg, D.R.; Thormburgh, D.A.; and Tappeiner, J.C. (1997). Alternative silvicultural approaches to timber harvesting: variable retention harvest systems. Pages *111–139* in K. A.Kohm *and* J. F.Franklin, editors. Creating a forestry for the 21st Century. Island Press, Washington , D.C .

Graham, R., A. Harvey, M. Jurgensen, T. Jain, J. Tonn, and D. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Research Paper INT-RP-477. USDA Forest Service Intermountain Research Station. 12 pages.

Harrington, C.A. 2009. Variable-Density Thinning-What the heck is it, and why should I care? *TimberWest* July/August p. 54.

Jones, B.E., Rickman, T.H., Vazquez, A. and others. 2005. Removal of Encroaching Conifers to Regenerate Degraded Aspen Stands in the Sierra Nevada. *Restoration Ecology* 13:(2) 373-379.

Neuenschwander, Leon F.; Byler, James W.; Harvey, Alan E.; McDonald, Geral I.; Ortiz, Denise S.; Osborne, Harold L.; Snyder, Gerry C.; Zack, Arthur 1999. White pine in the American West: A vanishing species - can we save it?. Gen. Tech. Rep. RMRS-GTR-35. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 20 p.
Rogers, Paul C., "Building Resilience Into Quaking Aspen Management" (2015). Aspen Bibliography. Paper 7312. http://digitalcommons.usu.edu/aspen_bib/7312

Oliver, C.D. and B.C. Larson. (1990). *Forest Stand Dynamics*. McGraw-Hill Inc. New York, NY.

Shepperd, W.D. 2001. Manipulations to regenerate aspen ecosystems. Pages 355-365 in Shepperd, W. D., Binkley, D. L. Bartos, T.J. Stholgren, and L.G. Eskew, compilers. 2001. Sustaining aspen in western landscapes: symposium proceedings, 13-15 June 2000; Grand Junction, CO. Proceedings RMRS-P-18. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 460 p.

Shepperd, W. D.; Rogers, P. C.; Burton, D.; Bartos, D. L. 2006. Ecology, biodiversity, management, and restoration of aspen in the Sierra Nevada. Gen. Tech. Rep. RMRS-GTR-178. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 122 p.

Stevens, Victoria. 1997. The ecological role of coarse woody debris: an overview of the ecological importance of CWD in B.C. forests. Res. Br., B.C. Min. For., Victoria, B.C. Work. Pap. 30/1997.

Tappeiner II J.C., Maguire, D.A., Harrington, T.B. (2007). *Silviculture and Ecology of Western U.S. Forests*. Oregon State University Press. Corvallis, OR.

US Geological Survey, Gap Analysis Program (GAP). August 2011. National Land Cover, Version 2.

Weiskittel, A.R., Kenefic, L.S., Seymour, R.S. & Phillips, L.M. 2009. Long-term effects of precommercial thinning on the stem dimensions, form and branch characteristics of red spruce and balsam fir crop trees in Maine, USA. *Silva Fennica* 43(3): 397–409.

Fuels

Agee, J.K., Skinner, C.N., 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management 211, 83–96.

Andrews, P.L. and R.C. Rothermel. 1982. Charts for Interpreting Wildland Fire Behavior Characteristics. USDA Forest Service Gen. Tech. Rep. INT-131.

Barrett, Stephen W. 1994. Fire Regimes on the Payette National Forest, Bear analysis Area. 18pp.

Graham,R. and T. Jain, 2005. Ponderosa pine ecosystems. USDA Forest Service Gen. Tech. Rep. PSW-GTR-198.

LANDFIRE: LANDFIRE 1.1.0 LANDFIRE.US_130FBFM40. U.S. Department of the Interior, Geological Survey. [Online]. Available: http://landfire.cr.usgs.gov/viewer/ [2012].

Raymond, Crystal L. and David L. Peterson, 2005. Fuel treatments alter the effects of wildfire in a mixed-evergreen forest, Oregon, USA. Can. J. For. Res. 35: 2981–2995.

Reinhardt, E.D., R. E. Keane, D.E. Calkin, J.D. Cohen, 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. Forest Ecol. Manage. 256:1997-2006.

Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Stephens, S.L. and M.A. Finney. 2002. Prescribed fire mortality of Sierra Nevada mixed conifer tree species: effects of crown damage and forest floor combustion. Forest Ecology and Management 162 (2002) 261–271.

Stephens, Scott L. and Jason J. Moghaddas. 2005. Experimental fuel treatment impacts on forest structure, potential fire behavior, and predicted tree mortality in a California mixed conifer forest. Forest Ecology and Management 215 (2005) 21–36.

Van Mantgem, Phillip and Mark Schwartz. 2003. An experimental demonstration of stem damage as a predictor of fire-caused mortality for ponderosa pine. Canadian Journal of Forest Restoration 34: 1343–1347.

Invasive, Non-Native Species

Asher, J. and C. Spurrier. 1998. The spread of invasive weeds in western wildlands: A state of biological emergency. The Governor's Idaho Weed Summit. Boise, Idaho. May 1998.

BLM. 2008. Programmatic Environmental Analysis for Vegetation Treatments. BLM, Coeur d'Alene Field Office. Coeur d'Alene, Idaho.

DeLuca, T.H. & Zouhar, K.L. 2000. Effects of selection harvest and prescribed fire on the soil nitrogen status of ponderosa pine forests. Forest Ecology and Management, 138, 263–271.

Hunter, M. E., and P. N. Omi. 2006. Response of native and exotic grasses to increased soil nitrogen and recovery in a postfire environment. Restoration Ecology 14:587–594.

Levine, J. M., M. Vil`a, C. M. D'Antonio, J. S. Dukes, K. Grigulis, and S. Lavorel. 2003. Mechanisms underlying the impacts of exotic plant invasions. Proceedings of the Royal Society of London B 270:775–781.

Moser, W. K., E. L. Barnard, R. F. Billings, S. J. Crocker, M. E. Dix, A. N. Gray, et al. 2009. Impacts of nonnative invasive species on US forests and recommendations for policy and management. Journal of Forestry 107:320–327.

Public Health and Safety

Idaho Transportation Department. 2014. *Idaho Traffic Crashes*. http://www.itd.idaho.gov/ohs/2014Data/Analysis2014final.pdf

Recreation and Socio-Economics

American Trails. 2011. *Jackson Hole Trails Project Economic Impact Study.p.7* http://www.mlppubsonline.com/publication/?i=81590

Coeur d'Alene Comprehensive Plan. 2007. [Online]: https://www.cdaid.org/files/planning/2007complan.pdf

Kootenai County Comprehensive Plan. 2010. [Online]: http://www.kcgov.us/departments/planning/newcompplan.asp

National Association of Homebuilders. 2013. *What Homebuyers Want.* https://www.nahb.org/en/research/housing-economics/special-studies/what-home-buyers-want-2013.aspx

National Wildlife Federation. 2013. *Valuing Our Western Public Lands: Safeguarding Our Economy and Way of Life.* http://www.ourpubliclands.org/sites/default/files/files/NWF_PublicLands.pdf

Outdoor Industry Association. 2016. "The Outdoor Recreation Economy" https://outdoorindustry.org/images/ore_reports/ID-idaho-outdoorrecreationeconomy-oia.pdf

U.S. Fish and Wildlife Service. 2011. Birding in the United States: A Demographic and Economic Analysis Addendum to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation Report 2011-1

U.S. Fish and Wildlife Service. 2011. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

United States Census Bureau. (2016) *Quick Facts: Coeur d'Alene city, Idaho* [Data File]. Retrieved from http://www.census.gov/quickfacts/table/PST045215/1616750,16055,16

Soils and Water

Megahan, Walter F. and John G. King. 2004. *Erosion, Sedimentation, and Cumulative Effects in the Northern Rocky Mountains*. Pages 201-222 in George G. Ice and John D. Stednick editors. A Century of Forest and Wildland Watershed Lessons. Society of American Foresters, Bethesda, Maryland.

USDA Natural Resources Conservation Service (NRCS). 2002. *Soil Survey of St. Joe Area, Parts of Benewah and Shoshone Counties, Idaho.*

Vegetation communities, including special status plants

Agee, J.K. 1993. Fire ecology of Pacific Northwest Forests. Island Press, Washington, D.C. 493pp.

BLM. 2007. Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report. BLM, Nevada State Office, Reno, Nevada.

Cooper, S.V., Neiman, K.E., and D.W. Roberts. 1991. Forest habitat types of Northern Idaho: A second approximation. Gen.Tech.Rep INT-236. USDA Forest Service, Intermountain Research Station. Ogden, Utah.

Demars, Jr. C.J.and Roettgering, B.H. 1982. Western pine beetle. Forest Insect and Disease Leaflet 1. USDA Forest Service 7 p

Ellis W.M, J.R. Taylor J, and R. J. Harrod. 1999. The reproductive biology and host specificity of *Orobanche pinorum* Geyer (Orobanchaceae). Madroño 46 (1): 7-12.

Hagle, S.K., Gibson, K.E., and Tunnock, S. 2003. Field guide to diseases and insect pests of northern and central Rocky Mountain conifers. Report No. R1-03-08. USDA Forest Service; State and Private Forestry; Northern Region, Missoula, Montana; Intermountain Region, Ogden, Utah. 197 p.

Hammet, E. A. 2008. Tumbledown Project—Threatened, Endangered, and Sensitive Plants and Forest Species of Concern (Rare Plants) Report. USDA Forest Service, unpublished report on file at Sandpoint Ranger District Office.

Harrod, R. J., D. E. Knecht, E. E. Kuhlmann, M. W. Ellis, and R. Davenport. 1997. Effects of the Rat and Hatchery Creek fires on four rare plant species, in Greenlee, J. M., Proceedings: First

Conference on Fire Effects on Rare and Endangered Species and Habitats. Coeur d'Alene, Idaho. International Association of Wildland Fire, Fairfield, WA. p. 311-319.

Hood, S., Bentz, B., Gibson, K., Ryan, K., and Denitto, G. 2007. Assessing post-fire Douglas-fir mortality and Douglas-fir beetle attacks in the northern Rocky Mountains. Gen. Tech. Rep. RMRS-GTR-199. Fort Collins, Colorado: USDA Forest Service, Rocky Mountain Research Station.

Idaho Department of Lands. 2015. Annosus root disease information pamphlet. Accessed as: http://www.idl.idaho.gov/forestry/forester-forums/id8.pdf; December 2015.

Lichthardt, J. 2003. Conservation Strategy for Clustered lady's-Slipper Orchid (*Cypripedium fasciculatum*) in U.S. Forest Service Region 1. Idaho Department of Fish and Game. Boise, Idaho. June 2003. 25 p. plus appendices.

Lorain, C.C. 1991. Species management guide for Mimulus clivicola (bank monkeyflower) on the Clearwater and Nez Perce National Forests. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 16 p. plus appendices.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at:http://explorer.natureserve.org. (Accessed: January 15, 2016)

Rippy, R.C., Stewart, J.E., Zambino, P.J., Klopfenstein, N.B., Tirocke, J.M., Kim, M., Thies, W.G. 2005. Root diseases in coniferous forests of the Inland West: potential implications of fuels treatments. Gen. Tech. Rep. RMRS-GTR-141. Fort Collins, Colorado: USDA Forest Service, Rocky Mountain Research Station.

