USDA

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Department of
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**Forest
Service**

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# Environmental Assessment

## Ball Park Thin Project

**McKenzie River Ranger District
Willamette National Forest
Lane County, Oregon**

**Legal Locations: Within T14S, R5E, Sec. 24; T.14S, R.6E, Sec. 17-21, 28-30, 31-33; T.15S, R.6E, Sec. 3-6, 7-11, 14-18, 20-23; Willamette Meridian**

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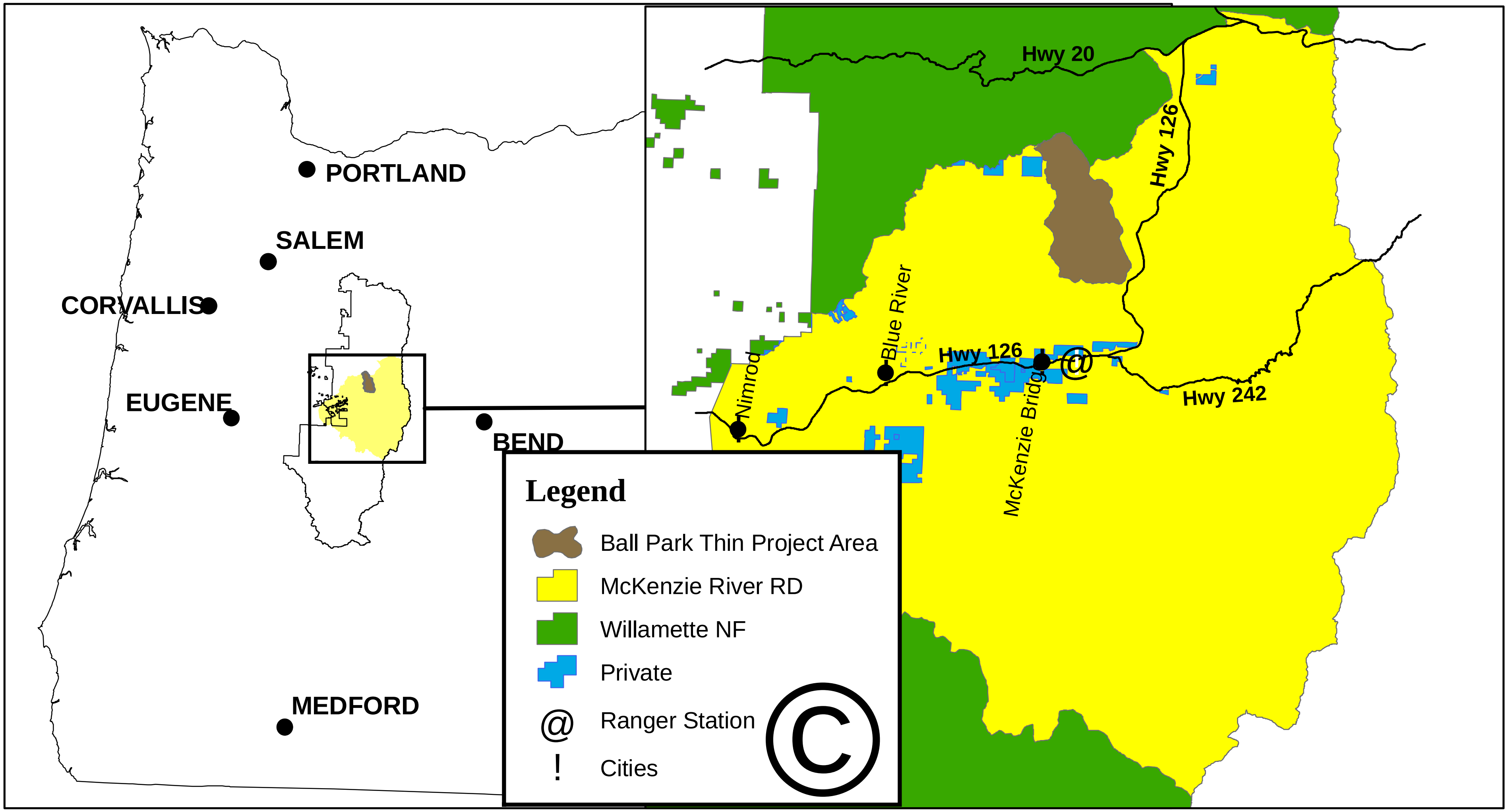


**Figure 1. Ball Park Thin Project location map.**

**Table of Acronyms:**

| | |
|---|---|
| ACS | Aquatic Conservation Strategy |
| ARP | Aggregate Recovery Percentage |
| BGEA | Big Game Emphasis Area |
| CWPP | Community Wildfire Protection Plan |
| dbh | Diameter breast height |
| DN | Decision Notice |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act |
| EWEB | Eugene Water And Electric Board |
| FEIS | Final Environmental Impact Statement |
| FERC | Federal Energy Regulatory Commission |
| FONSI | Finding of No Significant Impact |
| FPC | Federal Power Commission |
| FRCC | Fire Regime Condition Class |
| IDT | Inter-disciplinary Team |
| IRA | Inventoried Roadless Area |
| LFH | Listed Fish Habitat |
| MIS | Management Indicator Species |
| MRRD | McKenzie River Ranger District |
| MMBF | Million Board Feet |
| NEPA | National Environmental Policy Act |
| NFS | National Forest System |
| NMFS | National Marine Fisheries Service |
| NRHP | National Register of Historic Places |
| ODOT | Oregon Department of Transportation |
| OSHA | Occupational Safety and Health Administration |
| ODFW | Oregon Department of Fish and Wildlife |
| ROD | Record of Decision |
| ROS | Recreation Opportunity Spectrum |
| SEIS | Supplemental Environmental Impact Statement |
| SHPO | State Historic Preservation Office |
| SOPA | Schedule of Proposed Actions |
| TES | Threatened, Endangered, or Sensitive Species |
| USDA | United States Department of Agriculture |
| USDI | United States Department of Interior |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| VQO | Visual Quality Objective |
| WA | Watershed Analysis |
| WFP | Willamette Forest Plan |
| WNF | Willamette National Forest |

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# Chapter 1. Purpose and Need for Action

## Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters and appendices:

- **Chapter 1-Purpose and Need for Action:** This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. A section is included that details how the Forest Service informed the public of the proposal and how the public responded. This section also includes the relationship of the proposal to the 1990 Willamette Forest Plan, as amended.
- **Chapter 2 –Alternatives, Including the Proposed Action:** This section provides a more detailed description of the agency's proposed action as well as an alternative method for achieving the stated purpose. The alternative was developed based on significant issues raised by the public and other agencies. This discussion also includes a listing of mitigation measures and design features. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- **Chapter 3 -Environmental Consequences:** This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis discloses the effects on significant issues and the other issues addressed during scoping. Within each section, the affected environment is described first, followed by the effects from Alternative A – No Action, which provides a baseline for evaluation and comparison, Alternative B – Proposed Action, and Alternative C.
- **Chapter 4 - Consultation and Coordination:** This section provides a list of agencies, tribal governments, elected officials, and public consulted during the development of the environmental assessment. It also includes a list of IDT members who were involved in preparing this document.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including detailed analyses of project-area resources, may be found in the project planning record, or analysis file, located at the McKenzie River Ranger District Office in McKenzie Bridge, Oregon.

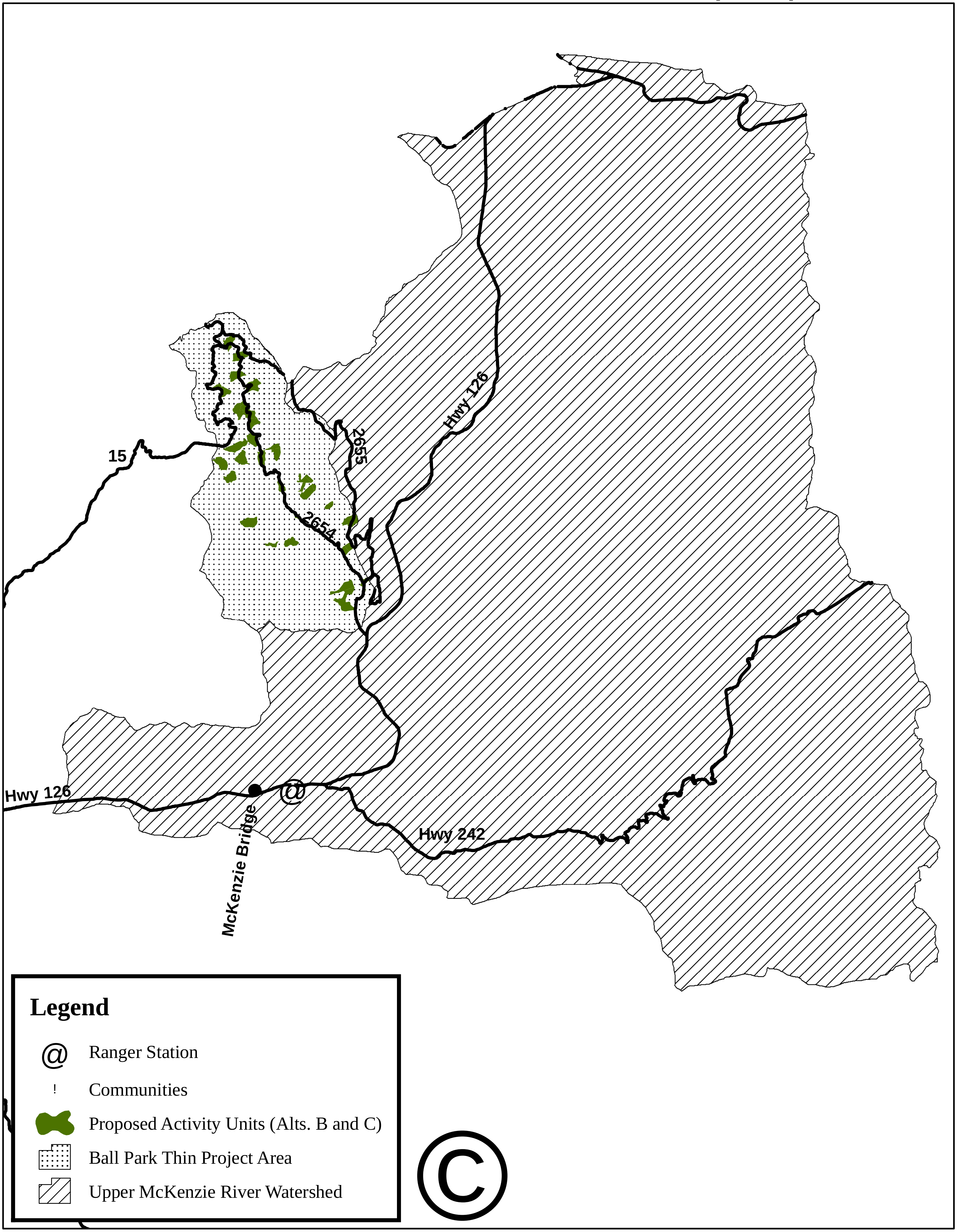



**Figure 2. Upper McKenzie River/Deer Creek Watershed map.**

# Introduction

The Ball Park Thin Project area is within the Deer Creek Subwatershed (6th field) of the Upper McKenzie Watershed (5th field) on the McKenzie River Ranger District. The project area consists of 14,508 acres located northwest of the McKenzie River, east of the HJ Andrews Experimental Forest, and south of the District boundary that is adjacent to the Sweet Home District. Major drainages include Deer Creek, Budworm Creek, Fritz Creek, and Carpenter Creek.

Legal description of the project: T14S, R5E, Sec. 24; T.14S, R.6E, Sec. 17-21, 28-30, 31-33; T.15S, R.6E, Sec. 3-6, 7-11, 14-18, 20-23; Willamette Meridian; Lane and Linn Counties, Oregon.

# Purpose and Need for Action

The purpose and need for this project is to improve stand conditions in terms of species composition, density, and structure over the long term in previously managed stands less than 80 years of age. The amended Willamette Forest Plan includes goals and objectives for managing stands with silvicultural techniques to maintain stand health and vigor and provide multiple use benefits, moving the project area toward the desired condition.

| Actions Are Needed To ➔ |
| --- |
| • Restore structural diversity in stem exclusion stands to enhance wildlife habitat; |
| • Accelerate restoration of late-successional conditions for stands within Riparian Reserves; |
| • Protect and maintain aquatic resources; |
| • Restore degraded roads infrastructure; |
| • Restore meadows where fire was historically present; |
| • Reduce hazardous fuels and return the role of fire to the ecosystem as a natural disturbance process. |
| • Provide a sustainable supply of wood in support of the local and regional economy. |

### Restore Structural Diversity in Stem Exclusion Stands to Enhance Wildlife Habitat

Overstocked, dense, stem exclusion stands with little or no large dead wood structure is not providing quality wildlife habitat. A need exists to restore structural diversity through techniques such as variable density thinning with skips and gaps, underburning, and subsequent large snag/log creation. Thinning can improve diversity by helping develop shrub and vertical structure development (Curtis et al. 1998).

### Accelerate Restoration of Late-Successional Conditions for Stands within Riparian Reserves

Riparian Reserves in existing plantations are currently characterized by dense, overstocked, stem exclusion conditions, and stand development toward late successional conditions has declined.

Riparian Reserves are intended to provide protection for riparian and aquatic habitat, and to provide late successional habitat and connectivity within the landscape. Silvicultural treatments such as thinning and prescribed fire are needed to eliminate stagnation and restore structural diversity in these riparian reserves. Thinning can accelerate development of large trees and multi-storied stands, leading to more complex and valuable habitats and sources of large wood to streams. Curtis et al. (1998), mentions how thinning can "produce larger, more valuable, and visually more attractive trees at any given age".

**Protect and Maintain Aquatic Resources**

The Ball Park Thin Project is located in Landscape Block 2A as identified in the Upper McKenzie Watershed Analysis (Willamette N.F., 1995). Recommendations from the watershed analysis for the protection and enhancement of aquatic resources include: maintenance of roads that are in poor condition, elimination of un-needed roads, restoration of large wood in deficient stream reaches, and protection and restoration of effective shade. Inclusion of opportunities to implement as many of these recommendations as possible are needed to move this portion of the watershed towards the desired condition.

**Restore Degraded Roads Infrastructure**

The forest roads in this planning area have a wide range of conditions and maintenance needs. The current road system was built to access timber and other forest resources. Timber sale revenues paid for the majority of past construction and road maintenance. However, timber harvest has declined under the Northwest Forest Plan. This change in forest management has reduced the operating budget and the ability to maintain the road system. Maintenance of degraded roads in the project area is needed to access areas for management with minimum impact to other resources.

**Restore Meadows Where Fire was Historically Present**

Many meadows depend on fire to keep encroaching trees and shrubs out of the opening. Over the past century fire return intervals have changed, resulting in the loss or reduction of many meadows to encroaching trees and shrubs. These meadows were historically burned by lightning or other indigenous methods. Improving the use of fire in these fire created meadows is needed to restore the structure and habitat of the area, which will in turn create more diversity across our forested landscapes.