Smith, J.K. and W.C. Fischer. 1997. Fire ecology of the forest habitat types of Northern Idaho. Gen. Tech. Report INT-GTR-363. USDA Forest Service, Intermountain Research Station, Ogden, Utah.

USDA Forest Service. 2009. Fire effects information system. Available: http://www.fs.fed.us/database/feis (July 24, 2009)

USDA Forest Service. 2015. Fire effects information system. Available: http://www.feis-crs.org/beta/faces/index.xhtml;jsessionid=58EE5EB33003F1A4AB9CE400CFA15B98 (accessed December 2015).

U.S. Fish and Wildlife Service. 2007. Recovery Plan for *Silene spaldingii* (Spalding's Catchfly). U.S. Fish and Wildlife Service, Portland, Oregon. xiii + 187 pages.

Wildlife

Adams, R.A. 2003. Bats of the Rocky Mountain West. University Press of Colorado. Boulder, CO. USA. 289pp.

Bird Studies Canada (BSC). 2013. *Project NestWatch*. Bird Studies Canada / Études d'Oiseaux Canada, URL: http://www.bsc-eoc.org/volunteer/pnw/?lang=en

Bock, C.E. and J.H. Bock. 1983. Responses of birds and deer mice to prescribed burning in ponderosa pine. The Journal of Wildlife Management, vol 47, no. 3, pp 836-840. Allen Press.

Copeland, J.P., J.M. Peek, C.R. Groves, W.E. Melquist, K.S. McKelvey, G.W. McDaniel, C.D. Long, and C.E. Harris. 2007. Seasonal habitat associations of the wolverine in central Idaho. Journal of Wildlife Management, Volume 71, Issue 7, Pages 2201-2212.

Hahn, T. P. 1996. Cassin's Finch (*Carpodacus cassinii*). *In* The Birds of North America, No. 240 (A. Poole and F. Gill, eds.). The Birds of North America Online, Ithaca, New York.

Hash, H.S. 1987. Wolverine. Pages 574-585 in M. Novak, J.A. Baker, M.E. Obbard, and B. Malloch, editors. Wild furbearer management and conservation in North America. Ontario Ministry of Natural Resources, Toronto

Hooker, L. L. and E. W Tisdale. 1974. Effects of prescribed burning on a seral brush community in northern Idaho. University of Idaho. Forest, Wildlife, and Range Experiment Station. Paper no. 14. Moscow, ID.

Hornocker, M.G. and H.S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Canadian Journal of Zoology, Volume 59, Pages 1286-1301.

Idaho Conservation Data Center. 2010. Elements of occurrence database. Idaho Department of Fish and Game, Boise, Idaho.

IDFG. 2003. Wolverine Survey Project Report December 2002-April 2003. Idaho Department of fish and Game Region 1.

Idaho Department of Fish and Game. 2005. Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

Idaho Department of Fish and Game. 2016. DRAFT Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. https://idfg.idaho.gov/swap/2015-revision-draft

Innes, Robin J. 2011. Cervus elaphus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2014, June 3].

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

Kaufman, Kenneth. 1996. Lives of North American Birds. Houghton Mifflin. New York, NY. 675pp.

Mace, R. D., J. S. Waller, T. L. Manley, L. J. Lyon and H. Zuuring. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, Montana. Journal of Applied Ecology 33: 1395-1404.

McLellan, B. N. and D. M. Shackleton. 1988. Grizzly bears and resource-extraction industries: Effects of roads on behaviour, habitat use and demography. Journal of Applied Ecology 25: 451-460.

Montana Fish, Wildlife, and Parks. Montana Animal Field Guide [Internet]. Available from: http://fwp.mt.gov/fieldguide/.

Moser, B.W. 2007. Space use and ecology of goshawks in northern Idaho. Dissertation, University of Idaho, Moscow, USA.
Nature Serve. Nature Serve Explorer [Internet]. Available from: http://www.natureserve.org/explorer/.

Moser B.W and E.O. Garton Source. 2009. Journal of Raptor Research, 43(1):1-10. 2009. Short-Term Effects of Timber Harvest and Weather on Northern Goshawk Reproduction in Northern Idaho

Peek,J. M., M. D. Scott, L.J. Nelson, D.J. Pierce,and L. L. Irwin. 1982. Role of cover in habitat management for big game in northwestern United States. Transactions of the North American Nature Resource Conference 47:363-373.

Rodewald, P. (Editor). 2015. The Birds of North America
Online: http://bna.birds.cornell.edu/BNA/. Cornell Laboratory of Ornithology, Ithaca, NY.

Rost, G. R. and J. A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. Journal of Wildlife Management 43: 634-641.

Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski (eds.). 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine. USDA Forest Service General Technical Report RM-254.

Ruggiero, L.F., K.S. McKelvey, K.A. Aubry, J.P. Copeland, D.H. Pletscher, and M.G. Hornocker. 2007. Wolverine conservation and management. Journal of Wildlife Management, Volume 71, Issue 7, Pages 2145-2146.

Schwartz, C.C., S.D. Miller, and M.A. Haroldson. 2003. Grizzly bear. Pages 556-586 in G.A. Feldhamer, B.C Thompson, and J.A. Chapman, editors. Wild Mammals fo North America: Biology, Management, and Conservation. Second Edition. Johns Hopkins University Press. Baltimore, Maryland. USA.

Servheen, G., and J.L. Lyon. 1989. Habitat Use by Woodland Caribou in the Selkirk Mountains. Journal of Wildlife Management 53:230–237.

Skovlin, J. M, P. Zager, and B. K. Johnson. 2002. Elk habitat selection and evaluation. In North American elk: Ecology and management, eds. D. E. Toweill, and J. W. Thomas, 531–55. Washington, DC: Smithsonian Institution Press.

Smith, R.L. 1992. Elements of Ecology. Third Edition. Harpers Collins Publishers Inc.
Thomas, J.W. 1979. Wildlife habitats in managed forests in the Blue Mountains of Oregon and Washington. USDA, Forest Service, Agriculture Handbook No. 553. 512 pp.

Snyder, S. A. 1991. *Ursus americanus*.
http://www.fs.fed.us/database/feis/animals/mammal/uram/index.html

Steidl, R.J., Powell, B.F., 2006. Assessing the effects of human activities on wildlife. George Wright Forum 23, 50e58

Squires, J.R. and R.T. Reynolds. 1997. Northern Goshawk, No. 298 *in* Birds of North America series, c/o Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA. 31 pp.

Thomas, J.W.; Black, H., Jr.; Scherzinger, R.J.; Pedersen, R.J. 1979. Deer and elk. In: Thomas, J.W., ed. Wildlife habitats in managed forests-the Blue Mountains of Oregon and Washington. Agric. Handb. 553. Washington, DC: U.S. Department of Agriculture: 104-127.

USDA Forest Service. 2009. Fire effects information system. Available from: http://www.fs.fed.us/database/feis (accessed February 2011).

USID, Fish and Wildlife Service (USFWS). 1993. Grizzly Bear Recovery Plan. U.S. Fish and Wildlife Service, Missoula, Montana.

USFWS. 2008. 12-month finding on a petition to list the North American wolverine as endangered or threatened. Federal Register, March 11, 2008, Volume 73, Number 48, Pages 12929-12941.

USFWS 2012a. Designation of Critical Habitat for the Southern Selkirk Mountains Population of Woodland Caribou (*Rangifer tarandus caribou*): Proposed rule; availability of supplementary documents and announcement of public hearing. Federal Register 77(105):32075–32080.

USFWS 2012b. Regional Fact Sheets: Wolverine. http://www.fws.gov/mountain-prairie/factsheets/Wolverine-122010.pdf. Accessed August 2012.

USFWS 2014. Federal Register Vol. 79, No. 156, pages 47522-47545. Wednesday, August 13, 2014. Proposed Rules. Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous

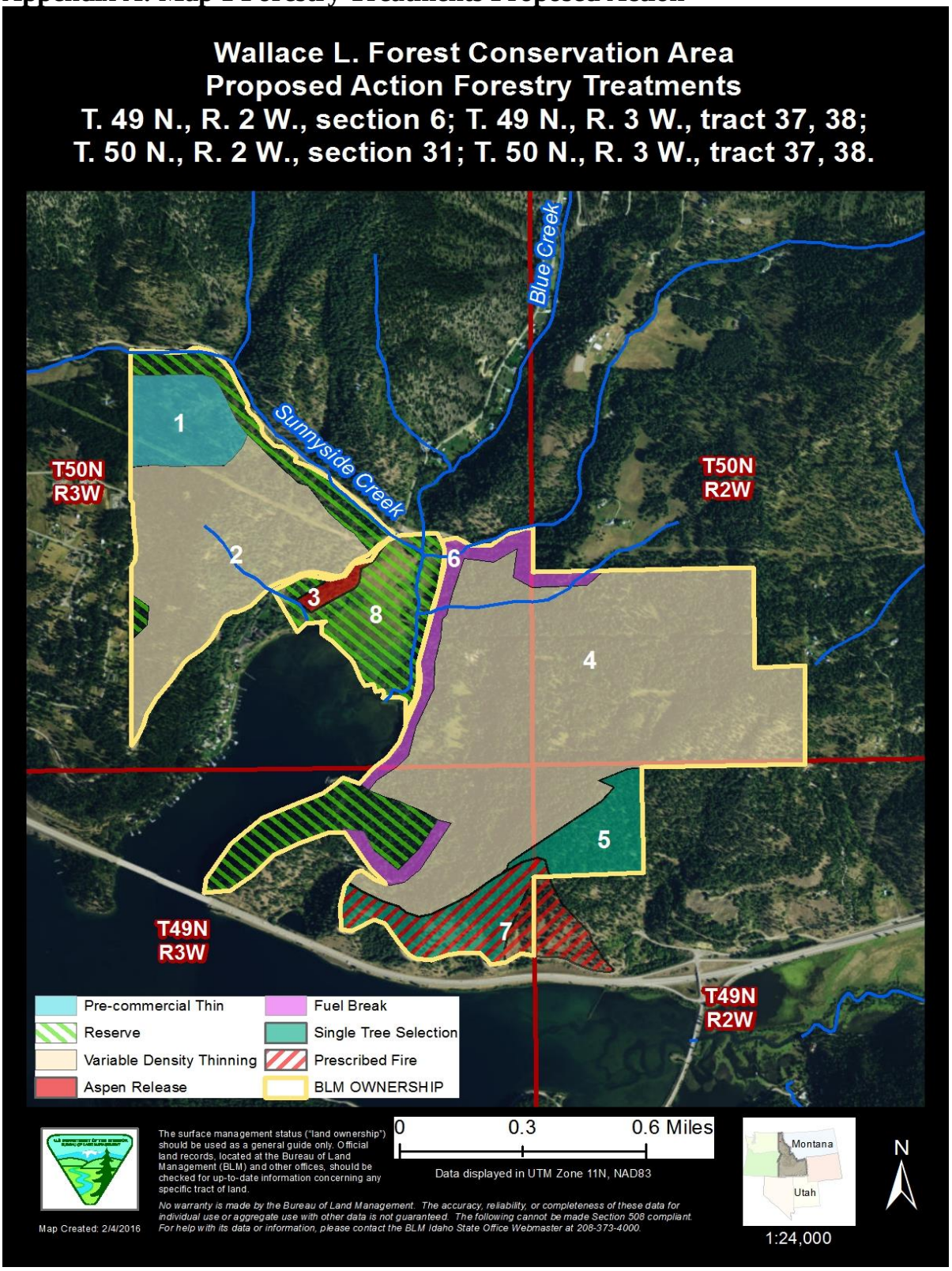
United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico.

Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico. Federal Register, Vol. 79, No. 156, Pages 45722-47545, Wednesday, August 13, 2014 Proposed Rules

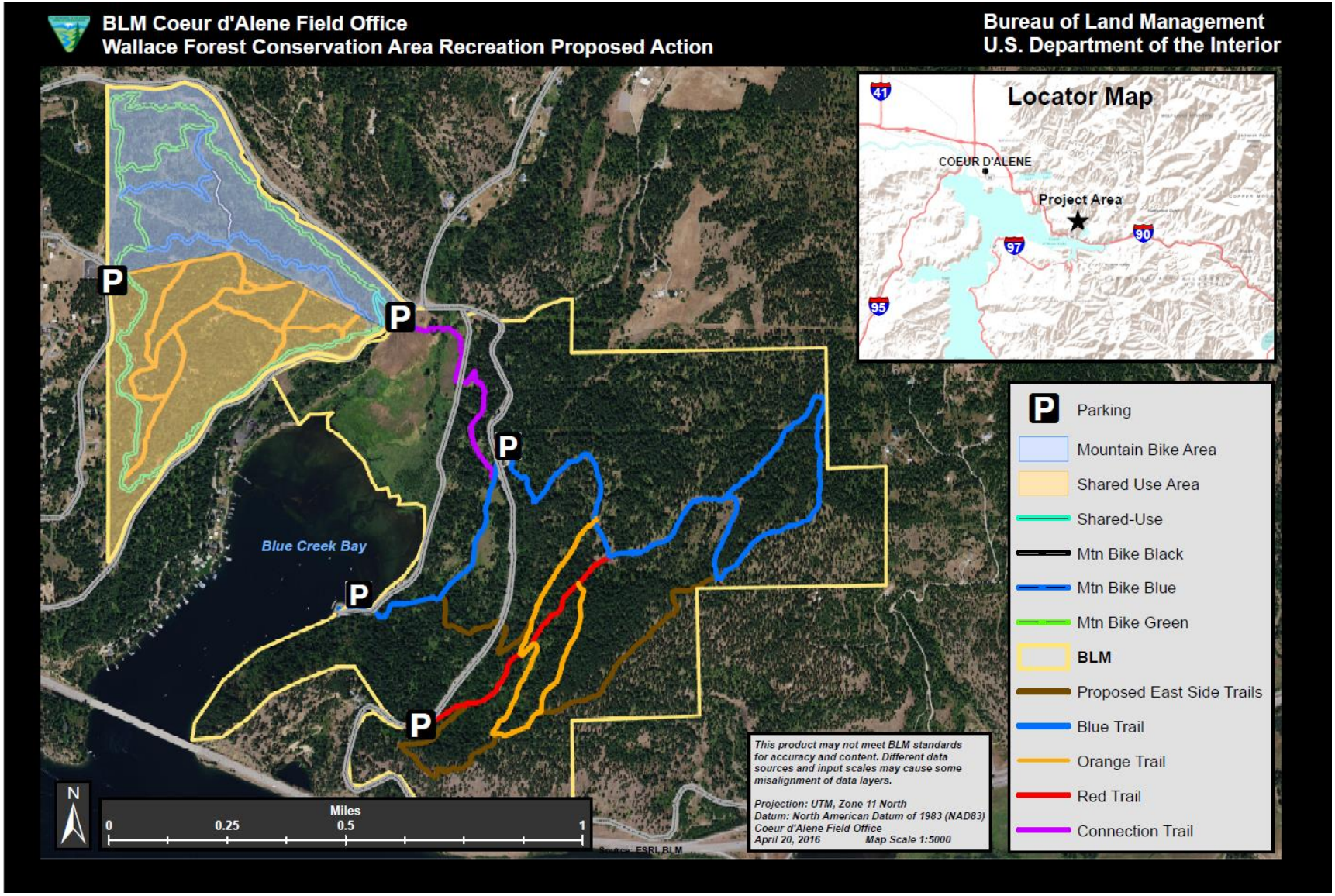
Van Dyke, F. G., R. H. Brocke and H. G. Shaw. 1986. Use of road track counts as indices of mountain lion presence. Journal of Wildlife Management 50: 102-109.

11.0 Appendix

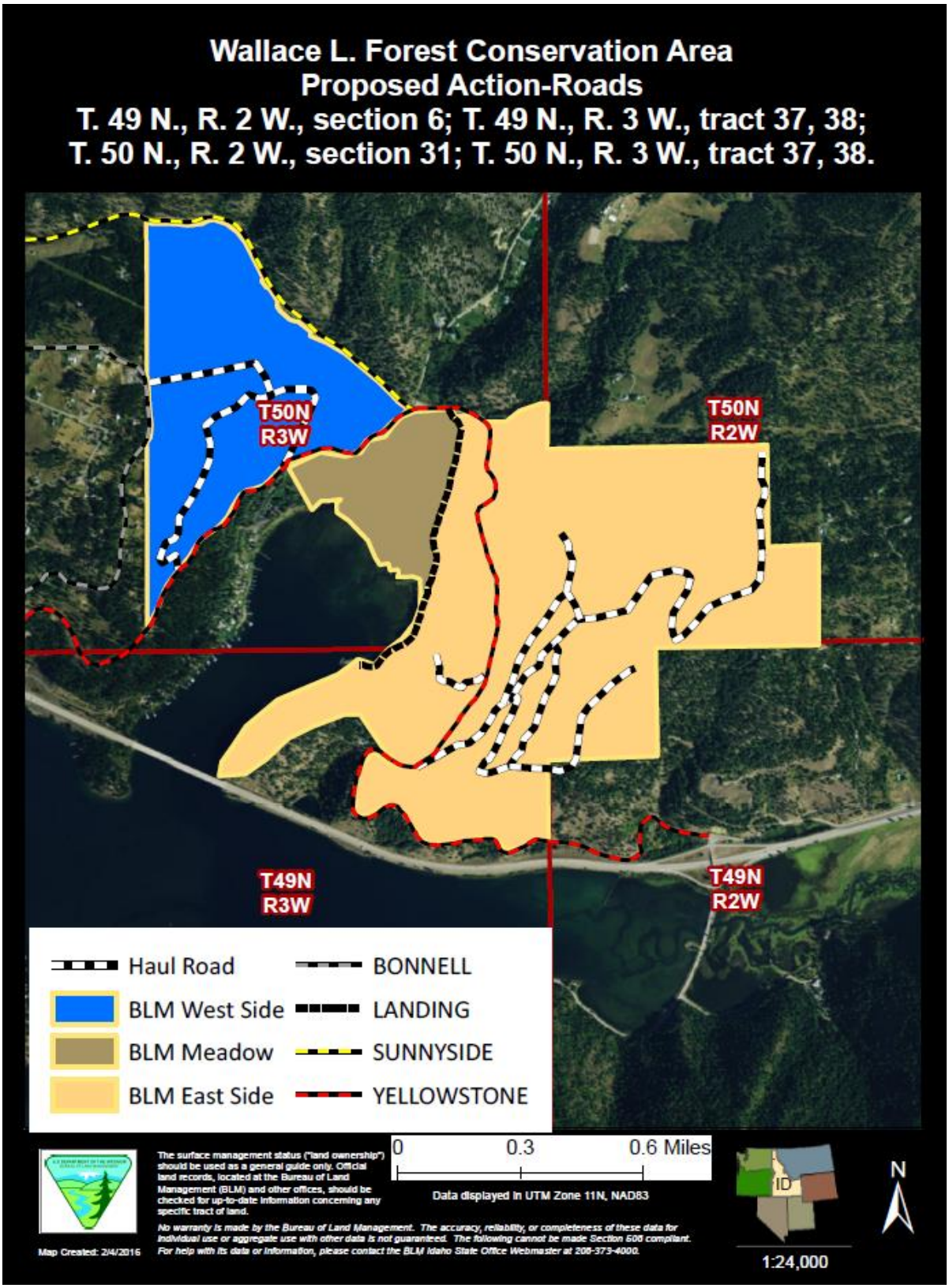
Appendix A: Map 1 Forestry Treatments Proposed Action



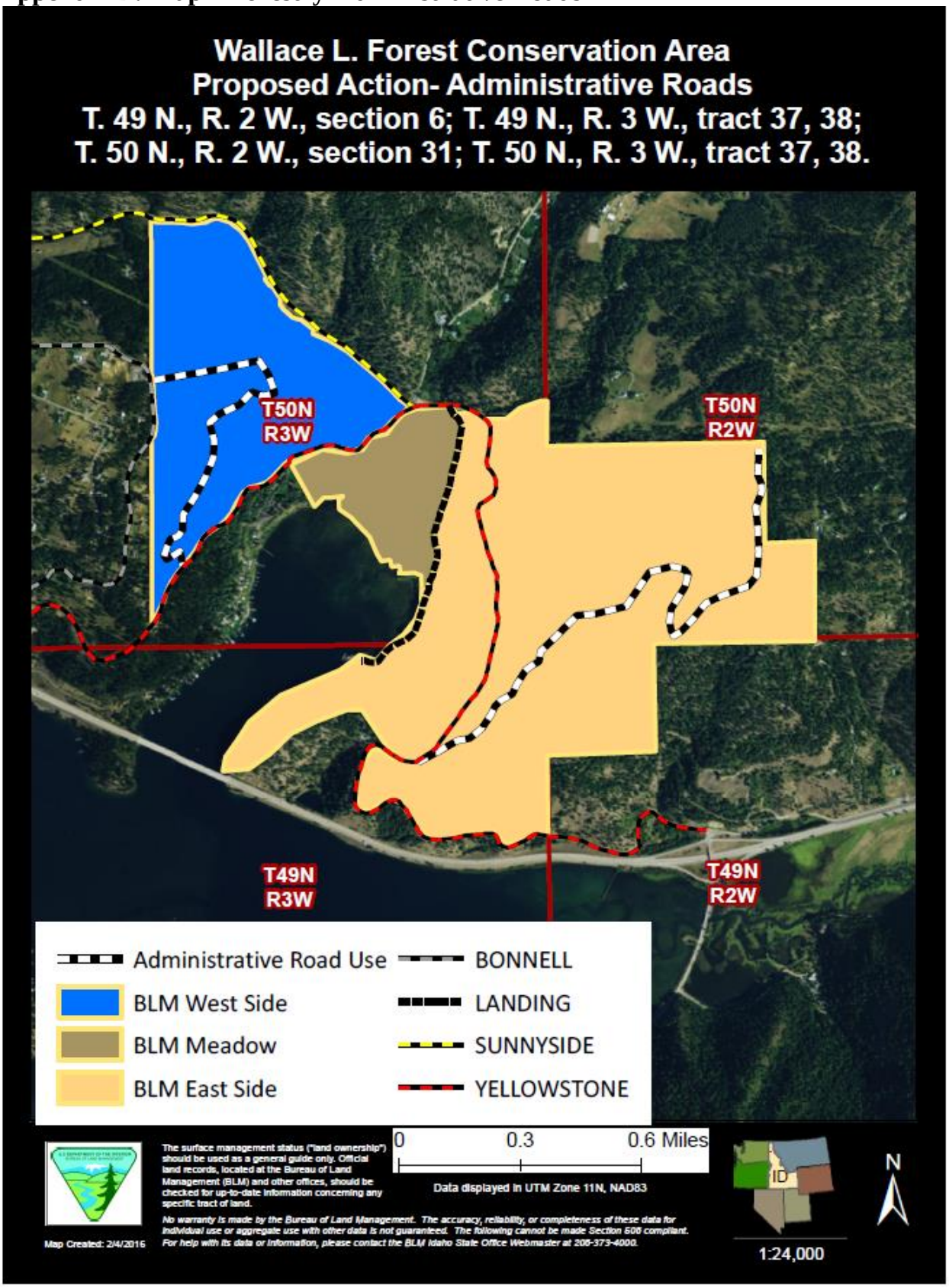
Appendix B: Map 2 Recreation Proposed Action



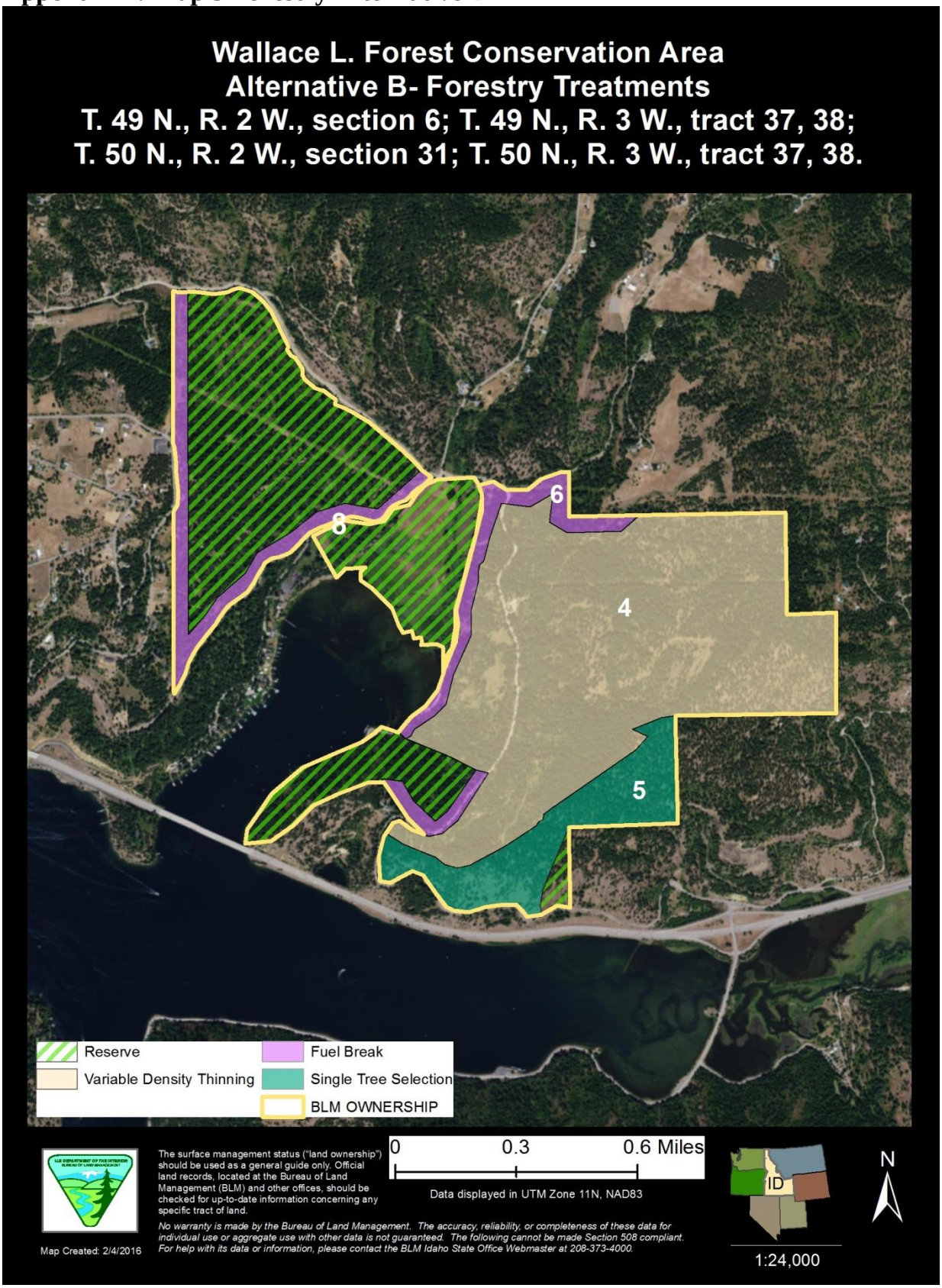
Appendix C: Map 3 Forestry-Proposed Action Roads



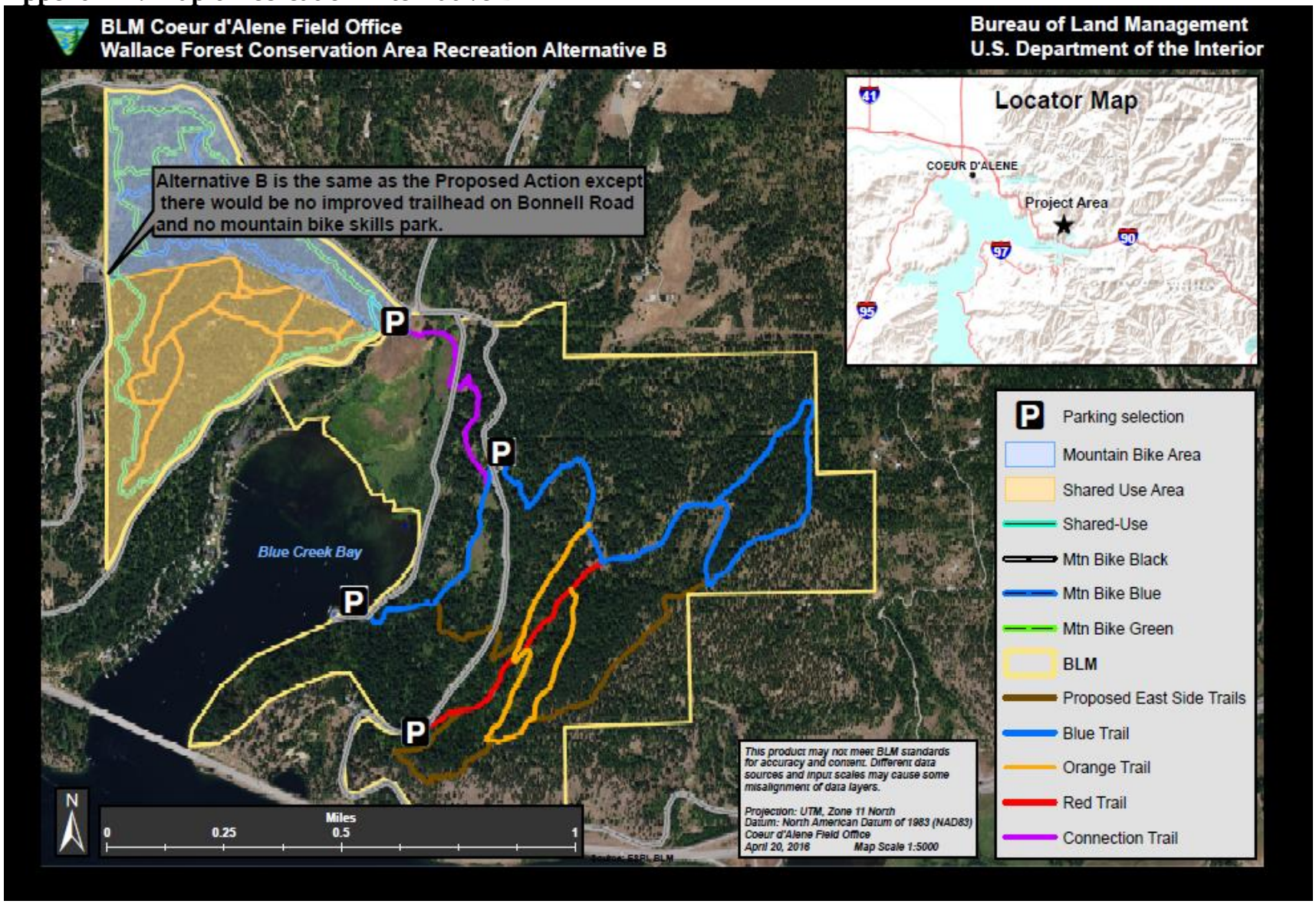
Appendix D: Map 4 Forestry-Administrative Roads



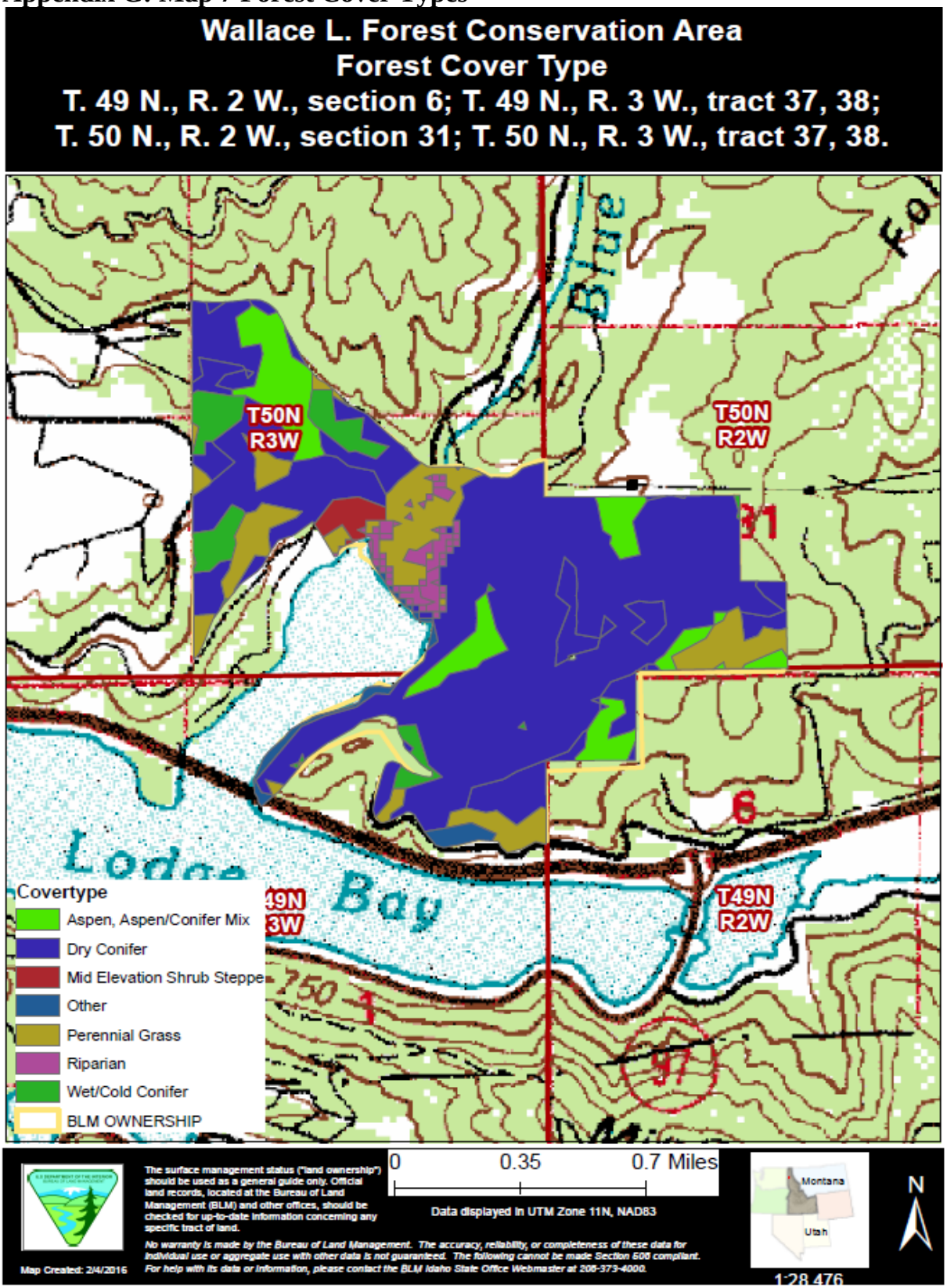
Appendix E: Map 5 Forestry Alternative B