**Reduce hazardous fuels and return the role of fire to the ecosystem as a natural disturbance process**

Fire has and will continue to play an active and vital role in our forest ecology. Treatments in this project would help to return the ecological role of fire disturbance. Historically, across the Willamette National Forest, fire created mosaic patterns within the vegetation as it occurred at different times in the year or locations which affected the intensity and severity of the fire. Fires were often caused by lightning, and there are references and stories of Indigenous people using fire for managing resources, the land, and travel routes (Teensma 1987, Kay 2007). Fire affects forest ecology in multiple ways through such items as: distribution of fungus, changes in understory vegetation and distribution of canopy cover, and diversifying areas for wildlife. Fire suppression over the past century makes managing hazardous fuels a priority in order to reduce potential of large, high severity wildfires and move the ecosystem closer to the natural disturbance process.

**Provide a Sustainable Supply of Wood In Support of the Local and Regional Economy**

There is a need to manage the project area to provide multiple-use benefits, as described in the Willamette National Forest Land and Resource Management Plan, which includes an expected output of timber products at the optimum level to meet the long-term sustained-yield capacity. The Willamette Forest Plan describes the goal to meet timber outputs at IV-227, and sets forth Standards and Guidelines for harvest scheduling at FW-176 and 177.

The Northwest Forest Plan Final Supplemental Environmental Impact Statement (USDA Forest Service and USDI Bureau of Land Management. 1994) Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl (USDA Forest Service and USDI Bureau of Land Management. 1994a) amended the Willamette Forest Plan. It recognizes that "the need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis" (page 1-4).

## Proposed Action

The McKenzie River Ranger District proposes to conduct activities on 1,156 acres of the Ball Park Project Area. The proposed activity acres include timber harvest (915), natural fuels underburns (49), and rock quarry/borrow pit use (5). The timber harvest would yield a gross estimate of 12.3 million board feet (MMBF) of wood products. This proposal, represented in Alternative B in this EA, would include canopy thinning on 664 acres, group selection on 129 acres, and riparian thinning on 122 acres. The timber sales from this proposal would likely be sold over a three year time span, beginning in fiscal year 2009.

The proposal also includes the activities listed below, which are described in detail in Chapter 2:

| Proposed Action Activities |
|---|
| • **Yarding Systems:** Ground-based yarding systems would be used on approximately 606 acres and skyline yarding would occur on 459 acres. |
| • **Post-harvest Planting:** In group selects created from root rot pockets, follow-up planting with species that are non-susceptible to the species of root disease may occur to augment natural regeneration. In random group selects (gaps), stocking will be evaluated two years post harvest to evaluate needs. If a planting need is determined, underrepresented species will be planted to augment natural regeneration. |
| • **Subsoiling:** Soil would be ripped to promote regeneration and provide a suitable environment for future growth. Subsoiling is used to offset compaction from equipment where the harvest |

| |
|---|
| prescription resulted in little to no residual stand and no further silvicultural treatments will be necessary for 40 or more years. Group selects will potentially have subsoiling needs if ground based operations create compaction within the unit or landings. |
| • **Road Closures and Decommissioning**: Activities are proposed to decommission Forest roads in the project area to return roads to reduce erosion potential and reduce disturbance to wildlife. Decommissioning roads is planned for 0.53 miles of currently closed roads, and would include activities that result in the stabilization and restoration to a more natural state. |
| • **Road Maintenance:** Roads used for timber haul that do not currently meet Forest standards for safety and haul suitability would receive road maintenance prior to use. Appropriate road maintenance would be performed on approximately 43.9 miles of Forest roads during operations and upon completion of sale activities. Part of the road maintenance activities would be the replacement of approximately 95 culverts and approximately 9 new culverts being installed in the project area. Proposed road maintenance activities would occur prior to timber harvest. |
| • **Temporary Road Construction:** The proposed action requires the connected action of constructing less than 3.0 miles of temporary roads to access proposed timber harvest units in the Ball Park Thin Project Area. Decommissioning of temporary roads in the project area would occur upon completion of sale activities. |
| • **Rock Quarry Development:** The proposed action requires the connected action of using existing nearby rock pits to supply crushed rock and rip rap for maintaining roads accessing the Ball Park Thin Project area. It is estimated that less than 4,000 cubic yards of crushed rock and riprap would be needed. No new development of any of the listed sources is required. |
| • **Fuels Treatments:** Logging slash would be reduced through underburning, burning landing piles, hand piles, and machine piles after harvest. Firewood cutting may be used as well. These treatments would reduce slash fuels created by timber harvesting. Underburning would also reintroduce the disturbance process of fire to the landscape within harvest units. Slash fuels may be pre-bunched in units where ground and skyline operations occur. Logging slash fuels treatments would occur within 5 years of timber harvest. |
| • **Natural Fuels Underburn:** (underburning without harvest) will occur which will reintroduce fire disturbance to the landscape. |

## Decision Framework

The Responsible Official for this proposal is the McKenzie River District Ranger. Given the purpose and need stated above, the Responsible Official reviews the proposed action and the other alternative actions in order to make the following determinations:

- The proposed actions as analyzed, comply with the applicable standards and guidelines found in the Willamette Forest Plan and all laws governing Forest Service actions.
- Sufficient site-specific environmental analysis has been completed.
- The proposed action meets the purpose and need for action.

With these assurances the Responsible Official must decide:

- Whether or not to select the Proposed Action or one of the alternatives, which includes the No-Action Alternative; and what, if any, additional actions should be required.
- Whether the selected alternative is consistent with the Willamette Land and Resource Management Plan (1990), or if the Forest Plan shall be amended in this action.

## Tiering and Incorporating by Reference

In order to eliminate repetition and focus on site-specific analysis, this EA is tiered to the following documents as permitted by 40 CFR 1502.20:

- The Willamette National Forest Land and Resource Management Plan (Forest Plan) FEIS and Record of Decision (ROD) dated July 31, 1990, as well as all subsequent NEPA analysis for amendments. This includes the April 1994, Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Spotted Owl, or Northwest Forest Plan (USDA Forest Service and USDI Bureau of Land Management. 1994a), and the accompanying Land and Resource Management Plan, as amended. The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Willamette National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.
- This EA tiers to a recent broader scale analysis for invasive plants (the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS) (USDA Forest Service. 2005). The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Willamette National Forest Plan by adding management direction relative to invasive plants. This project is intended to comply with the new management direction. Proposed actions would also incorporate measures contained in the December 1988, Record of Decision and FEIS for Managing Competing and Unwanted Vegetation, and the requirements of the Mediated Agreement, signed May 24, 1989 by USFS, NCAP, OFS, et al.
- The Upper McKenzie Watershed Analysis (1995) is incorporated by reference. This document provides the Responsible Official with comprehensive information upon which to base land management decisions and establishes a consistent, watershed level context to project level analysis. The watershed analysis provides descriptions of reference, historic, and existing conditions of important physical, biological, and social components of the fifth field watershed. The study analyzed activities and processes that cumulatively altered the Upper McKenzie landscape over time. It recommends watershed management activities based upon landscape and ecological objectives. The watershed analysis is used to characterize elements of the watershed, provides background information for the cumulative effects analyses, and provides recommendations for management activities that move the systems toward management objectives.

- The Willamette National Forest Road Analysis Report (2003) is incorporated by reference. The Forest Road Analysis provides the responsible official with information needed to identify and manage a minimum road system. This is a road system that is safe, responsive to public needs and desires, is affordable, and efficient. The system also needs to have minimal adverse effects on ecological processes, ecological health, diversity, and be in balance with available funding for needed management actions. The District Roads Analysis evaluated each individual road segment on the District with criteria relating to terrestrial, aquatic, administrative, and public use factors. Transportation system decisions were made based on the rating system and road closure recommendations.

## The Forest Plan

The Willamette Forest Plan, as amended, provides resource management goals and gives direction to apply a range of harvest methods to timber stands. Chapters II and III from the FEIS discuss silvicultural activities expected to occur on suitable lands on the Forest. Appendix F from the FEIS further documents the rationale used to determine the appropriate harvest systems to be used in managing coniferous forests on the Willamette National Forest.

Table 1 displays Management Area acres as designated in the amended Willamette Forest Plan (WFP) for the project area. The table also includes the overlying land allocations from the 1994 Northwest Forest Plan. Five of the six Northwest Forest Plan (NWFP) allocations are present and consist of Adaptive Management Area, Administratively Withdrawn, Late-Successional Reserves, Matrix, and Riparian Reserves. However, because Riparian Reserves overlap with other land allocations, they are not represented in the table. The intent is to accurately display WFP Management Area acres. Riparian Reserves within harvest units are displayed in Chapter 3, in the Water Quality/Aquatic Resources section. Management areas corresponding to both the WFP and the NWFP within the Ball Park Thin project area are displayed in Figures 3 and 4. All proposed activity units are located in the Adaptive Management Area NWFP land allocation. The objective of the Adaptive Management Area is to develop, demonstrate, implement, and monitor the effects of activities prescribed within the treatment areas.

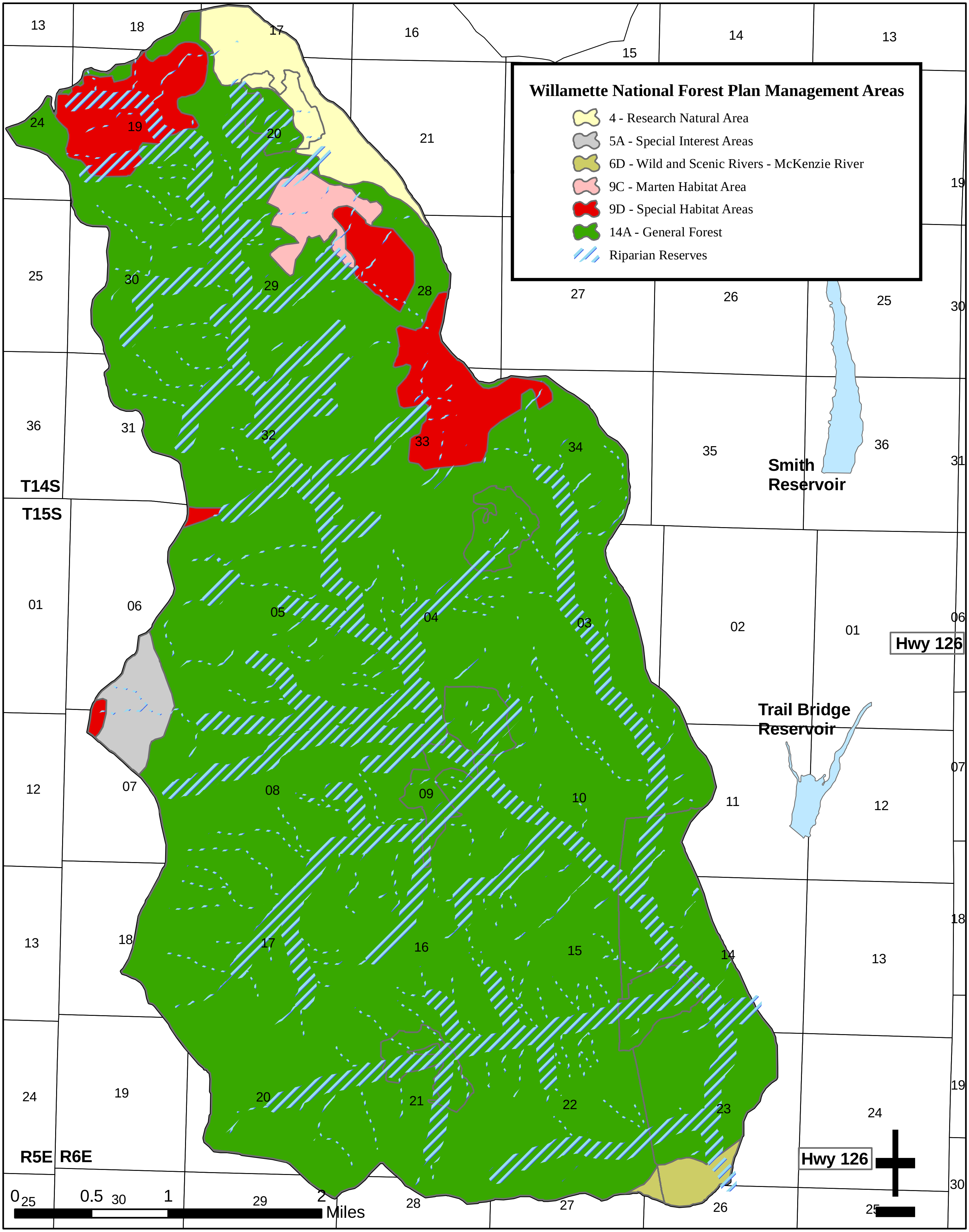



Figure 3. Willamette National Forest Plan Management Areas in the Ball Park Thin Project Area.

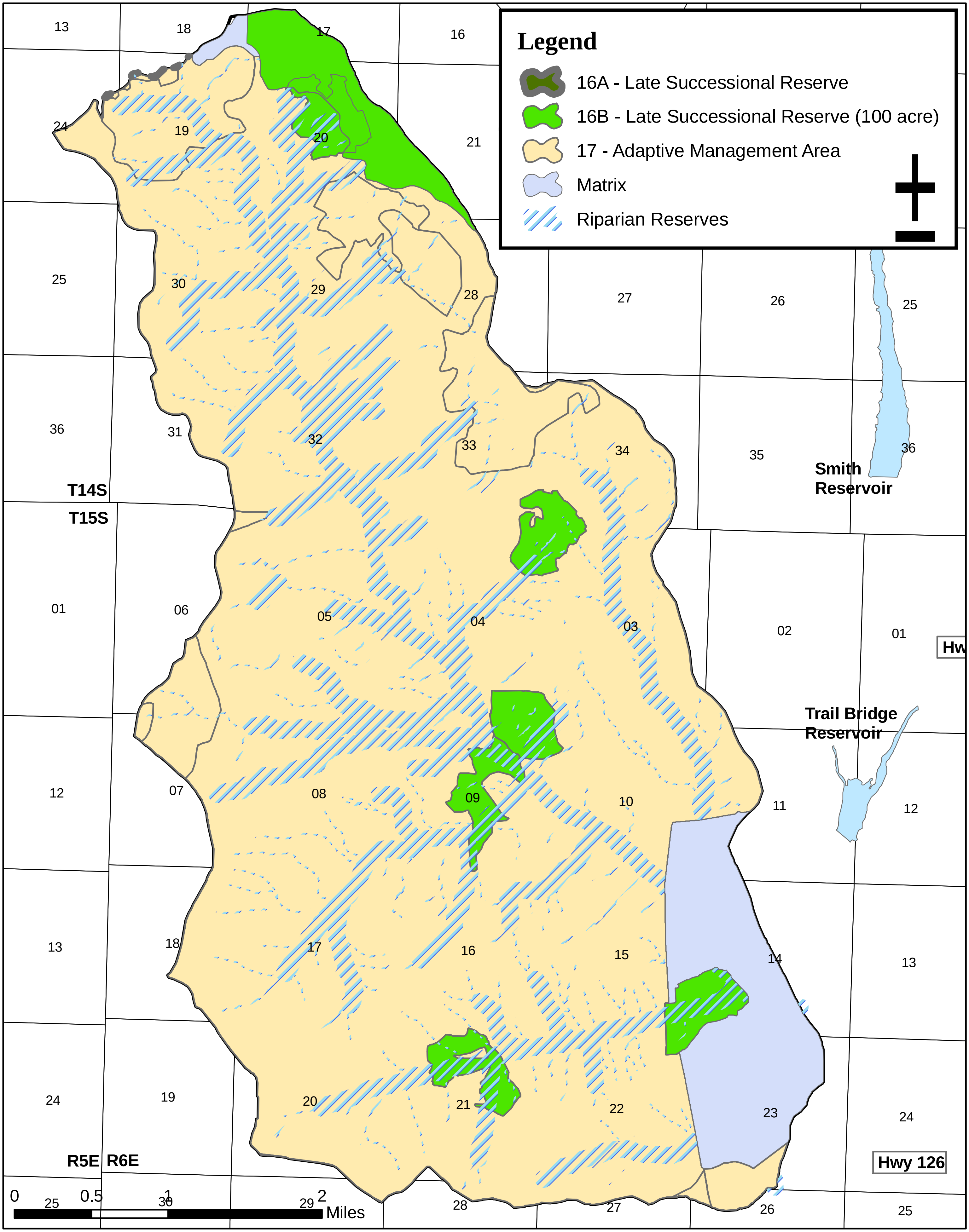



Figure 4. Northwest Forest Plan Management Areas in the Ball Park Thin Project Area.