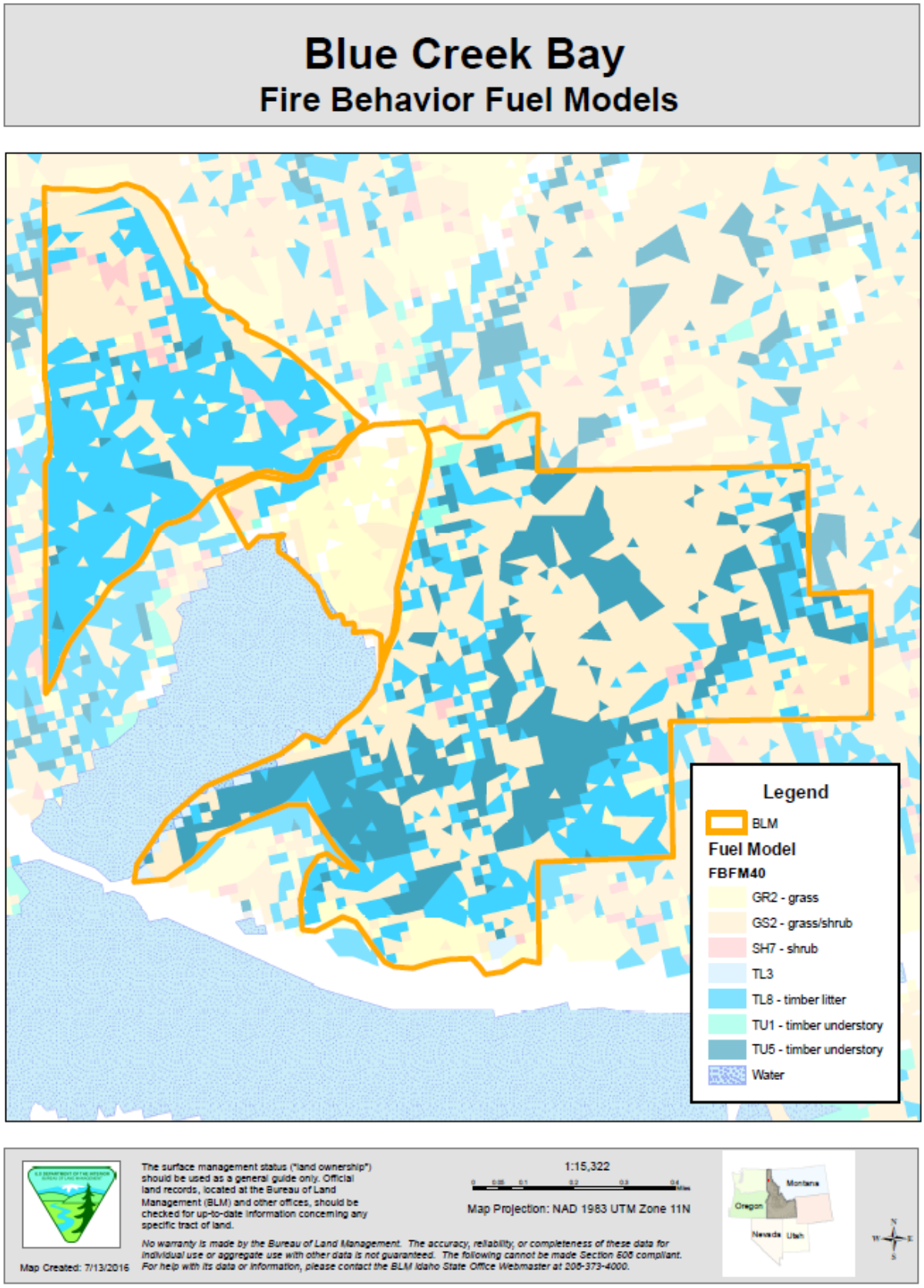
Appendix F: Map 6 Recreation Alternative B