**Table 1. Management Areas within the Project Area.**

| Willamette Forest Plan Management Areas | Northwest Forest Plan Land Allocations | Total Acres | Acres in Activity Units |
|---|---|---|---|
| **4 - Research Natural Area** | *Administratively Withdrawn* | 297 | ---- |
| **4 - Research Natural Area** | *Late Successional Reserves* | 54 | --- |
| **5a – Carpenter Mt. SIA** | *Late Successional Reserves* | 168 | --- |
| **6d – McKenzie River Wild and Scenic (Rec)** | *Congressional Withdrawn* | 78 | --- |
| **6d – McKenzie River Wild and Scenic (Rec)** | *Adaptive Management Area* | 13 | --- |
| **9c – Wildlife Habitat-Marten** | *Adaptive Management Area* | 154 | --- |
| **9d – Wildlife Habitat-Special Areas** | *Adaptive Management Area* | 793 | --- |
| **14a – General Forest** | *Matrix* | 905 | 172 |
| **14a – General Forest** | *Late Successional Reserves* | 591 | --- |
| **14a – General Forest** | *Adaptive Management Area* | 11,455 | 984 |
| **Total Acres** | | **14,508** | **1,156** |

The following briefly discusses the goals of the Forest Plan Management Areas within which harvest units or other management actions are included in action alternatives. See Chapter 2, Tables 2, and 4, for prescriptions by alternative.

**MA-14a, General Forest – Matrix**

**Activity units partially or entirely within MA-14a:**

The primary goal of this management area is to produce an optimum and sustainable yield of timber based on the growth potential of the land that is compatible with multiple use objectives and meets environmental requirements for soil, water, and wildlife habitat quality. In addition, this area can provide many opportunities for public use and enjoyment.

This allocation is distributed over the Ball Park Thin Project area. All temporary roads will be built in MA-14a. Restoration projects in MA-14a include road maintenance required to access harvest units, road closures, and decommissioning (2654-795, 2654-812).

**MA-15, Riparian Reserves**

Timber harvest units which include riparian reserves are listed in Chapter 2, Table 2.

Riparian Reserves are one of the designated management areas identified in the Northwest Forest Plan. The primary goal for lands located in this management area is to maintain the ecological function of rivers, streams, wetlands, and lakes within the landscape.

Riparian Reserves include at least the water body, inner gorges, all riparian vegetation, 100-year floodplain, landslides, and landslide-prone areas. Reserve widths are based on either a multiple of the site-potential tree or a prescribed slope distance, whichever is greater. Reserve widths may be adjusted based on watershed analysis to meet Aquatic Conservation Strategy (ACS) objectives. The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands by maintaining and restoring ecosystem health at watershed and landscape scales. The intent is to protect habitat for fish and other riparian-dependent species and to restore currently degraded habitats.

All action alternatives have management activities that occur in Riparian Reserves that are designed to be consistent with ACS objectives. Activities include: thinning, fuels treatments, natural fuels underburns and road restoration projects.

## Public, Tribal, and Agency Involvement

Scoping is the process for determining issues relating to a proposed action and includes review of written comments, distribution of information about the project, interdisciplinary Team (IDT) meetings, and local news releases.

Scoping began on the Ball Park Thin Project under the current proposed action on May 24, 2007. The McKenzie River Ranger District sent a public scoping letter with preliminary information about this EA to a project mailing list of 43 interested individuals, agencies, tribal governments, and elected representatives. The scoping letter described the proposed action, a purpose and need for action, a brief summary of preliminary issues, and alternative actions. The Ball Park Thin Project has been listed in the Forest Focus – the quarterly schedule of proposed actions (SOPA) for the Willamette National Forest, since February 23, 2007.

## Issues

Issues are points of concern about environmental effects that may occur as a result of implementing the proposed action. They are generated by the public, other agencies, organizations, and Forest Service resource specialists and are in response to the proposed action.

Significant issues describe a dispute or present an unresolved conflict associated with potential environmental effects of the proposed action. Significant issues are used to formulate alternatives, prescribe mitigation measures, and focus the analysis of environmental effects. Significant issues are also determined based on the potential extent of their geographic distribution, duration of their effects, or intensity of interest or resource conflict, if not mitigated or otherwise addressed. The significant issues for this project were identified by the ID Team and approved by the Responsible Official.

Significant issues are tracked through Issue Identification (Chapter 1), Alternative Development and Description (Chapter 2), and Environmental Consequences (Chapter 3). Measurement criteria have been identified for the significant issues and are used to compare alternatives. These criteria are shown in comparison in Table 11 at the end of Chapter 2.

In addition to the significant issues, other issues or non-significant issues were raised by the public or Forest Service resource specialists. These issues were determined to be non-significant because they were; 1) outside the scope of the proposed action, 2) already decided by law or regulation, Forest Plan, or other higher level decision, 3) irrelevant to the decision to be made, or 4) conjectural and not supported by scientific or factual evidence. These issues are less focused on the elements of the purpose and need for action and did not influence the formulation of alternatives. Several of the non-significant issues are also included in the environmental effects analysis (Chapter 3) because of regulatory or policy direction.

## Significant Issues

### Issue 1. Water Quality/Aquatic Resources

Past management activities have resulted in impacts to the riparian and aquatic resources of the analysis area. Proposed management activities such as timber harvest, prescribed fire, and road construction can adversely affect water quality, and aquatic and riparian habitat. The most common impacts include: reduction of large wood available for input to streams, removal of shading vegetation, and increases in sedimentation. These effects can result in simplification or elimination of fish and other aquatic habitat, and degradation of water quality with respect to elevated stream temperatures and increases in sediment delivered to streams. However, these same proposed management activities can positively affect these resources by creating stand conditions that favor the development of future large wood and other late-successional stand characteristics, as well as providing opportunities to restore degraded conditions that are the result of past activities in the watershed.

Beneficial uses that are dependent on the quality of the water in the McKenzie River in the project area include spawning and early rearing habitat for spring Chinook salmon, rearing and foraging habitat for sub-adult and adult bull trout (both listed as Threatened species and protected under the Endangered Species Act), and use as public drinking water for the City of Eugene at the Hayden Bridge intake downstream of the project area. Tributaries to the McKenzie River in the project area provide habitat for additional aquatic organisms, including cutthroat and rainbow trout, bull trout and spring Chinook salmon; all considered Management Indicator Species in evaluating project effects to animals and their habitat.

The effects of this project on water quality, aquatic and riparian habitat are evaluated by the following criteria:

| Issue #1 Water Quality/Aquatics—Indicators | | |
|---|---|---|
| **#** | **Indicator** | **Measurement** |
| **1** | *Changes in available stream shade and potential to increase stream water temperatures* | Projected increase in stream water temperature above current condition (Degrees Celsius) |
| **2** | *Changes in risk of altered peak flows.* | Expressed by the Aggregate Recovery Percentage |

| Issue #1 Water Quality/Aquatics—Indicators | | |
|---|---|---|
| # | Indicator | Measurement |
| 3 | *Estimated project effect on short-and-long term transport of sediment from project area roads* | Cubic yards of sediment yield originating from roads during and after the project |
| 4 | *The amount of riparian area receiving treatment, and the effects of the treatment on riparian stand composition* | Acres and % of riparian thinned |

**Issue 2. Distribution and Amount of Diverse Early Seral Habitat for Wildlife**

Diverse early seral habitat can be described as the forbs or small shrubs known to occur in early seral stages that occur after some sort of disturbance or natural meadow. This habitat type includes the structural diversity of dead wood, including various sizes and decay classes of snags and logs. Abundant flowering forbs and hardwoods are valuable components of wildlife habitat diversity. Changes in forest management on federal lands within the past 25 years have significantly decreased early seral openings. While early seral habitat is still plentiful on private lands adjacent to the Willamette National Forest, many of the species dependent on this type of habitat require the diverse species and structural diversity that intensively managed plantations on private land do not provide. A total of 156 wildlife species have been documented to depend on early seral habitat and the contribution to biological diversity it provides (O'Neil et.al 2001). This includes 10 species of amphibians, 88 species of birds, 42 species of mammals, and 16 species of reptiles.

Effects of the alternatives on diverse early seral habitat are evaluated by the following criteria:

| Issue #2 Diverse Early Seral Habitat —Indicators | | |
|---|---|---|
| # | Indicator | Measurement |
| 1 | *The amount of diverse early seral habitat created* | Acres of diverse early seral habitat created with gaps and remaining overstory canopy closure after treatments |

## Non-Significant Issues

These *other issues* were addressed in project development. The issue statements below are followed by reasons why they were not considered significant to the development of alternatives and not always fully analyzed in the following chapters. However, they may serve as important tools that are used to qualitatively evaluate differences between alternatives.

**Soil Productivity/Slope Stability**

Soil compaction and displacement can occur during timber harvest and road construction activities, which could adversely affect the re-establishment of vegetation and the hydrologic capacity of the soils. Road construction and timber harvest can reduce slope stability on potentially unstable slopes.

Since the potential effects identified with this issue would be effectively mitigated by measures designed to comply with the Willamette Forest Plan, this issue was not considered significant for designing alternatives to meet the purpose and need for action. All action alternatives meet or exceed standards and guidelines for soil protection from the Willamette Forest Plan, through incorporation of Best Management Practices for the protection of soil resources.

### Variable Density Thinning

Scoping comments were received that urge use of variable density thinning in managed stands for this proposal. Variable density thinning would begin development of late-seral stand characteristics over time.

This issue was not considered significant because silviculture prescriptions and marking guidelines include variations in average residual tree spacing of between 17 and 35 feet. The average spacing along with openings caused by natural disturbances, such as, insects and diseases, as well as, windthrow along with untreated reserves will result in a stand with variability in continuity and density, similar to that suggested by the commenters (see Silvicultural Descriptions, page 54). Commercial thinning prescriptions would result in much the same variation in stand density after treatment as suggested by the commenters (see Silvicultural Descriptions).

### Sensitive or Other Terrestrial Species of Concern

Activities that remove or degrade forest habitats might affect a variety of species. Activities that create noise above ambient levels may also impact a variety of wildlife species.

This issue was not considered significant because all actions that remove or degrade forest habitat would be required to follow conservation and protection guidelines provided by the Willamette Forest Plan to avoid adverse affects on listed species. Activities that generate noise above ambient levels near nest sites of Sensitive or other wildlife species of concern would be seasonally restricted. Design and mitigation measures address this issue in Chapter 2. The effects of the proposed action and other alternatives on Sensitive and other wildlife species of concern are addressed in Chapter 3.

### Migratory Land Birds

This project could affect Migratory Land Birds and their habitat, which varies broadly for this large group of species. Required protection for these species is outlined in the Migratory Bird Treaty Act.

This issue was not considered significant because the proposed silvicultural treatments promote understory shrub development, tree species diversity, deciduous trees, and growth of larger trees. As a result, snags and downed logs are maintained and created, as well as the creation of gaps, which generally improve avian biodiversity in the stand. The effects of the proposed action and other alternatives on migratory land birds are addressed in Chapter 3.

### Management Indicator Species (MIS)

Proposed actions could affect Management Indicator Species located within the project area as listed and described in the Willamette Forest Plan. The Forest MIS species list includes the northern spotted owl, pileated woodpecker, marten, Roosevelt elk, black-tailed deer, cavity excavators, bald eagle, peregrine falcon, sea-run spring Chinook salmon, river-dwelling bull trout, and resident fish species like rainbow trout, and cutthroat trout. Through Region-wide coordination each Forest identified the minimum habitat distribution and habitat characteristics needed to satisfy the life history needs of MIS. Management recommendations to ensure the viability of Management Indicator Species were incorporated into all action alternatives analyzed in the 1990 Willamette Forest Plan FEIS.

This issue was not considered significant because project action alternatives would meet the Willamette Forest Plan applicable Standards and Guidelines. The action alternatives are also designed to protect MIS species. Effects of the action alternatives on MIS are addressed in Chapter 3.

**Fire and Fuels**

Proposed actions may increase or reduce the severity of the effects from wildfires that could occur within the project area. Reducing continuity of vegetation through thinning and slash from harvest activities changes the potential for wildfire spread rate, intensity and mortality. Leaving activity created slash untreated would increase the effects of wildfire. Prescribed fire underburns and fuels treatments will reduce activity slash or naturally occurring fuels across the landscape, thus lessening the impact and severity of future wildfires in the project area. The methods of fuel treatments, the time of year prescribed fire is applied, and the frequency of prescribed fire treatments can change and reduce the amount and arrangement of fuel over the landscape. Additionally, returning the natural process of fire to the ecosystem creates variability in the effects from future wildfires. Air quality may also be affected during prescribed burning, given the close proximity of the Class I Airsheds (Mt. Washington and Three Sisters Wilderness) and the Designated Area of Willamette Valley (Leaburg).

This issue was not considered significant because design measures and accepted procedures for fuels treatments and air quality standards would follow the Willamette Forest Plan Standards and Guidelines addressed in Chapter 3.

**Invasive Plants**

Proposed actions may introduce or spread invasive and non-native plants. Off-road vehicle/equipment use, ground disturbance, and created openings in the forest canopy resulting from any action alternative, can provide an opportunity for invasive plants to establish and out-compete the desirable native vegetation.