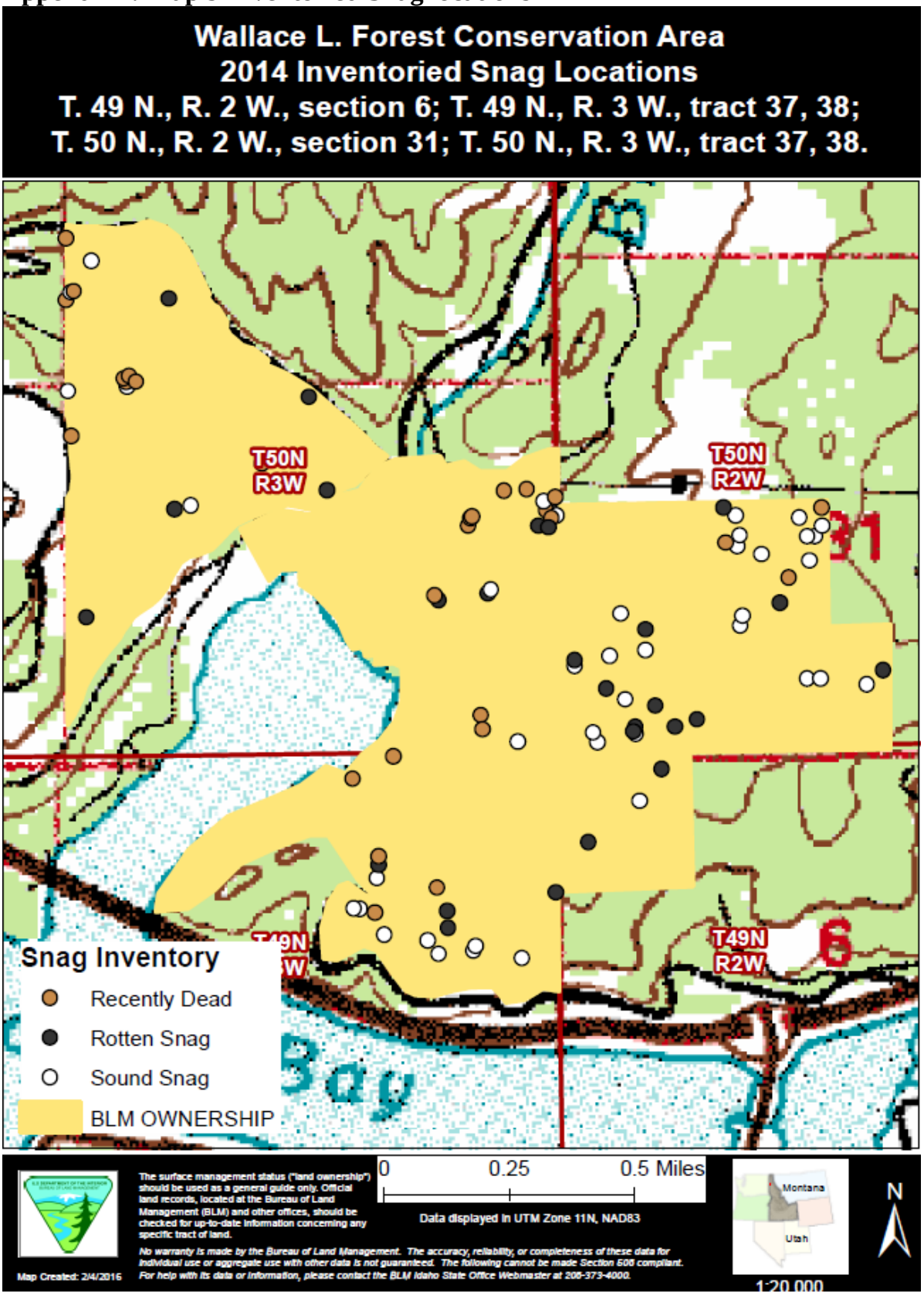
Appendix G: Map 7 Forest Cover Types



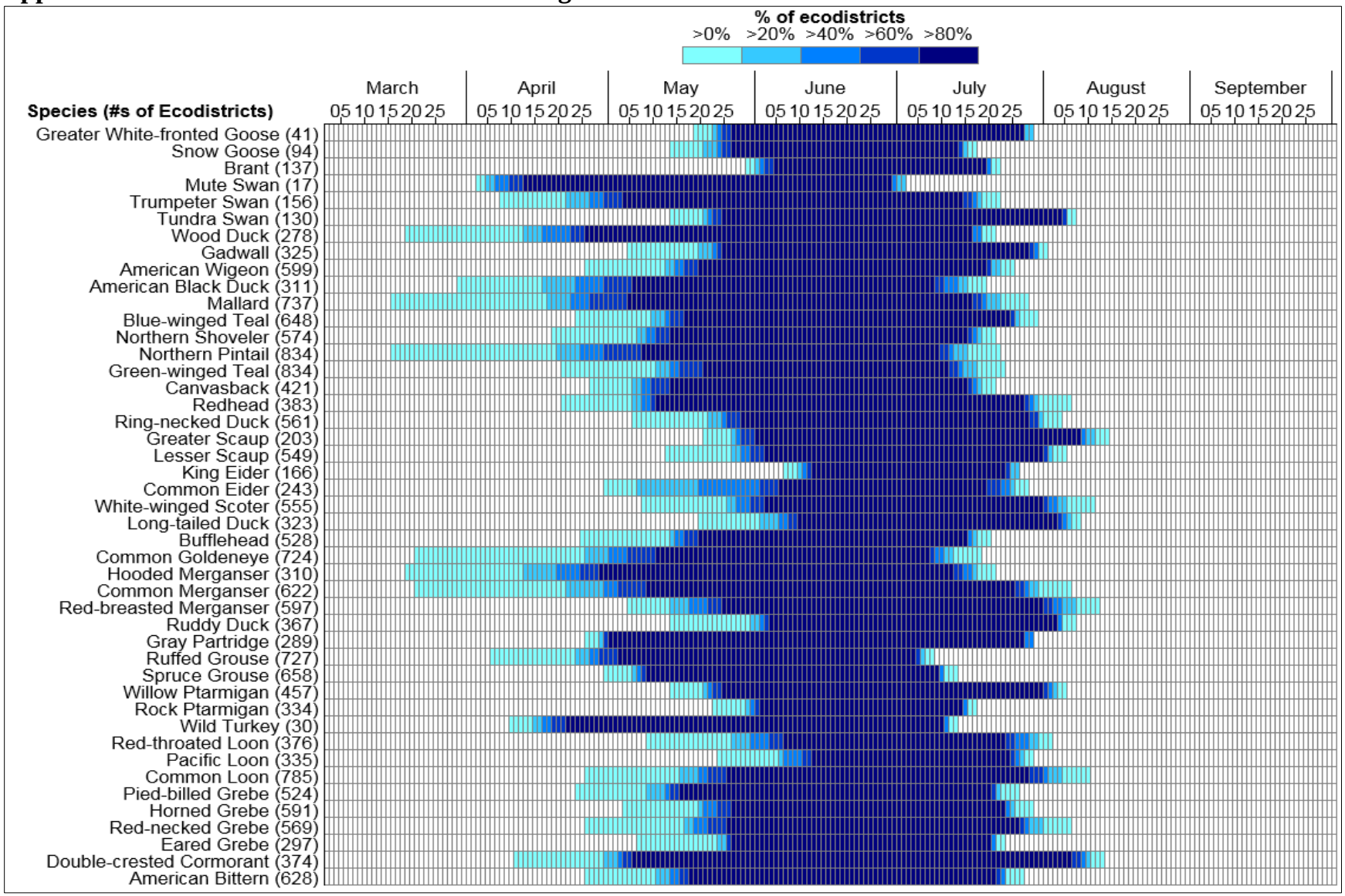
Appendix H: Map 8 Fire Behavior Fuel Models-LANDFIRE 2012

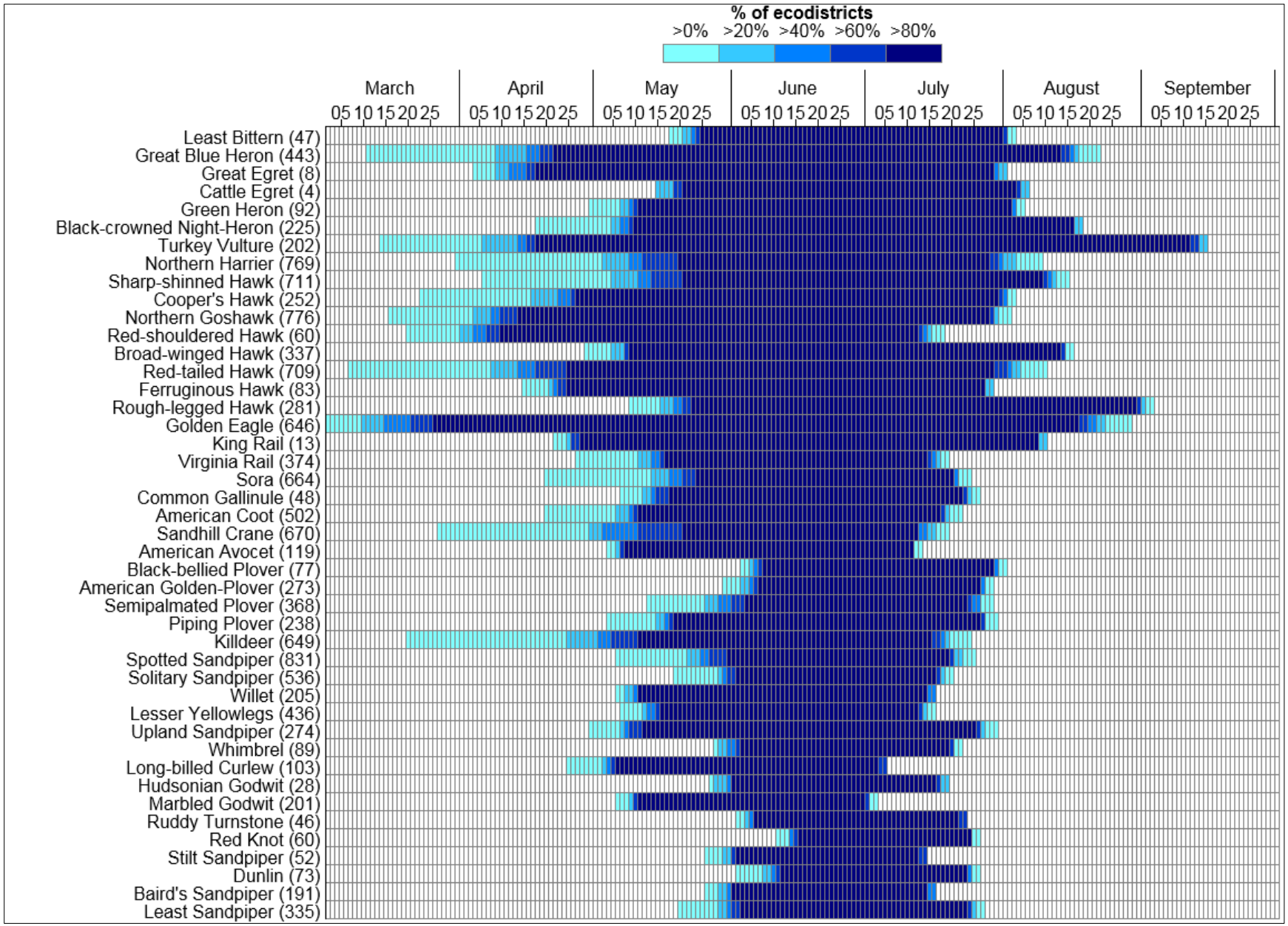


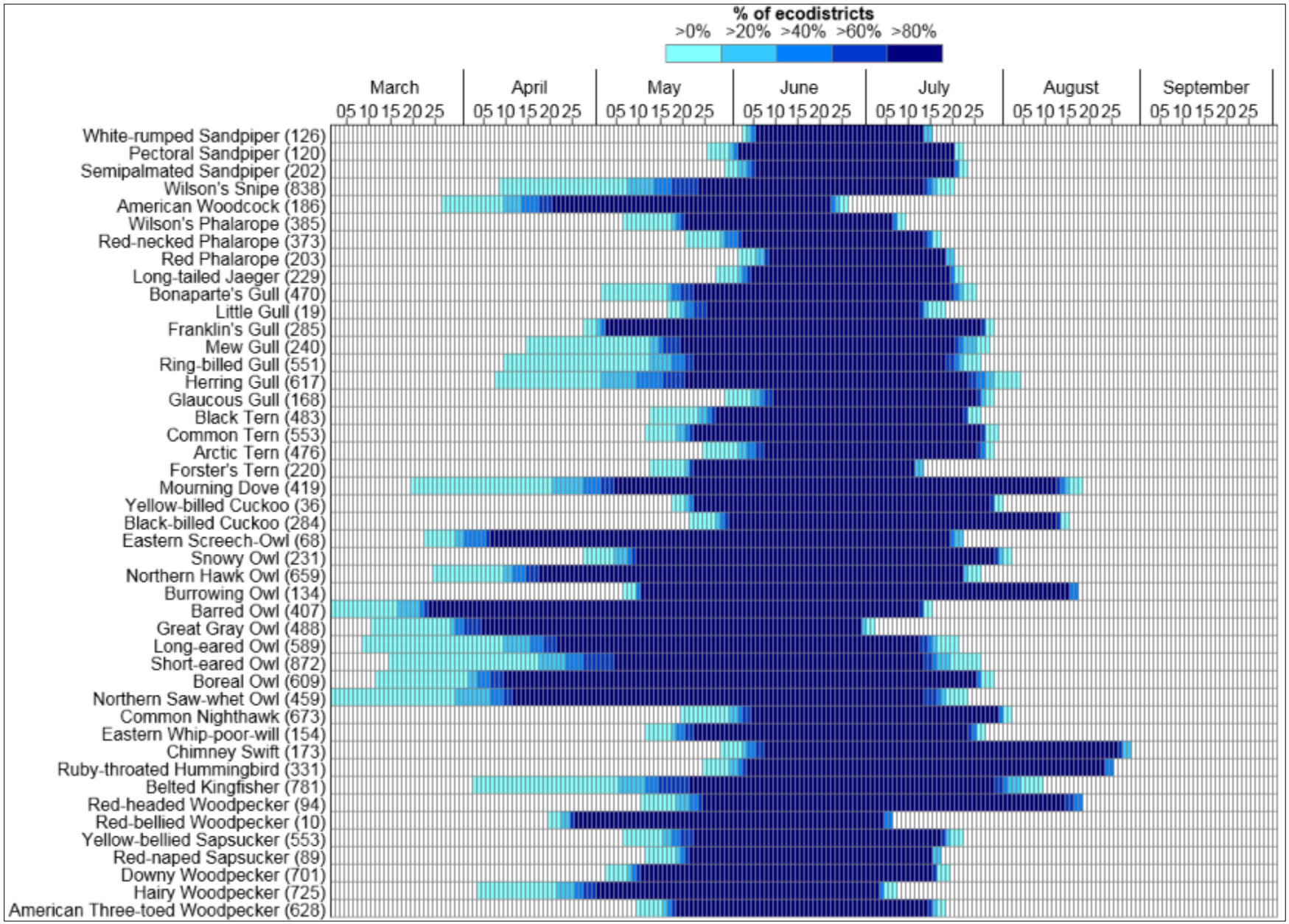
Appendix I: Map 9 Inventoried Snag locations

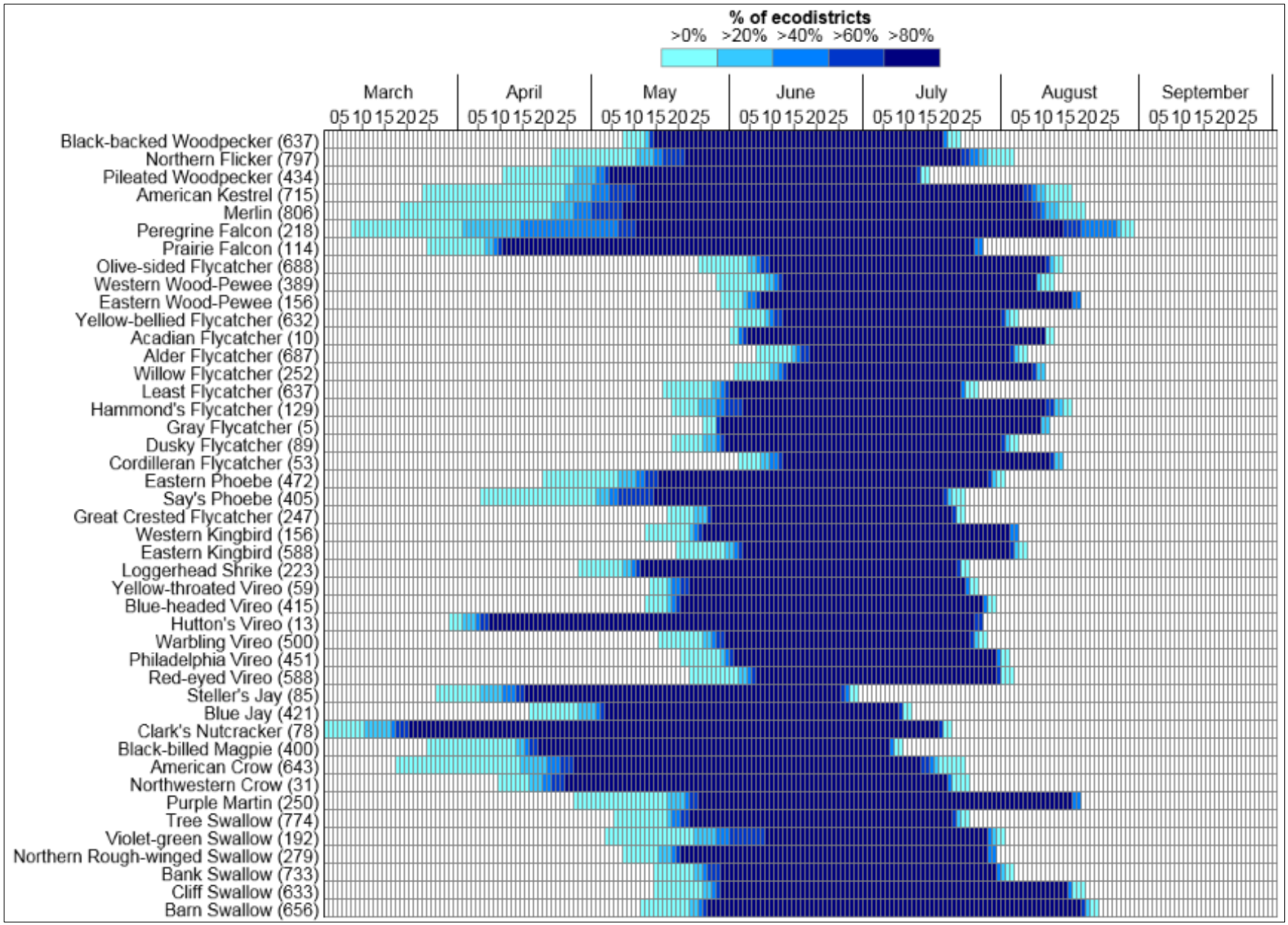


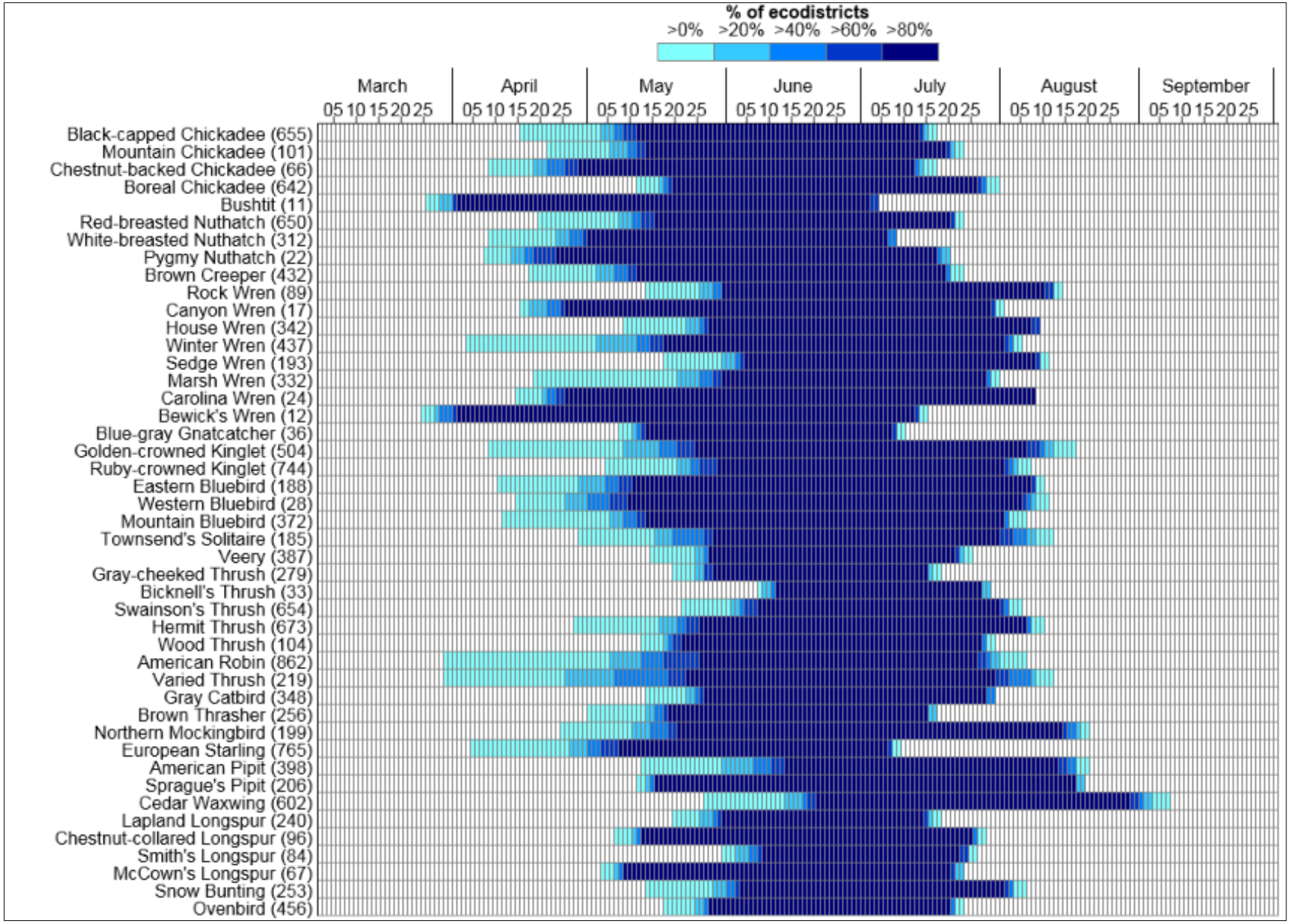
Appendix J: Northern Continental Divide Nesting Calendar