Among the documented invasive plants in the Deer Creek watershed, four are "new invaders" which are weeds limited in distribution with the possibility of eradication based on knowledge of their location. These weeds are capable of broad ecological tolerance, prolific growth, and abundant seed production. Spotted knapweed (*Centaurea maculosa*) and false brome (*Brachypodium sylvaticum*) spread easily by vehicular traffic and have quickly become established along forest roads found in the project area.

This issue was not considered significant because prevention measures, such as washing of equipment, re-vegetation using local native species, and minimizing creation of open, disturbed areas adjacent to existing weeds would be used for all action alternatives. These measures would prevent population expansion and minimize establishment of any invaders. (See Mitigation Measures and Design Measures detailed in Chapter 2.)

### Roads and Access

Management decisions could increase or decrease the roaded condition of the landscape, potentially affecting slope stability, water quality, and recreational access. Many of the roads within the project area are below current maintenance standards and are not drivable. This project would provide opportunities to improve current conditions on the 43.9 miles of road needed for rock and timber haul. Existing roads that pose potential adverse effects to riparian resources would require improvements to comply with existing Best Management Practices.

This issue was not considered significant because all action alternatives perform maintenance on roads where the need is identified, and improvements will comply with existing Best Management Practices. The effects of the action alternatives on roads and access are discussed in Chapter 3.

### Recreation

Timber harvest and associated activities within and adjacent to proposed harvest units could affect dispersed recreation activities. There are no developed recreation sites within the project area. Mitigation measures listed in Chapter 2 would include signing at high traffic areas to ensure public safety and preventing binder checkpoints at parking areas or other public use locations.

This issue was not considered significant because the number of affected recreationists would be small, the impacts would be short-term, and mitigation measures would provide for public safety. The proposed action is also designed to be consistent with Willamette Forest Plan standards and guidelines for recreation management. Effects of the action alternatives on recreation are discussed in Chapter 3.

### Scenic Quality

Proposed actions include timber harvest that may affect visual quality in the project area by creating openings from timber harvest. Commercial thinning harvest may also alter form and texture. The Visual Quality Objective for the project area where management activities are proposed is maximum modification.

This issue was not considered significant because the proposed action is designed to be consistent with Willamette Forest Plan visual quality standards and guidelines. Effects of the action alternative on scenic quality are discussed in Chapter 3.

### Social/Economics

Timber volume generated from the proposed harvest units vary with different silviculture prescriptions. Alternatives actions may have different effects on the local and regional economies regarding job creation for neighboring communities when one considers the volume per acre of timber products for this proposal, and potential fluctuations in selling values when timber sales are implemented (starting in fiscal year 2009).

This issue was not considered significant for designing alternatives to meet the purpose and need because all action alternatives provide similar positive economic benefits to the economy in providing jobs and contributing timber products to local markets. All action alternatives are economically viable. See Chapter 3 for a discussion of this issue.

### Heritage Resources

The project area has some known cultural resource sites and contains high probability areas for additional, undiscovered sites. Timber harvest and other ground-disturbing actions could potentially affect heritage resources.

This issue was not considered significant because Federal laws and regulations require that cultural resources be protected either through avoidance or data recovery. Cultural resource surveys of the proposed project area have been completed. All known NRHP eligible or potentially eligible sites in the Ball Park Thin Project area would be buffered and excluded from resource management activities.

### Carmen-Smith Hydroelectric Project

The Eugene Water and Electric Board (EWEB) operates transmission lines associated with its Carmen-Smith Hydroelectric Project within this planning area. In 1958, EWEB applied for and was granted a 50-year license for the construction, operation, and maintenance of the project by the Federal Power Commission (FPC), with an effective date of December 1, 1958. Since EWEB's Original License was issued for a period of 50 years, the utility is currently seeking a New License from the Federal Energy Regulatory Commission, or FERC, the successor to the FPC. The New License is scheduled to be issued on December 1, 2009. All parties to the re-licensing effort are currently participating in settlement negotiations regarding potential license terms and conditions. FERC is currently collecting information as it prepares to conduct an Environmental Analysis of the utility's proposal and would subsequently issue a New License with its Articles based on that analysis and the result of settlement negotiations.

At this time there are no proposals or decisions associated with this project which can be reliably or accurately analyzed in order to assess future effects that may contribute cumulative effects within the context of this EA. Therefore, this issue was not considered significant to development of project alternatives. Ongoing regular maintenance activities would continue into the future for the hydropower project. Comments were received from EWEB managers during public scoping (Appendix H). The Smith-Carmen Hydroelectric project and facilities were considered in alternative development, and in the inclusion of mitigation and design measures, as discussed in Chapter 2.

# Chapter 2. Alternatives, Including the Proposed Action

This chapter describes and compares the alternatives considered for the Ball Park Thin Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare alternatives is based upon the design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon the environmental effects of implementing each alternative (i.e., the amount of erosion or amount of spotted owl habitat altered).

## Alternatives Considered – Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following Alternative design features were eliminated from detailed analysis for the reasons stated.

| Alternative Excluding Silvicultural Treatments in Riparian Reserves |
| --- |
| In response to initial public scoping comments that expressed concern about management activity in Riparian Reserves, an alternative that excluded silvicultural treatment within Riparian Reserves was evaluated. The District Ranger chose not to develop this alternative, and eliminated it from detailed study because it fails to meet the purpose and need to accelerate restoration of late-successional conditions for stands within Riparian Reserves. |

## Actions Considered – Eliminated from Action Alternatives

The following design features were incorporated into each of the action alternatives. These design features were based on public comment on the proposed action and new information concerning the project area.

| Dropped Units for Economic Consideration |
| --- |
| Initial public scoping indicated concerns that timber harvest proposals be economically feasible and that expensive methods be minimized. Consequently, Units 90, 100, 180, 250, 260, 300, 320, 340, and 350, which were originally considered for commercial thinning in the proposed action were dropped. This was the result of initial analysis that showed the current size of trees and volume per acre did not support the cost of logging in today's market. |
| **Burning of Bunchgrass Mountain Meadow** |
| The original proposed action included a 42 acre prescribed meadow burn. This restoration broadcast burn was intended to reduce encroaching conifers and encourage the growth of grasses and forbs. |

| |
|---|
| Meadow researchers and resource specialists visited the Bunchgrass Mountain meadow in June 2007 to discuss the ecology and maintenance of this meadow. As a result of this review, a recommendation was made not to apply any burning treatments at this time because fire was not determined to be the single and primary process in the creation or maintenance of this particular meadow. Consequently, the proposed action to burn the area was not considered to be appropriate for this decision, and was dropped from the project. |
| **EWEB Re-licensing** |
| Unit 380, which is located adjacent to the EWEB transmission line along Deer Creek, was included in the original proposal for commercial thinning. However, EWEB and other parties to settlement negotiations for FERC re-licensing of these facilities are in the process of evaluating alternative designs and/or locations for the transmission line in this area. Since the outcome of these negotiations has not yet been determined, and could impact management design for Unit 380, management action in the unit was not considered to be appropriate for decision at this time. Consequently, Unit 380 was dropped from the proposed action. |

# Alternatives Considered in Detail

## Alternative A – the No Action Alternative

Alternative A assesses the current management situation of the affected environment and serves as a baseline to compare and describe the differences in effects between taking no action and implementing action alternatives to meet project objectives. Existing site specific management plans and standards and guidelines would continue to be the basis for management of the project area. Only those management activities planned and implemented under previous decisions would continue in the project area.

The existing network of roads would remain unchanged. Normal scheduled road maintenance, such as brushing, culvert cleaning (not new or replacement), and surface blading would continue in accordance with annual maintenance plans. Control of invasive plants would continue as currently programmed and funded.

### Alternative A (No Action) as it Responds to the Significant Issues:

**Water Quality/Aquatic Resources**

Alternative A proposes no activities that would create new risks to soil and water resources. However, the alternative allows existing road related problems including erosion from roads currently in poor condition resulting in continued annual road related sediment production of an estimated 183 cu yd/year. Alternative A would also allow dense, stagnant riparian stand conditions to persist in stands where prior regeneration harvest occurred, resulting in delayed development of late successional habitat and sources of large wood.

**Distribution and Amount of Diverse Early-Seral Habitat for Wildlife**

Alternative A proposes no activities that would change current declining trends of early seral wildlife habitat in the project area.

## Alternative B – The Proposed Action

Alternative B would respond to the purpose and need by implementing timber harvest on 915 acres for a gross estimate of 12.3 million board feet (MMBF) of Forest products. This alternative is consistent with management direction set forth in the Willamette National Forest Plan and the Northwest Forest Plan direction for Adaptive Management Areas. Figure 5 display the activity units in the project area. Table 7 presents the types of treatment for each unit in this alternative

### Vegetation

Harvest treatments include 122 acres of riparian thin, 664 acres of thinning to 40% canopy closure, and 129 acres group selects of approximately one acre each scattered through all units except 50, 130, 140, 160, 190, 200, 210, 230, 280, 330, and 360. Group selection (gaps) would be cut to help enhance the development of early seral habitat by creating openings in the stands. There would be 129 one-acre gaps within the project area. Stand conditions and silvicultural prescriptions for the units in this alternative can be found on pages 56-61. Alternative B would implement harvest using approximately 606 acres of ground based yarding and 459 acres using skyline yarding systems.

**Table 2. Alternative B Treatment Plan**

| Type of Treatment | | # of Acres |
|---|---|---|
| *Timber Harvest* | Thinning to 40% canopy closure | 664 |
| | Riparian Thinning | 122 |
| | 1-acre Gap Creation | 129 |
| | *Total Harvest* | *915* |
| *Prescribed Burning* | Under or pile burns | 1,065 |
| | Underburn Buffer | 42 |
| | Natural fuels underburn | 49 |
| | *Total Burning* | *1,156* |

Alternative B would provide for underrepresented species, for example Sugar Pine and Western redcedar. Though rare in the project area, Sugar Pine, a relatively shade intolerant species, has been shown to increase seed-to-seedling success from a ratio of (1:244 to 1:483) to (1:70) with disturbance under the seed trees (Fowells, 1956).

Natural fuels underburning will occur within two units on approximately 49 acres with three acres of reserves within the units. Burning will help to reduce stand competition by removing smaller trees more susceptible to fire kill while promoting understory shrubs and herbs.

**Table 3. Alternative B Harvest Units.**

| Unit | Acres | Harvest Prescription* (Acres) | Logging Systems (acres) | Feet of Temp-Roads | Acers of Gaps | Fuels Treat-ment ++ | Residual Trees per acre** | Gross Estimated Timber Volume (MBF / CCF) | |
|---|---|---|---|---|---|---|---|---|---|
| **10** | 42 | CT-15, RT-11, GS-6, NT-10 | Skyline: 30<br>Ground: 12 | 500 | 6 | UB | 93 | 540 | 1,038 |

| Unit | Acres | Harvest Prescription* (Acres) | Logging Systems (acres) | Feet of Temp-Roads | Acres of Gaps | Fuels Treat-ment[++] | Residual Trees per acre** | Gross Estimated Timber Volume (MBF / CCF) | |
|---|---|---|---|---|---|---|---|---|---|
| **20** | 42 | CT-21, RT-4, GS-9, NT-8 | Skyline: 42 | 1,050 | 9 | BB | 109 | 217 | 417 |
| **30** | 52 | CT-20, RT-12, GS-8, NT-12 | Skyline: 52 | 450 | 8 | HP | 106 | 376 | 723 |
| **40** | 40 | CT-22, RT-6, GS-4, NT-8 | Skyline: 40 | | 4 | UB | 85 | 288 | 554 |
| **50** | 6 | CT-5, NT-1 | Ground: 6 | | 0 | GP | 109 | 85 | 163 |
| **60** | 52 | CT-17, RT-17, GS-7, NT-11 | Ground: 52 | | 7 | UB | 88 | 1,171 | 2,252 |
| **70** | 39 | CT-17, RT-9, GS-8, NT-5 | Skyline: 26 Ground: 13 | 600 | 8 | GP/HP | 122 | 989 | 1,902 |
| **80** | 34 | CT-22, RT-4, GS-5, NT-4 | Ground: 34 | 450 | 5 | GP | 117 | 694 | 1,335 |
| **110** | 44 | CT-12, RT-13, GS-5, NT-14 | Skyline: 44 | | 5 | UB*/HP | 106 | 361 | 694 |
| **120** | 57 | CT-35, RT-9, GS-6, NT-7 | Ground: 57 | 144 | 6 | UB*/GP/HP | 106 | 334 | 642 |
| **130** | 18 | CT-18, NT-1 | Ground: 18 | | | GP/HP | 99 | 245 | 471 |
| **140** | 29 | CT-29 | Skyline: 5 Ground: 24 | 300 | | GP/HP | 109 | 449 | 863 |
| **150** | 44 | CT-30, RT-5, GS-6, NT-3 | Skyline: 8 Ground: 36 | 1,300 | 6 | GP/HP | 122 | 825 | 1,587 |
| **160** | 46 | CT-42, NT-4 | Skyline: 10 Ground: 36 | | | GP/HP | 109 | 546 | 1,050 |
| **170** | 47 | CT-26, RT-1, GS-11, NT-9 | Skyline: 10 Ground: 37 | 2,000 | 11 | UB*/GP/HP | 121 | 370 | 712 |
| **190** | 39 | CT-39 | Skyline: 19 Ground: 20 | 2,000 | | GP/HP | 99 | 257 | 494 |
| **200** | 5 | CT-5 | Ground: 5 | | | GP | 90 | 41 | 79 |
| **210** | 10 | CT-9, NT-1 | Ground: 10 | 200 | | GP | 99 | 73 | 140 |
| **220** | 24 | CT-17, RT-2, GS-3, NT-2 | Ground: 24 | | 3 | UB*/GP | 80 | 498 | 958 |
| **230** | 11 | CT-11 | Ground: 11 | 300 | | GP | 121 | 197 | 379 |
| **240** | 43 | CT-24, RT-1, GS-10, 8 | Ground: 43 | 1,000 | 10 | GP | 143 | 322 | 619 |
| **270** | 14 | CT-11, GS-2, NT-1 | Ground: 14 | | 2 | GP | 99 | 167 | 321 |
| **280** | 9 | RT-5, NT-4 | Skyline: 9 | | | UB*/HP | 134 | 54 | 104 |
| **290** | 51 | CT-31, RT-2, GS-12, NT-6 | Ground: 51 | 1,500 | 12 | UB*/GP/HP | 109 | 906 | 1,742 |
| **310** | 52 | CT-35, RT-1, GS-7, NT-9 | Skyline: 25 Ground: 27 | 900 | 7 | UB*/GP/HP | 110 | 250 | 481 |

| **Unit** | **Acres** | **Harvest Prescription* (Acres)** | **Logging Systems (acres)** | **Feet of Temp-Roads** | **Acres of Gaps** | **Fuels Treat-ment++** | **Residual Trees per acre**** | **Gross Estimated Timber Volume (MBF / CCF)** | |
|---|---|---|---|---|---|---|---|---|---|
| **330** | 18 | CT-17, NT-1 | Skyline: 18 | | | UB*/HP | 108 | 265 | 510 |
| **360** | 19 | CT-10, RT-6, NT-3 | Skyline: 3 Ground: 16 | | | GP/HP | 112 | 380 | 731 |
| **370** | 48 | CT-33, GS-8, NT-7 | Skyline: 10 Ground: 38 | 500 | 8 | HP | 90 | 952 | 495 |
| **390** | 82 | CT-71, RT-3, GS-3, NT-5 | Skyline: 60 Ground: 22 | 500 | 3 | UB*/HP | 106 | 555 | 1,067 |
| **400** | 48 | CT-20, RT-12, GS-9, NT-7 | Skyline: 48 | | 9 | UB | 96 | 892 | 1,715 |
| **1000** | 2 | | | | | UB-buf | | | |
| **1001** | 16 | | | | | UB-buf | | | |
| **1002** | 7 | | | | | UB-buf | | | |
| **1003** | 17 | | | | | UB-buf | | | |
| **2001** | 34 | | | | | NFUB | | | |
| **2002** | 15 | | | | | NFUB | | | |
| Total | 1,156 | 1065 *** | | 13,694 | 129 | | | 12,347 | 24,238 |

* **CT** = Canopy thin; **RT** = Riparian Thin; **GS** = Group Select; **NT** = No Treatment Riparian Reserve.

** Trees per acres (TPA) of trees 7+ inches diameter breast height. For units with multiple presctiptions (i.e. CT and RT), an average TPA (not including GS) of the prescriptions assigned to that unit is given. TPA is calculated based on average stand residual spacing.

*** Total acreage of a stands that have commercial harvest. This number includes NT areas of a stand.

++ **UB** = underburn; **UB*** = possible underburn trees <15"; **HP** = Hand piling within unit and/or along roads ~100ft; **GP** = grapple pile throughout unit <30% slopes; **UB*/GP/HP** = follow-up fuels treatment based on post harvest conditions; **NF UB** = Natural Fuel underburn, **UB--Buf** = Buffer unit around NF UB

## Activities Common to Alternatives B and C

Treatments and actions to address significant issues that are common to both action alternatives (B and C) are presented below. Activities that differentiate the alternatives are presented in a separate section for each alternative.

### Treatments Common to Alternatives B and C:

#### Fuels Treatment

The proposed fire/fuels treatments for Alternative B are shown in Table 2. The treatments are based on the type of stand, age and size of trees (dbh), topography, and location. All fuel treatments may cause tree mortality and result in additional large snag creation, which is an important component of wildlife habitat.

Tree mortality in underburning units is expected and desired to be between the ranges of 5 to 20%. Useable snags would occur if trees are lightly burned such that the bark is charred. In pile burn units tree mortality of the trees larger than 14" dbh is desirable to create future snag habitat. A high level of tree mortality is not expected within pile burn units. Some piles should be created adjacent to large trees such that they would be killed, but not fully consumed.

**Table 4. Fuels Treatment and Fuel Loading Following Timber Harvest Proposed for Each Unit.**
([1]fuel loading is in tons per acre)

| Unit | Acres | Treatment | Fuel Loading[1] 0-3" | Unit | Acres | Treatment | Fuel Loading* 0-3" |
|---|---|---|---|---|---|---|---|
| 10 | 42 | UB | 13.6 | 220 | 24 | UB*/GP | 15.1 |
| 20 | 42 | BB | 12.6 | 230 | 11 | GP | 15.4 |
| 30 | 52 | HP | 11.9 | 240 | 43 | GP | 11.6 |
| 40 | 40 | UB | 10.1 | 270 | 14 | GP | 11.8 |
| 50 | 6 | GP | 20.8 | 280 | 9 | UB*/HP | 26.1 |
| 60 | 52 | UB | 17.1 | 290 | 51 | UB*/GP/HP | 13 |
| 70 | 39 | GP/HP | 27 | 310 | 52 | UB*/GP/HP | 8.6 |
| 80 | 34 | GP | 18.2 | 330 | 18 | UB*/HP | 15.3 |
| 110 | 44 | UB*/HP | 12.9 | 360 | 19 | GP/HP | 21.3 |
| 120 | 57 | UB*/GP/HP | 14.9 | 370 | 48 | HP | 19.1 |
| 130 | 18 | GP/HP | 13.5 | 390 | 82 | UB*/HP | 9.5 |
| 140 | 29 | GP/HP | 13.6 | 400 | 48 | UB | 14.8 |
| 150 | 44 | GP/HP | 15.6 | 1000 | 2 | UB-buffer | 4 |
| 160 | 46 | GP/HP | 13.8 | 1001 | 16 | UB-buffer | 4 |
| 170 | 47 | UB*/GP/HP | 9.7 | 1002 | 7 | UB-buffer | 4 |
| 190 | 39 | GP/HP | 9.9 | 1003 | 17 | UB-buffer | 4 |
| 200 | 5 | GP | 11 | 2001 | 34 | NFUB | 4 |
| 210 | 10 | GP | 11.5 | 2002 | 15 | NFUB | 4 |

| |
|---|
| **NFUB -- Natural Fuels Underburn in Units 2001 and 2002** |
| No commercial harvest but fuels and vegetation will be treated through an underburn with expected mortality to range from 5 to 20%. Hazardous fuels will be reduced to S&G. Mop up will follow directly after ignition. |
| **UB – Underburn in activity slash units** |
| Post harvest fuels will be underburned. Treatment will be done in spring-like conditions when 1000 hour fuels and duff are still moist, mortality of residual trees will be ≤10% because majority of the trees will be >15” dbh. Hazardous fuels will be reduced to S&G levels. Mop-up follows directly after the unit is ignited. |
| **UB-buffers – Buffers next to Units 1000, 1001, 1002, and 1003** |
| These units are attached to units 270, 330, 240, and 210, respectively. The UB-buffer units are to |

| |
|---|
| provide a different method of holding fire within the UB unit. Due to safety concerns and ecological constraints, the UB-buffer units will reduce the need for handline and also create safer implementation for firefighters during the UB. |
| **UB* - Underburn *** |
| Following the harvest the stand will be evaluated again to measure the residual tree dbh. If the majority of trees are 14" dbh they will be more resistant to a light/moderate underburn and the mortality of ≤10% can be maintained. If a unit has the majority of trees 12" dbh, mortality in an underburn may be difficult to hold at 10% or less due to the thin bark of the smaller trees. |
| **GP – Grapple pile** |
| Within units or in parts of units that are logged with ground equipment, create and cover piles post harvest and then burn the piles in the winter to reduce hazardous fuels to S&G. |
| **HP – Hand pile** |
| Within the unit where concentrations of slash exist or along the road to reinforce the road as a safer fire break and cover post harvest and then burn piles in winter to reduce hazardous fuels to meet S&G. |
| **GS – Group selection with broadcast burning** |
| One acre (Alt. B) to three acre (Alt. C) acre gaps will be created during the timber harvest. Units 10, 20, 40, 60, and 400 will be underburned and gaps will be burned at the same time. Units 110, 120, 170, 220, 280, 290, 310, 330, and 390 may be underburn, if the dbh does not allow then only the gaps will be broadcast burned. If the GS is <5 acres per unit, the GS will not be broadcast burned. Other units with GP or HP treatments may be broadcast burned within the group selection. |

All units with harvest activities would have landing piles burned following harvest. Units with hand piling treatments would be focused along the roadsides within 100 feet into the unit or areas of concentrations within the unit. Hand piling would make roads more effective as fuel breaks for wildfire suppression. Alternative biomass utilization would occur if a market exists for wood fiber or firewood. Burning to treat logging slash would take place during the spring season, or when weather and fuels are in spring-like conditions. Spring-like conditions are defined as:

| Spring-like conditions are defined as: |
|---|
| Fuels ≥3" in diameter (1,000 hour fuels) have fuel moistures of 25% or greater, |
| Soil moistures and duff moistures are damp, at levels where duff consumption could be limited to 30-40% across the unit, |
| Overstory tree mortality ranges from 5 to 20%. |

**Roads**

For Alternative B, approximately 37.4 miles of existing forest roads would be maintained to allow access to harvest areas for timber haul and to reduce adverse impacts to resources. Another 6.5 miles of road would receive spot rocking and other road maintenance to support rock haul, for a total of 43.9 miles of road maintenance. Road maintenance activities would include felling danger trees, clearing and grubbing, replacing drainage structures, removing slides, repairing holes in the roadbed, reconstructing ditches, and placement of aggregate surfacing. There would be approximately 95 replacement culverts with nine new culverts would be installed as part of road maintenance activities.

**Table 5. Roads Plan**

| All Action Alternatives – Roads Plan | |
|---|---|
| Maintain existing system roads | 43.9 miles |
| Decommissioning of currently closed roads | 0.53 miles |
| Constructing temporary spur roads (to be closed after use) | Less than 3.0 miles |

Table 4 has a list of the approximate stream crossing culvert replacements. The stream crossing culvert replacement projects would occur on existing roads designated for haul in this project. All stream-crossing improvements would accommodate 100-year flood events.

**Table 6. Approximate Stream Crossing Culvert Replacement.**

| Road Number | MP | Existing Culvert Diameter (Inches) | Streamflow[1] (Class) |
|---|---|---|---|
| 1500 | 0.16 | 18 | DR |
| | 0.36 | 18 | DR |
| | 0.72 | 18 | DR |
| | 1.38 | 30 | I |
| | 1.44 | N/A | DR |
| | 1.47 | 36 | P |
| | 1.55 | 18 | DR |
| | 1.62 | 18 | I |
| | 1.67 | 18 | DR |
| | 1.68 | 30 | I |
| | 1.81 | N/A | DR |
| | 2.30 | 18 | I |
| | 2.37 | 18 | DR |
| | 2.83 | 30 | I |
| | 3.25 | 18 | DR |
| | 3.27 | 18 | DR |
| | 3.32 | 18 | I |
| | 3.37 | 18 | DR |
| | 3.42 | 18 | I |
| | 3.80 | 18 | DR |
| | 4.15 | 18 | I |
| | 4.19 | 18 | DR |
| | 4.65 | 18 | I |
| | 4.86 | 18 | P |
| | 5.01 | 18 | P |
| | 5.10 | 18 | DR |
| | 5.25 | 18 | I |
| 1500-700 | 0.02 | 0.02 | 18 |
| | 0.07 | 0.07 | N/A |
| | 0.02 | 18 | DR |
| 1500-705 | 1.19 | 18 | DR |
| 1506 | 0.04 | 18 | DR |
| | 0.12 | 18 | I |
| | 0.26 | 18 | I |
| | 0.60 | 18 | DR |
| | 0.74 | 18 | P |
| | 1.22 | 18 | DR |
| | 1.26 | Unknown | DR |
| 2654 | 1.12 | 18 | I |
| | 1.36 | 18 | DR |
| | 1.62 | 18 | DR |
| | 1.72 | 18 | DR |
| | 1.78 | 18 | DR |
| | 1.89 | 18 | I |
| | 2.05 | 18 | DR |
| | 2.09 | 18 | I |
| | 2.19 | 18 | DR |
| | 2.41 | 18 | DR |
| | 2.46 | 18 | DR |
| | 2.66 | 18 | I |
| | 2.95 | 18 | DR |
| | 3.06 | 18 | I |
| | 3.25 | 18 | P |
| | 3.33 | 18 | DR |
| | 3.35 | 18 | I |
| | 3.38 | 18 | P |
| | 3.45 | 18 | P |
| | 3.60 | 18 | DR |
| | 3.79 | 18 | P |

| Road Number | MP | Existing Culvert Diameter Inches | Streamflow[1] Class |
|---|---|---|---|
| 2654 | 3.85 | 18 | DR |
| | 3.86 | 18 | DR |
| | 4.60 | 18 | P |
| | 5.08 | 18 | I |
| | 5.35 | 18 | I |
| | 6.66 | 16 | I |
| | 8.10 | 18 | I |
| | 8.38 | 18 | DR |
| | 8.92 | 18 | DR |
| | 8.94 | 18 | DR |
| | 9.14 | 18 | DR |
| | 9.33 | 24 | I |
| | 9.94 | 24 | P |
| | 9.99 | 18 | DR |
| | 10.19 | 18 | I |
| 2654-782 | 0.08 | 18 | P |
| | 0.11 | 18 | DR |
| | 0.35 | 24 | DR |
| | 0.64 | 42 | I |
| | 0.68 | 36 | I |
| 2654-792 | 0 | N/A | DR |
| | 0.03 | N/A | DR |
| | 0.18 | N/A | DR |
| 2654-796 | 0.4 | 24 | P |
| 2654-797 | 0.37 | 18 | I |
| | 0.66 | 18 | DR |
| 2655 | 0.42 | 18 | DR |
| | 0.77 | 36 | P |

| Road Number | MP | Existing Culvert Diameter Inches | Streamflow[1] Class |
|---|---|---|---|
| 2655 | 3.43 | 18 | DR |
| | 10.32 | N/A | I |
| | 10.57 | 18 | I |
| | 10.95 | 18 | DR |
| | 11.03 | 18 | I |
| | 11.54 | 16 | DR |
| | 11.62 | 16 | I |
| 2655-503 | 2.83 | 18 | DR |
| 2655-507 | 0.18 | N/A | DR |
| | 0.56 | N/A | DR |
| 2656 | 0.2 | 18 | I |
| | 0.26 | 18 | I |
| | 0.29 | 18 | I |
| | 0.43 | 18 | DR |
| | 0.47 | 18 | DR |
| | 0.54 | 18 | DR |
| | 0.93 | 30 | I |

***Streamflow[1]:*** *I-Intermittent DR-Ditch relief P-Perennial*

No existing open roads would be closed. Approximately 0.53 miles of existing closed roads would be decommissioned (see Soils, Watershed, and Fisheries protection Mitigation #16 for description). The segments of these roads that will be decommissioned will not be needed for Ball Park unit access (Forest Roads 2654-795 northern part and 2654-812).Both action alternatives would also construct less than 3.0 miles of new temporary roads to allow access to harvest. Upon completion of sale activities, the temporary roads would be decommissioned.

**Table 7. Roads Decommissioning for Alternative B.**

| Road Number | Existing Condition | Proposed Road Treatment | Description of Associated Treatment Activities | Miles Affected |
|---|---|---|---|---|
| ***2654-795*** | Open* | Decommission end of road only from point prior to Class 3 stream crossing | Remove culverts and fills, deep rip , and re-vegetate | 0.33 |
| ***2654-812*** | Open | Decommission | Remove culverts and fills, deep rip , and re-vegetate | 0.2 |
| ***Total*** | | | | **0.53** |

* Road is open from milepost 0.0 to 0.60. Decommissioned will occur from milepost 0.60 to the end of the road.

### Post-Timber Sale Activities

Following is a description of actions that would also occur within the Ball Park project area. More detailed site-specific information about these activities is available at the McKenzie River Ranger District.