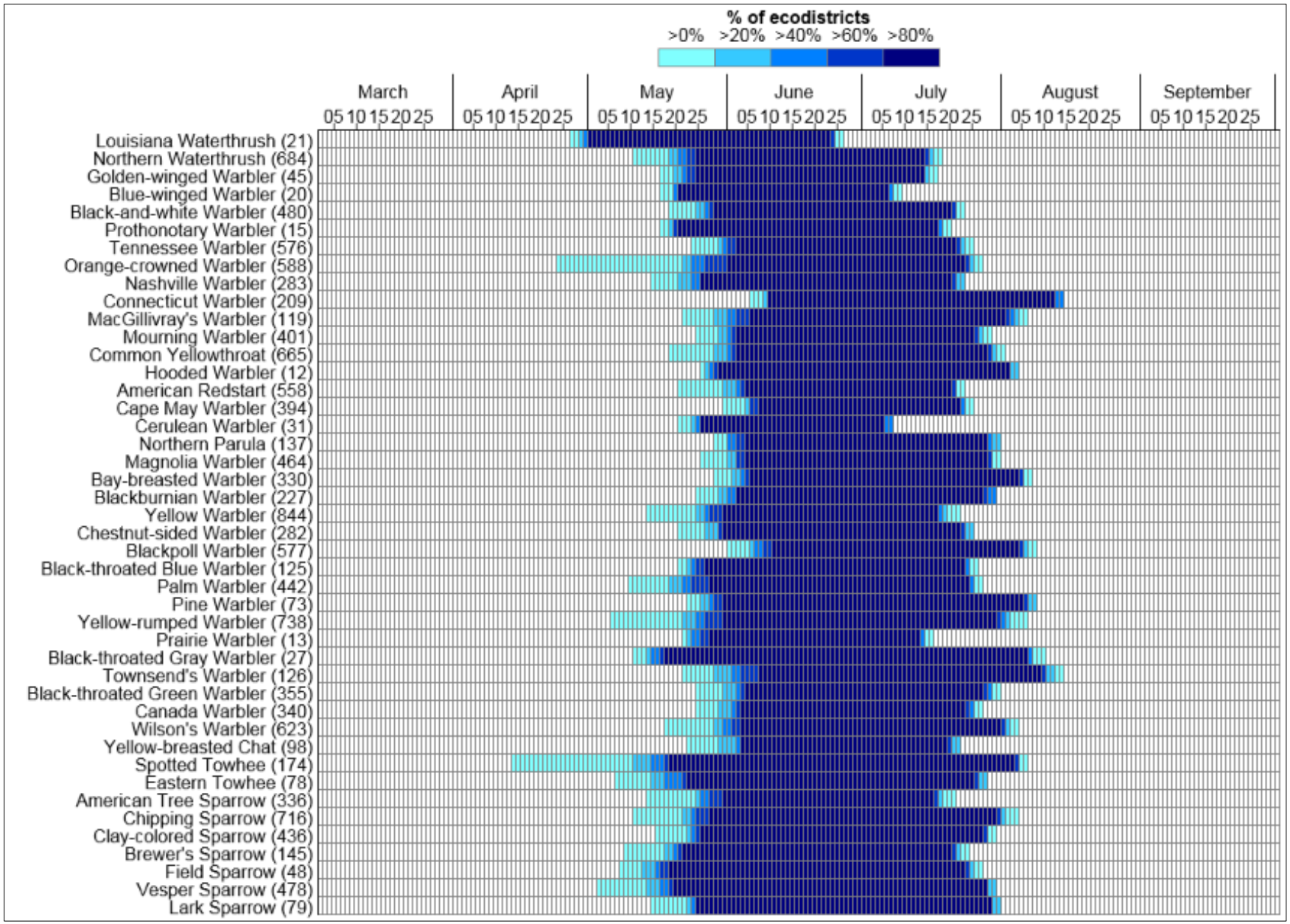


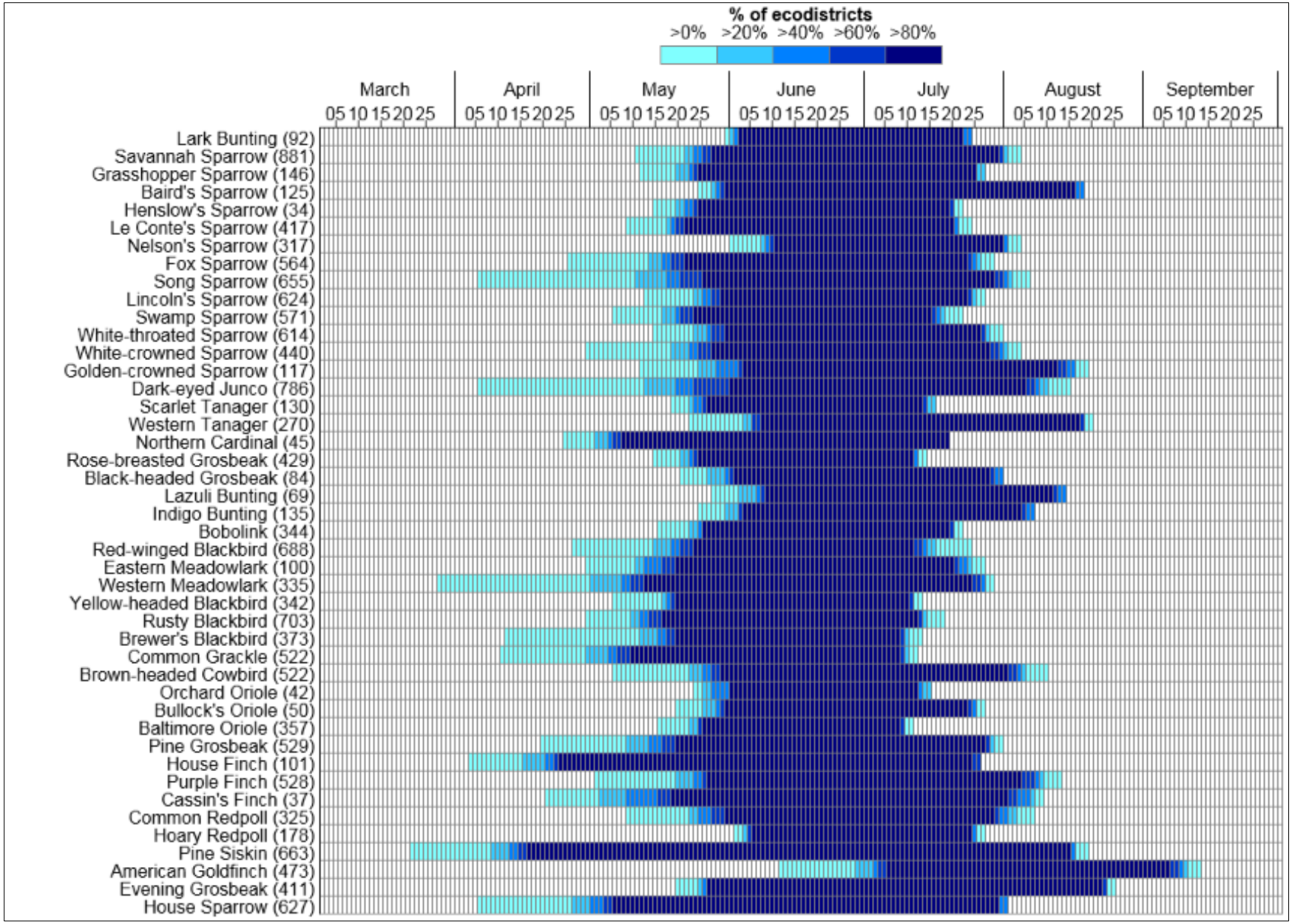

% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
05 10 15 20 25
Least Bittern (47)
Great Blue Heron (443)
Great Egret (8)
Cattle Egret (4)
Green Heron (92)
Black-crowned Night-Heron (225)
Turkey Vulture (202)
Northern Harrier (769)
Sharp-shinned Hawk (711)
Cooper's Hawk (252)
Northern Goshawk (776)
Red-shouldered Hawk (60)
Broad-winged Hawk (337)
Red-tailed Hawk (709)
Ferruginous Hawk (83)
Rough-legged Hawk (281)
Golden Eagle (646)
King Rail (13)
Virginia Rail (374)
Sora (664)
Common Gallinule (48)
American Coot (502)
Sandhill Crane (670)
American Avocet (119)
Black-bellied Plover (77)
American Golden-Plover (273)
Semipalmated Plover (368)
Piping Plover (238)
Killdeer (649)
Spotted Sandpiper (831)
Solitary Sandpiper (536)
Willet (205)
Lesser Yellowlegs (436)
Upland Sandpiper (274)
Whimbrel (89)
Long-billed Curlew (103)
Hudsonian Godwit (28)
Marbled Godwit (201)
Ruddy Turnstone (46)
Red Knot (60)
Stilt Sandpiper (52)
Dunlin (73)
Baird's Sandpiper (191)
Least Sandpiper (335)


% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
05 10 15 20 25
White-rumped Sandpiper (126)
Pectoral Sandpiper (120)
Semipalmated Sandpiper (202)
Wilson's Snipe (838)
American Woodcock (186)
Wilson's Phalarope (385)
Red-necked Phalarope (373)
Red Phalarope (203)
Long-tailed Jaeger (229)
Bonaparte's Gull (470)
Little Gull (19)
Franklin's Gull (285)
Mew Gull (240)
Ring-billed Gull (551)
Herring Gull (617)
Glaucous Gull (168)
Black Tern (483)
Common Tern (553)
Arctic Tern (476)
Forster's Tern (220)
Mourning Dove (419)
Yellow-billed Cuckoo (36)
Black-billed Cuckoo (284)
Eastern Screech-Owl (68)
Snowy Owl (231)
Northern Hawk Owl (659)
Burrowing Owl (134)
Barred Owl (407)
Great Gray Owl (488)
Long-eared Owl (589)
Short-eared Owl (872)
Boreal Owl (609)
Northern Saw-whet Owl (459)
Common Nighthawk (673)
Eastern Whip-poor-will (154)
Chimney Swift (173)
Ruby-throated Hummingbird (331)
Belted Kingfisher (781)
Red-headed Woodpecker (94)
Red-bellied Woodpecker (10)
Yellow-bellied Sapsucker (553)
Red-naped Sapsucker (89)
Downy Woodpecker (701)
Hairy Woodpecker (725)
American Three-toed Woodpecker (628)


% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
0 5 10 15 20 25
Black-backed Woodpecker (637)
Northern Flicker (797)
Pileated Woodpecker (434)
American Kestrel (715)
Merlin (806)
Peregrine Falcon (218)
Prairie Falcon (114)
Olive-sided Flycatcher (688)
Western Wood-Pewee (389)
Eastern Wood-Pewee (156)
Yellow-bellied Flycatcher (632)
Acadian Flycatcher (10)
Alder Flycatcher (687)
Willow Flycatcher (252)
Least Flycatcher (637)
Hammond's Flycatcher (129)
Gray Flycatcher (5)
Dusky Flycatcher (89)
Cordilleran Flycatcher (53)
Eastern Phoebe (472)
Say's Phoebe (405)
Great Crested Flycatcher (247)
Western Kingbird (156)
Eastern Kingbird (588)
Loggerhead Shrike (223)
Yellow-throated Vireo (59)
Blue-headed Vireo (415)
Hutton's Vireo (13)
Warbling Vireo (500)
Philadelphia Vireo (451)
Red-eyed Vireo (588)
Steller's Jay (85)
Blue Jay (421)
Clark's Nutcracker (78)
Black-billed Magpie (400)
American Crow (643)
Northwestern Crow (31)
Purple Martin (250)
Tree Swallow (774)
Violet-green Swallow (192)
Northern Rough-winged Swallow (279)
Bank Swallow (733)
Cliff Swallow (633)
Barn Swallow (656)


% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
05 10 15 20 25
Black-capped Chickadee (655)
Mountain Chickadee (101)
Chestnut-backed Chickadee (66)
Boreal Chickadee (642)
Bushtit (11)
Red-breasted Nuthatch (650)
White-breasted Nuthatch (312)
Pygmy Nuthatch (22)
Brown Creeper (432)
Rock Wren (89)
Canyon Wren (17)
House Wren (342)
Winter Wren (437)
Sedge Wren (193)
Marsh Wren (332)
Carolina Wren (24)
Bewick's Wren (12)
Blue-gray Gnatcatcher (36)
Golden-crowned Kinglet (504)
Ruby-crowned Kinglet (744)
Eastern Bluebird (188)
Western Bluebird (28)
Mountain Bluebird (372)
Townsend's Solitaire (185)
Veery (387)
Gray-cheeked Thrush (279)
Bicknell's Thrush (33)
Swainson's Thrush (654)
Hermit Thrush (673)
Wood Thrush (104)
American Robin (862)
Varied Thrush (219)
Gray Catbird (348)
Brown Thrasher (256)
Northern Mockingbird (199)
European Starling (765)
American Pipit (398)
Sprague's Pipit (206)
Cedar Waxwing (602)
Lapland Longspur (240)
Chestnut-collared Longspur (96)
Smith's Longspur (84)
McCown's Longspur (67)
Snow Bunting (253)
Ovenbird (456)


% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
05 10 15 20 25
Louisiana Waterthrush (21)
Northern Waterthrush (684)
Golden-winged Warbler (45)
Blue-winged Warbler (20)
Black-and-white Warbler (480)
Prothonotary Warbler (15)
Tennessee Warbler (576)
Orange-crowned Warbler (588)
Nashville Warbler (283)
Connecticut Warbler (209)
MacGillivray's Warbler (119)
Mourning Warbler (401)
Common Yellowthroat (665)
Hooded Warbler (12)
American Redstart (558)
Cape May Warbler (394)
Cerulean Warbler (31)
Northern Parula (137)
Magnolia Warbler (464)
Bay-breasted Warbler (330)
Blackburnian Warbler (227)
Yellow Warbler (844)
Chestnut-sided Warbler (282)
Blackpoll Warbler (577)
Black-throated Blue Warbler (125)
Palm Warbler (442)
Pine Warbler (73)
Yellow-rumped Warbler (738)
Prairie Warbler (13)
Black-throated Gray Warbler (27)
Townsend's Warbler (126)
Black-throated Green Warbler (355)
Canada Warbler (340)
Wilson's Warbler (623)
Yellow-breasted Chat (98)
Spotted Towhee (174)
Eastern Towhee (78)
American Tree Sparrow (336)
Chipping Sparrow (716)
Clay-colored Sparrow (436)
Brewer's Sparrow (145)
Field Sparrow (48)
Vesper Sparrow (478)
Lark Sparrow (79)


% of ecodistricts
>0% >20% >40% >60% >80%
March
April
May
June
July
August
September
05 10 15 20 25
Lark Bunting (92)
Savannah Sparrow (881)
Grasshopper Sparrow (146)
Baird's Sparrow (125)
Henslow's Sparrow (34)
Le Conte's Sparrow (417)
Nelson's Sparrow (317)
Fox Sparrow (564)
Song Sparrow (655)
Lincoln's Sparrow (624)
Swamp Sparrow (571)
White-throated Sparrow (614)
White-crowned Sparrow (440)
Golden-crowned Sparrow (117)
Dark-eyed Junco (786)
Scarlet Tanager (130)
Western Tanager (270)
Northern Cardinal (45)
Rose-breasted Grosbeak (429)
Black-headed Grosbeak (84)
Lazuli Bunting (69)
Indigo Bunting (135)
Bobolink (344)
Red-winged Blackbird (688)
Eastern Meadowlark (100)
Western Meadowlark (335)
Yellow-headed Blackbird (342)
Rusty Blackbird (703)
Brewer's Blackbird (373)
Common Grackle (522)
Brown-headed Cowbird (522)
Orchard Oriole (42)
Bullock's Oriole (50)
Baltimore Oriole (357)
Pine Grosbeak (529)
House Finch (101)
Purple Finch (528)
Cassin's Finch (37)
Common Redpoll (325)
Hoary Redpoll (178)
Pine Siskin (663)
American Goldfinch (473)
Evening Grosbeak (411)
House Sparrow (627)