**Pre-commercial Thinning (PCT)** – Thirty-two units were analyzed for pre-commercial thinning for an estimated 475 acres. PCT involves selectively cutting excess trees in stands from 10 to 20 years old to reduce competition for sunlight, moisture, and soil nutrients. By reducing competition the remaining trees are healthier, increase growth, and are less vulnerable to wind and snow damage. PCT also decreases the vulnerability of attack from insects and diseases. A 10-foot no-cut buffer is required along class 4 streams and a 20' foot no cut buffer is required along class 1-3 streams. Roadside buffers to provide hiding cover for wildlife may also be required as described in individual unit prescriptions. Slash pullback and scattering is required along all forest roads to provide a fuel break. See Appendix F for a list of stands where treatments may occur.

**Conifer Pruning** – Twelve units were analyzed for conifer pruning for an estimated 240 acres. Conifer pruning involves removing the lower limbs from 70 to 110 trees per acre. These trees are between 20 and 40 years old. The lower limbs are removed from the base of the tree up to ½ the height of the tree. By removing the lower branches sooner than they would naturally fall off, it can produce higher quality lumber by allowing clear wood to form sooner. Pruning may also reduce the incidence of foliage diseases, such as Swiss Needle Cast and White Pine Blister Rust, and increase fire resistance within the stand by removing "ladder fuels". There are no known relevant resource impacts associated with pruning that would support or prohibit the activity in Riparian Reserves. From the viewpoint of managing for water quality and stream bank and channel stability, there would be no restriction on pruning in Riparian Reserves. Slash pullback and scattering is required along all forest roads to provide a fuel-break. See Appendix F for a list of stands where treatments may occur.

## Alternatives B and C as it Responds to the Significant Issues:

### Water Quality/Aquatic Resources

Both action alternatives include 19 specific Best Management Practices (BMPs) that provide for the protection of soil, water, and fisheries resources, as required project mitigation. In addition each action alternative must comply with all project design criteria contained in the fisheries consultation document located in Appendix B. The riparian reserve thinning strategy also provides for the retention of effective stream shading vegetation and adequate levels of large wood in Riparian Reserves that occur in proposed partial cutting units. Silvicultural and fuels treatments within Riparian Reserves are prescribed at distances sufficient to maintain or improve aquatic habitat condition.

Both action alternatives treat approximately 122 acres of riparian reserve with thinning and fuels treatment following harvest. These treatments are expected to create stand conditions that favor the accelerated development of future large wood for in stream habitat, and stand characteristics that provide successional habitat and connectivity. The action alternatives would provide greater immediate diversity of patches and openings compared to the no action alternative, and would create conditions that result in greater plant species richness in thinned portions of Riparian Reserves.

Both action alternatives improve stream crossings on roads 2654, 2654-796, and 2655, improve road conditions through road maintenance and reconstruction on 43.9 miles of road, and decommission 0.53 miles of unneeded roads. Consequently road generated sediment upon completion of the project will be reduced from the current level of an estimated 183 cu yd/year to approximately 159 cu yd/year.

### Alternative B as it Responds to the Significant Issues:

#### Distribution and Amount of Diverse Early Seral Habitat for Wildlife

This alternative will create diverse early seral habitat through the creation of 129 one-acre gaps. Gap creation would temporarily increase the amount of flowering and palatable forbs and shrubs. 915 acres of thinning units will leave 40% average canopy closure on all stands. The canopies are expected to close back in to the current condition within 7-10 years. Some additional but very small openings would be created within the prescribed natural fuels underburn units (49 acres) through minor overstory tree mortality. The goal is to kill 10% of overstory trees with an acceptable range of 5-20%. Large down wood would be left within harvest units. Both measures to increase snag and large down wood habitat would improve diversity within the created early seral habitat. Commercial thinning and underburning would increase the use of young forests in the area for foraging and hiding cover.

## Alternative C

Alternative C would implement timber harvest on 915 acres for a gross estimate of 13.1 million board feet (MMBF) of Forest products. This alternative is consistent with management direction set forth in the Willamette National Forest Plan and the Northwest Forest Plan direction for Adaptive Management Area. Figures 8 displays Alternative C activity units within the Ball Park Thin Project area. Table 9 presents the types of treatment that is different from Alternative B for each unit in this alternative.

### Vegetation

Harvest treatments include approximately 122 acres of riparian thin, 642 acres of canopy thinning, and 151 acres of Group selection thinning within 30 harvest units. The group selection thinning would have a higher frequency of 1 - 3 acre gaps installed compared to Alternative B. A total of 151 acres of gaps would be created. In addition to harvest, the units include about 150 acres of untreated reserves. Gaps would be placed within all of the same units as Alternative B with additional gaps added to unit 210. Stand conditions and silvicultural prescriptions for the units in Alternative C can be found on pages 54-56. Alternative C would implement harvest using the same methods as Alternative B.

**Table 8. Alternative C Treatment Plan.**

| | Type of Treatment | # of Acres |
|---|---|---|
| *Timber Harvest* | Thinning to 40% canopy closure | 425 |
| | Thinning to 30% canopy closure | 217 |
| | Riparian Thinning | 122 |
| | 1-3 acre Gap Creation | 151 |
| | *Total Harvest* | *915* |
| *Prescribed Burning* | Under or pile burns | 1,065 |
| | Underburn Buffer | 42 |
| | Natural fuels underburn | 49 |
| | *Total Burning* | *1,156* |

**Table 9. Alternative C Differences in Harvest Units.**
All Units are the same as Alternative B except for the following (total is for whole Alternative):

| Unit | Acres | Acers of Gaps | Harvest Prescrip-tion* (Acres) | Logging Systems (acres) | Temp-Roads (Feet) | Residual Trees per acre** | Gross Estimated Timber Volume (MBF / CCF) | |
|---|---|---|---|---|---|---|---|---|
| **170** | 47 | 14 | CT-23, RT-1, GS-14, NT-9 | Skyline: 10, Ground: 37 | 2000 | 121 | 583 | 1,121 |
| **210** | 10 | 3 | CT-6, GS-3, NT-1 | Ground: 10 | 200 | 99 | 98 | 188 |
| **240** | 43 | 13 | CT-21, RT-1, GS-13, 8 | Ground: 43 | 1000 | 143 | 404 | 777 |
| **270** | 14 | 4 | CT-9, GS-4, NT-1 | Ground: 14 | | 99 | 208 | 400 |
| **290** | 51 | 15 | CT-28, RT-2, GS-15, NT-6 | Ground: 51 | 1500 | 109 | 1,164 | 2,238 |
| **310** | 52 | 15 | CT-27, RT-1, GS-15, NT-9 | Skyline: 25, Ground: 27 | 900 | 110 | 417 | 802 |
| **All Other Units** | 939 | 87 | ---- | ---- | 8,270 | ---- | 10,259 | 20,233 |
| **Total Alt. C** | **1,156** | **151** | **1065 ***** | | **13,870** | | **13,133** | **25,759** |

* **CT** = Canopy thin; **RT** = Riparian Thin; **GS** = Group Select; **NT** = No Treatment Riparian Reserve.

** Trees per acres (TPA) of trees 7+ inches diameter breast height. For units with multiple prescriptions (i.e. CT and RT), an average TPA (not including GS) of the prescriptions assigned to that unit is given. TPA is calculated based on average stand residual spacing.

*** Total acreage of a stands that have commercial harvest. This number includes NT areas of a stand.

## Alternatives C as it Responds to the Significant Issues:

See "Activities Common to Alternatives B and C" above for activates on fuels and roads.

**Water Quality/ Aquatic Resources**

See "Alternatives B and C as it Responds to the Significant Issues" above for how alternative C respond to this significant issue.

**Distribution and Amount of Diverse Early Seral Habitat for Wildlife**

This alternative would create diverse early seral habitat by creating 151 acres of group selects (gaps). These gaps would be approximately 1-3 acres in size scattered through all units except 50, 130, 140, 160, 190, 200, 230, 280, 330, and 360. It would also include 915 total acres of thinning units. An average of 40% canopy closure would remain on 642 acres of the total acres. 30% canopy closure would be maintained on 217 acres of the total acres to better benefit early seral wildlife habitat. Six units shown below with 30% canopy closure thinning were selected based on locations in a high emphasis elk management area that is below the target forage value, as well as two units being excellent potential forage areas for elk and other early seral wildlife species. These six selected units show high understory vegetation suitable for forage development. Commercial thinning would increase the use of young forests in the area for foraging and hiding cover. The prescribed natural fuels underburn will also provide for some early seral habitat with the goal of killing 10% of overstory trees with an acceptable range of 5 to 20%. This may create some additional but very small openings and medium-sized snags. Commercial thinning and underburning would increase the use of young forests in the area for foraging and hiding cover.

**Table 10. Ball Park Units Most Suitable for Wider Canopy Spacing (30%).**

| Unit number | Emphasis Area Rating | HEI Forage | Area to concentrate forage openings | Reasoning |
|---|---|---|---|---|
| **170** | Deer/County-M | 0.48 | Ground-based portion | Area used heavily by elk |
| **210** | Upper Westside McKenzie-H | 0.42 | Entire unit | High emphasis area low in forage |
| **240** | Deer/County-M and Upper Westside McKenzie-H | 0.48<br>0.42 | Entire unit | High emphasis area low in forage |
| **270** | Upper Westside McKenzie-H | 0.42 | Entire unit | High emphasis area low in forage |
| **290** | Upper Westside McKenzie-H | 0.42 | Center of unit, avoid western edge with steep riparian reserve | High emphasis area low in forage |
| **310** | Deer/County-M | 0.48 | Entire unit | Area used heavily by elk. |

Note: The Deer/County Emphasis Areas is being evaluated as one unit, as well as the Upper Westside/Upper McKenzie Westside areas.

**Disclaimer: All maps are approximate. Ground activities may vary slightly. Spatial information is based on the Willamette NF Geographic Information System (GIS).**

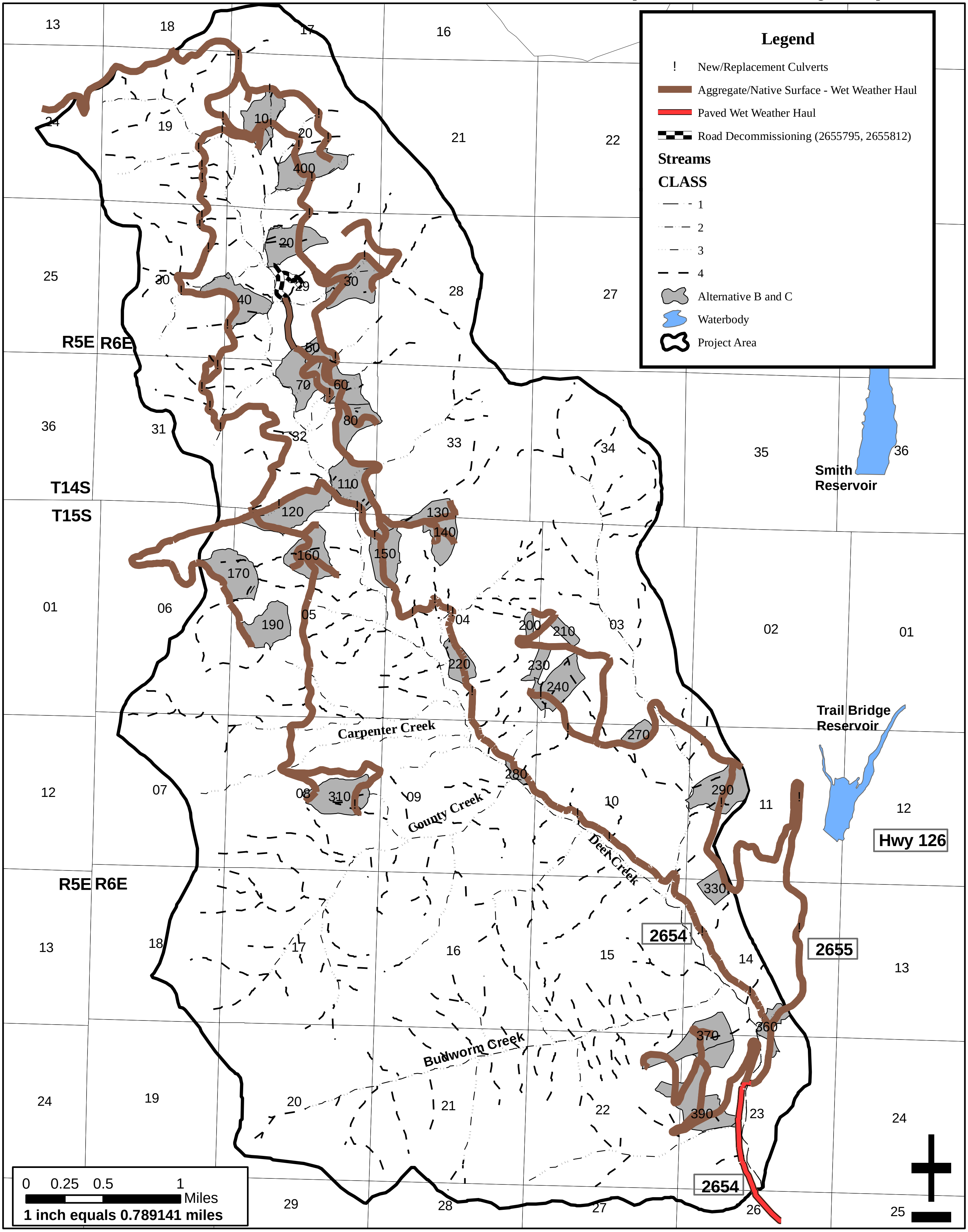



**Figure 5 - Haul Route, Decommissioned Roads and New/Replacement Culvert Locations - Alternative B and C.**

# Ball Park Thin Unit #10 and #400

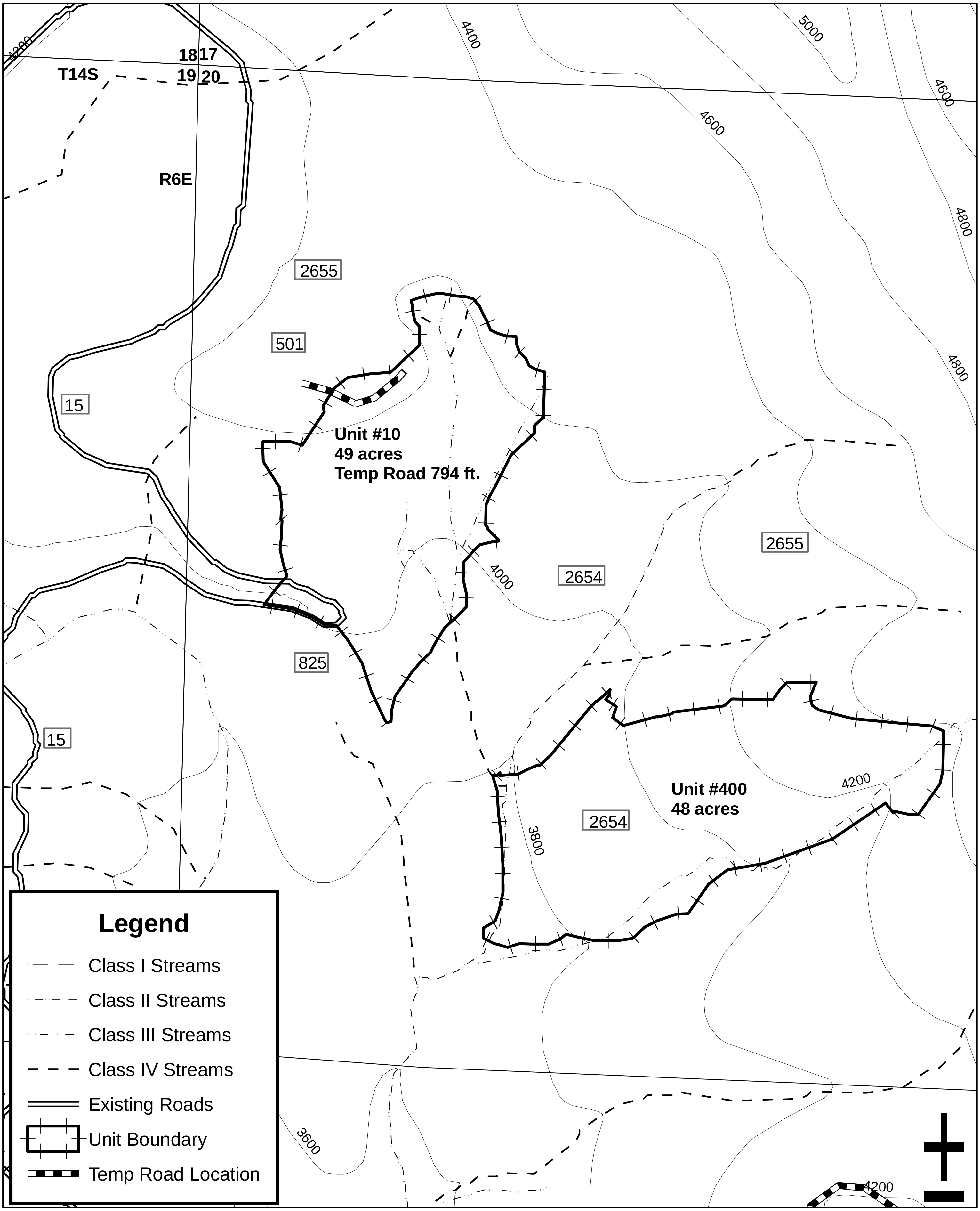



Figure 6 . Approximate Unit and Temporary Road Map - Unit 10 and 400 1 inch equals 660 feet

# Ball Park Thin Unit #20 and #30

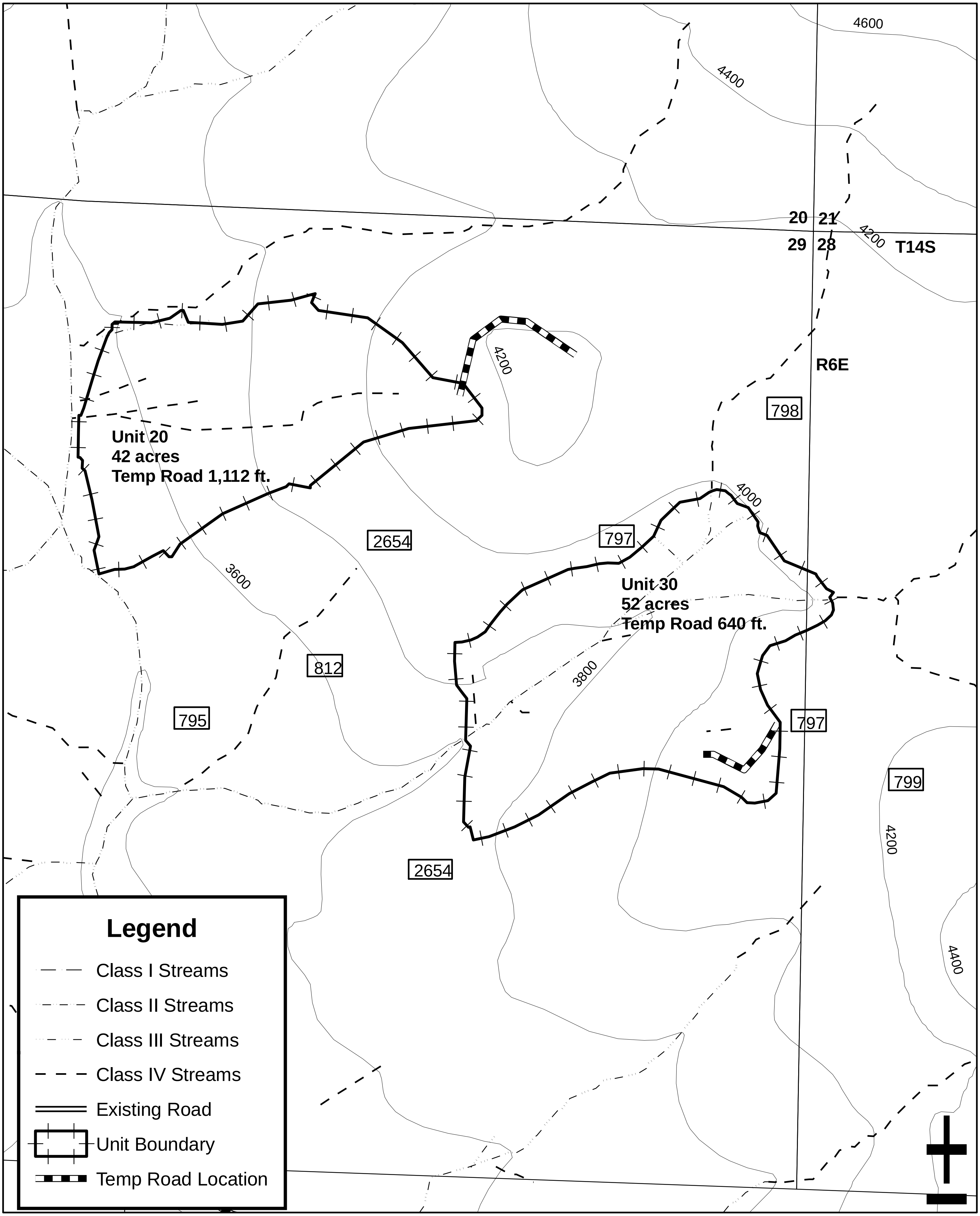



Figure 7. Approximate Unit and Temporary Roads Map - Unit 20 and 30 1 inch equals 660 feet

# Ball Park Thin Unit #40

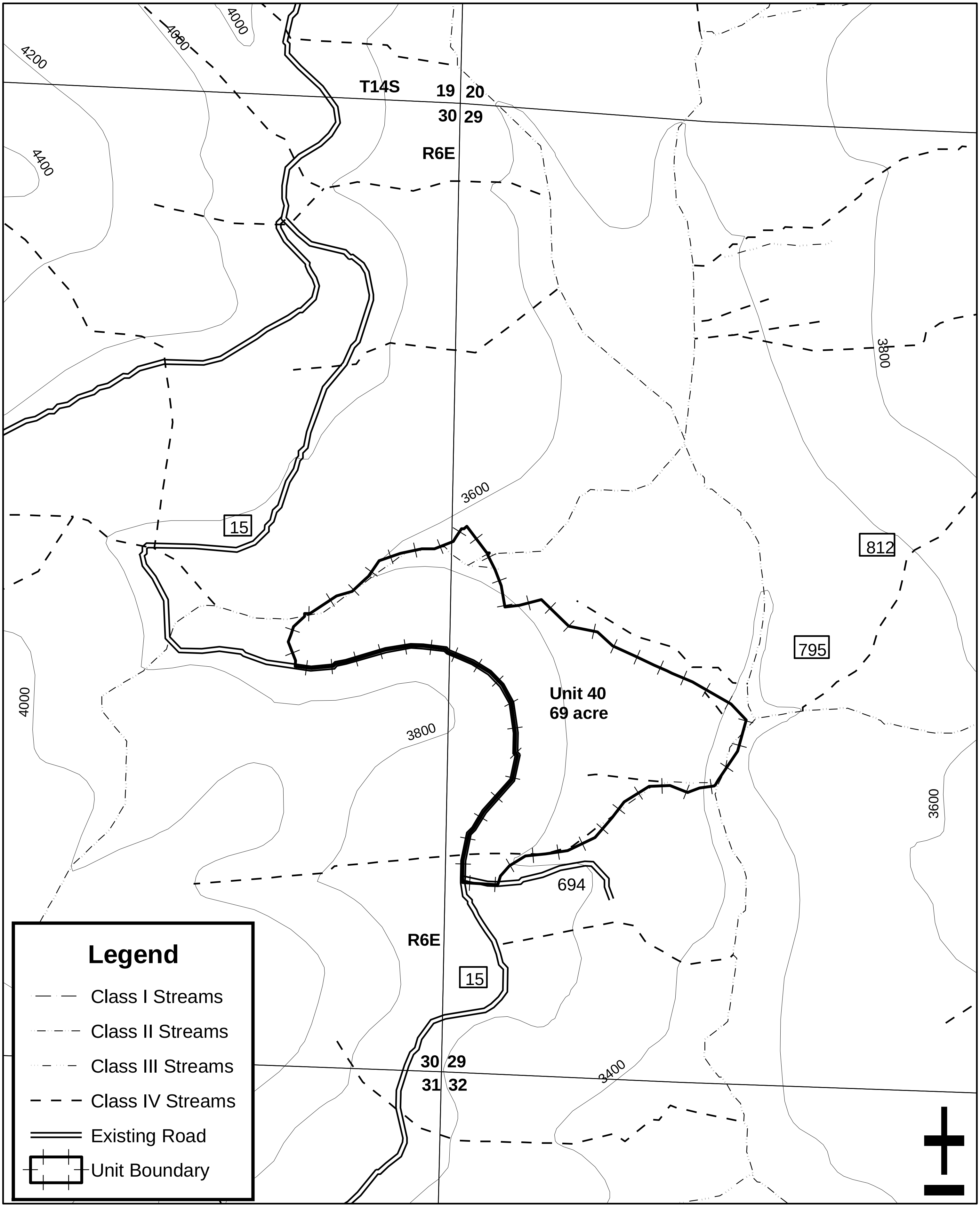



**Figure 8. Approximate Unit Map. No Temp Road - Unit 40** **1 inch equals 660 feet**

# Ball Park Thin Unit #50, #60, #70, and #80

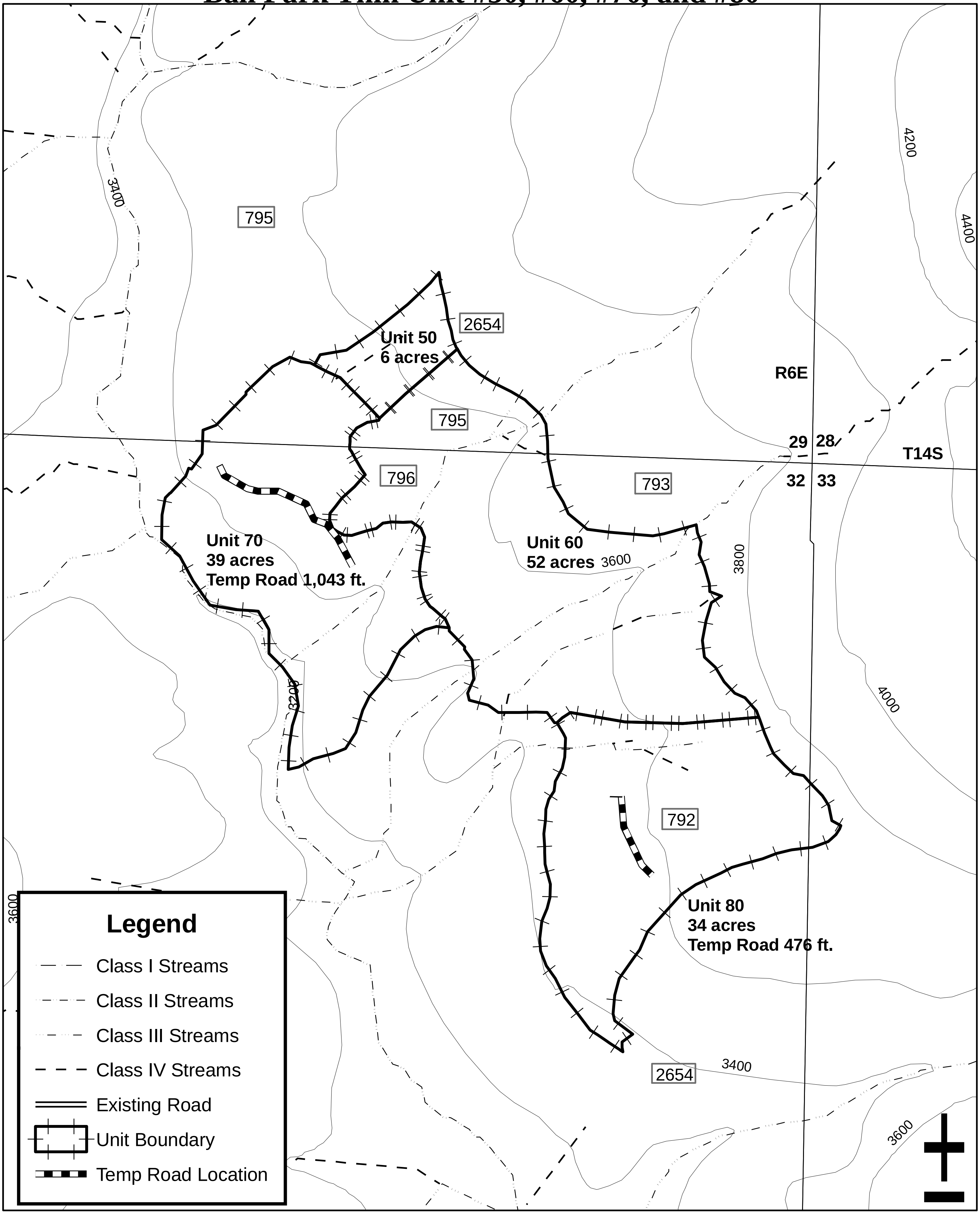



**Figure 9. Approximate Unit and Temporary Road Map - Unit 50, 60, 70, and 80** **1 inch equals 660 feet**

# Ball Park Thin Unit #110, #130, #140, and 150

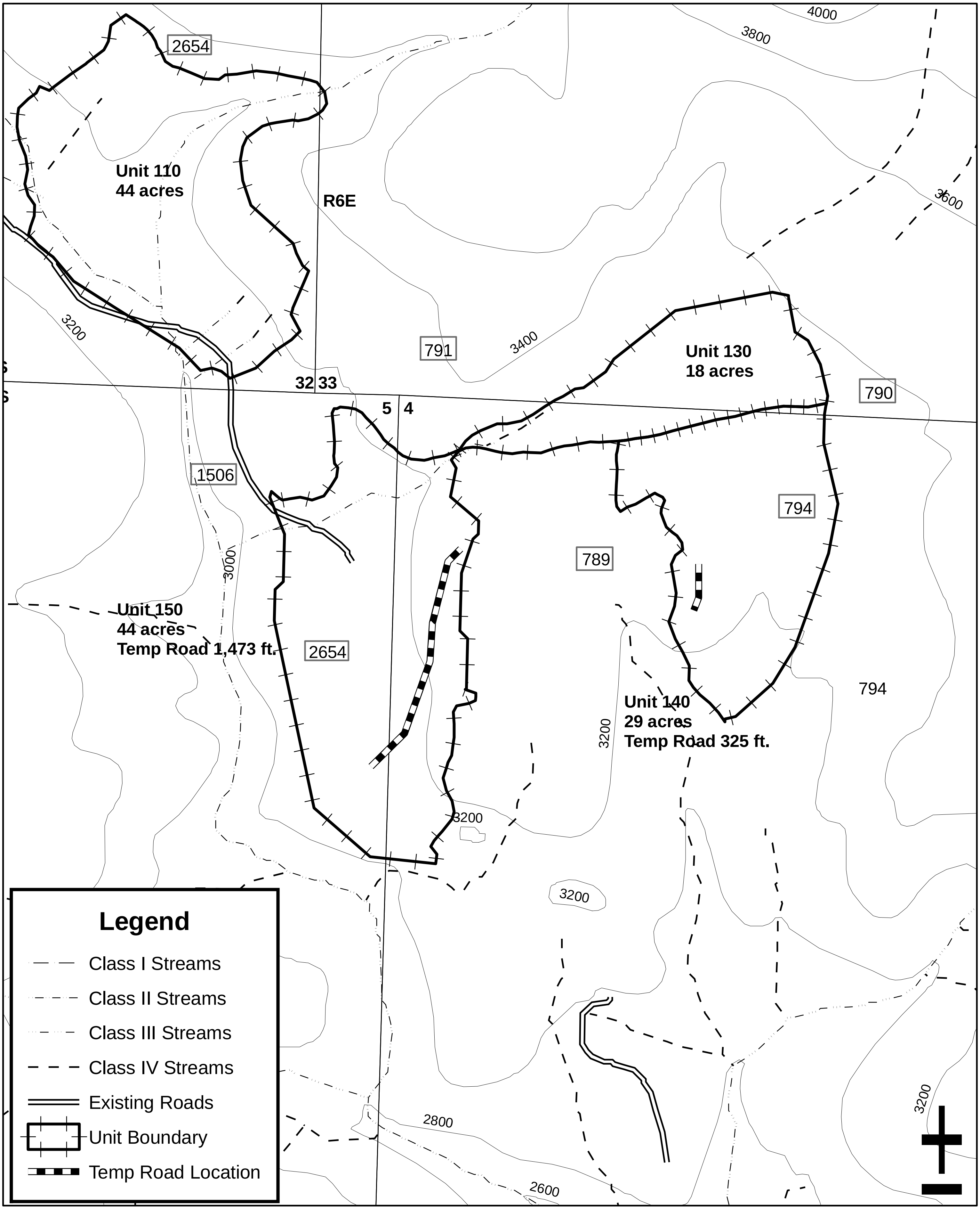



**Figure 10. Approximate Unit and Temporary Road Map - Unit 110, 130, 140, and 150** **1 inch equals 660 feet**

# Ball Park Thin Unit #120, #160, #170, and #190

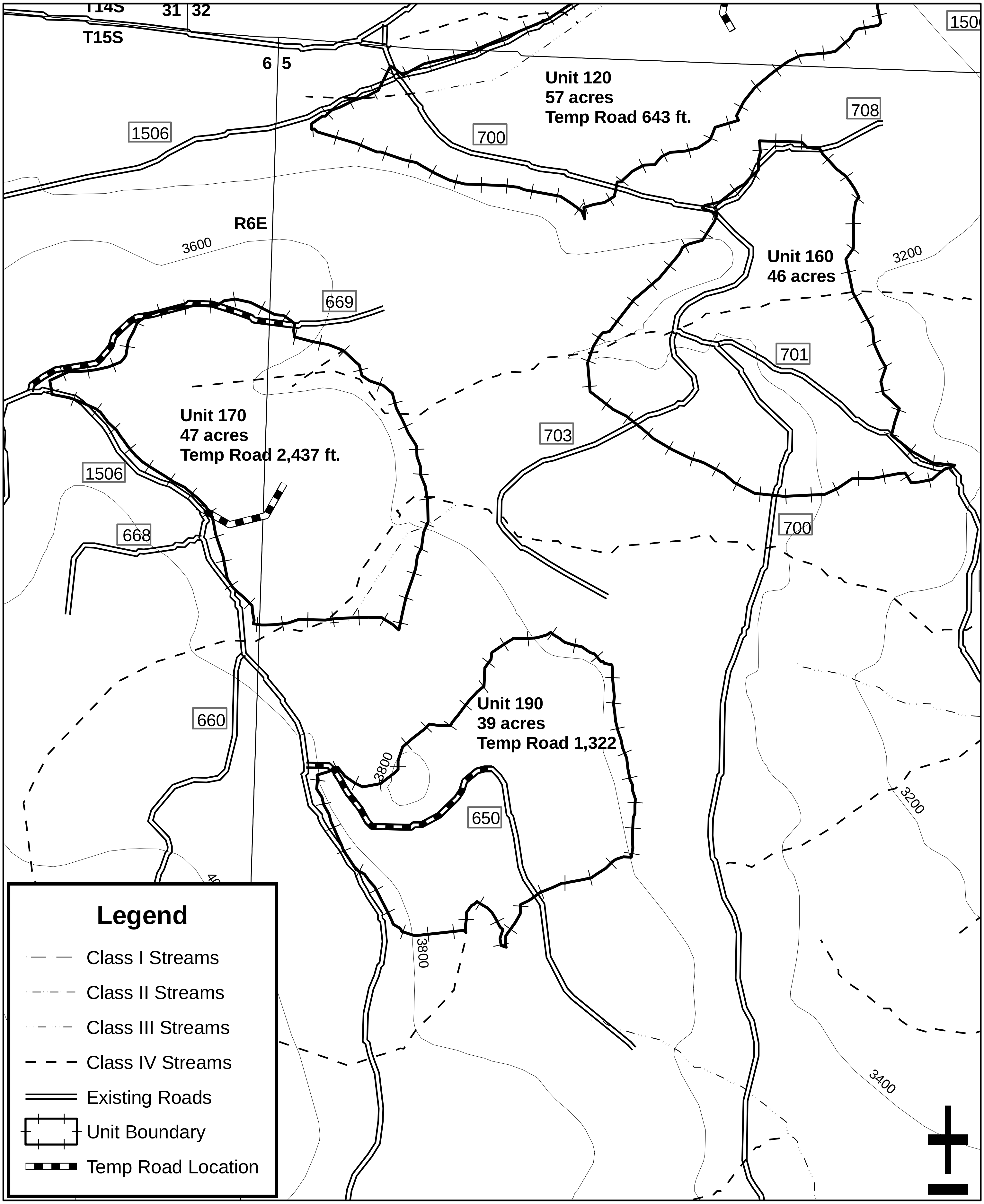



**Figure 11. Approximate Unit and Temporary Road Map - 120, 160, 170, and 190**

**1 inch equals 660 feet**

# Ball Park Thin Unit #200, #210, #220, #230, and #240

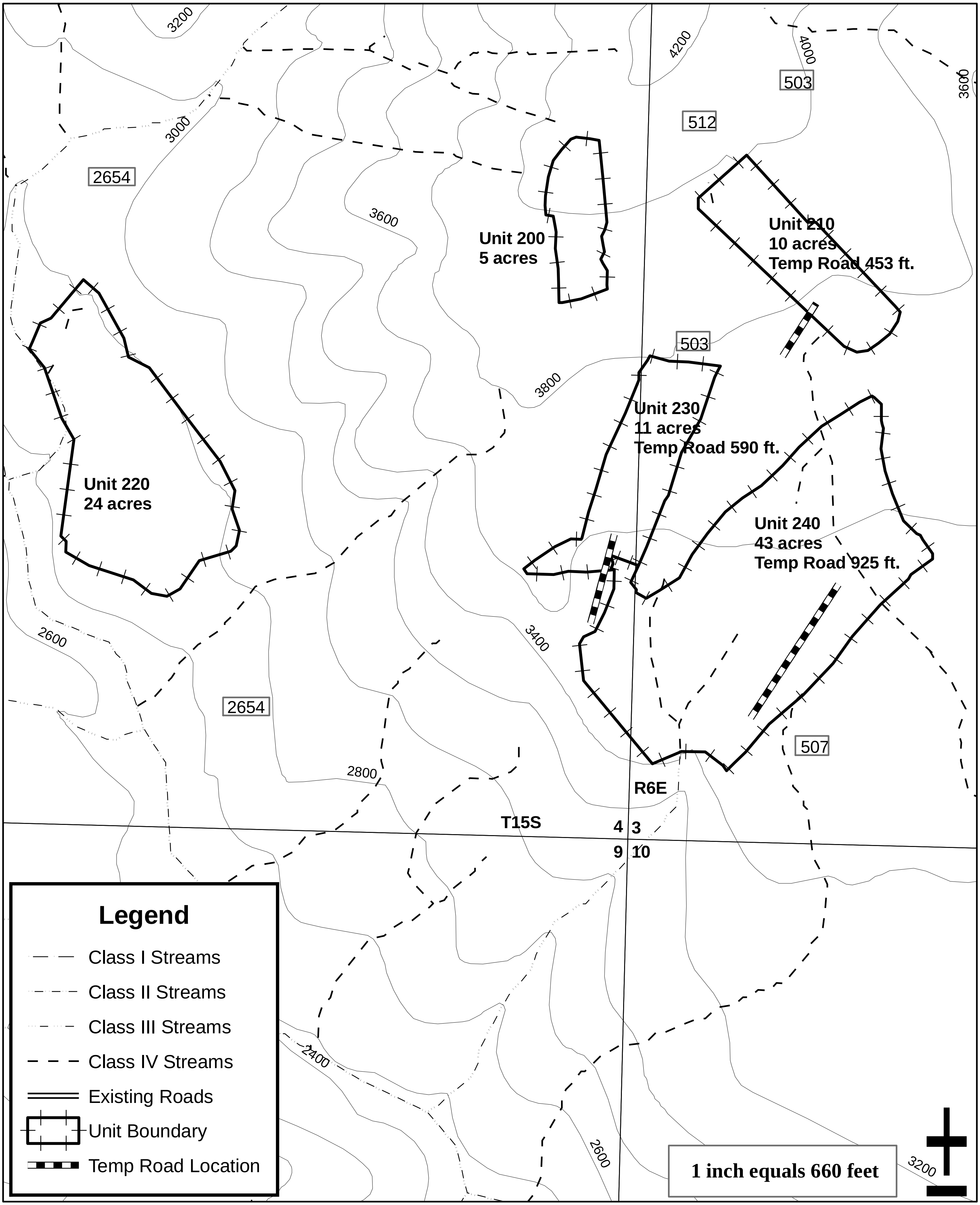



**Figure 12. Approximate Unit and Temporary Road Map - Unit 200, 210, 220, 230, and 240**

# Ball Park Thin Unit #220 and #280

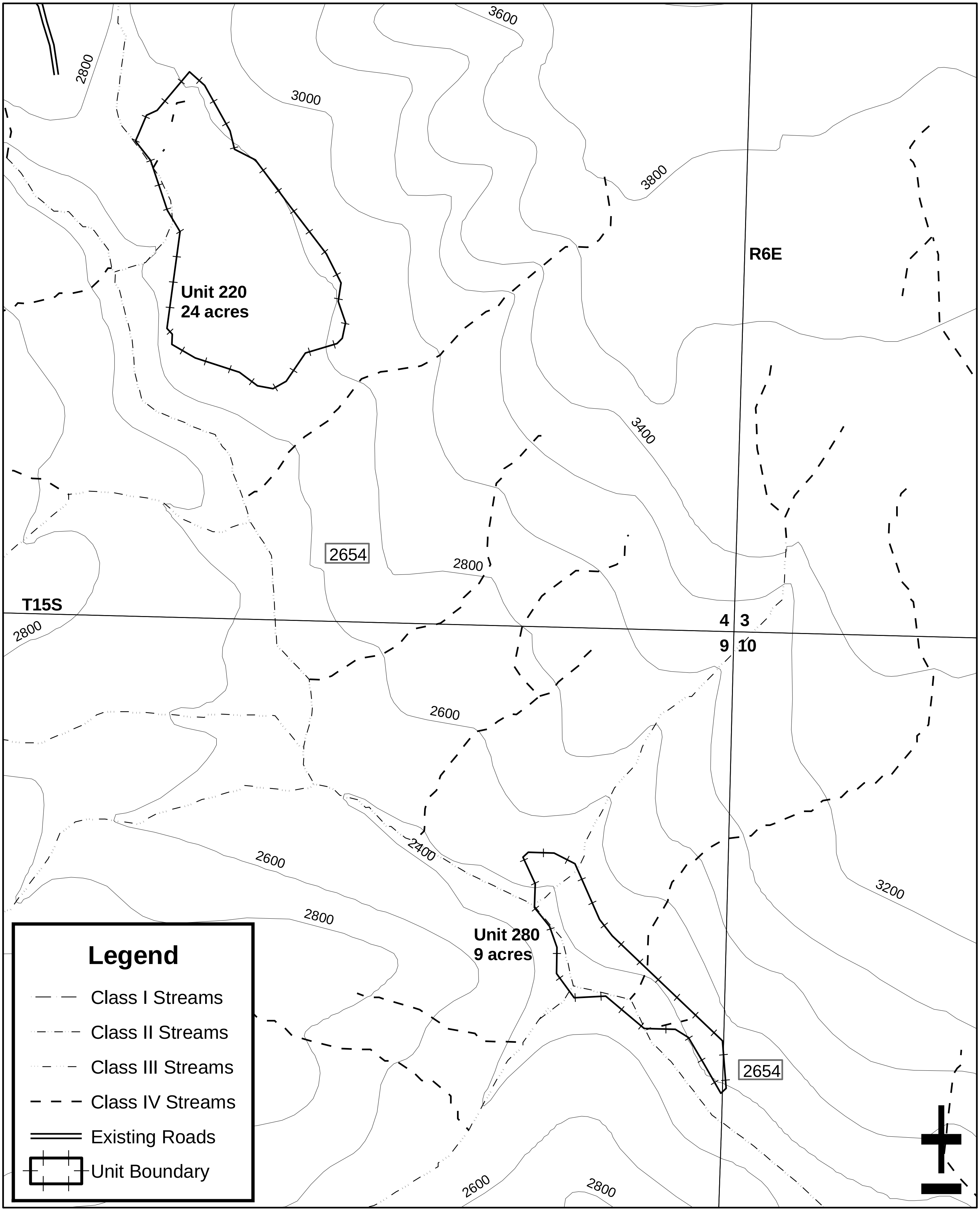



**Figure 13 . Approximate Unit Map. No Temp Road - Unit 220 and 280** **1 inch equals 660 feet**

# Ball Park Thin Unit #270 and #290

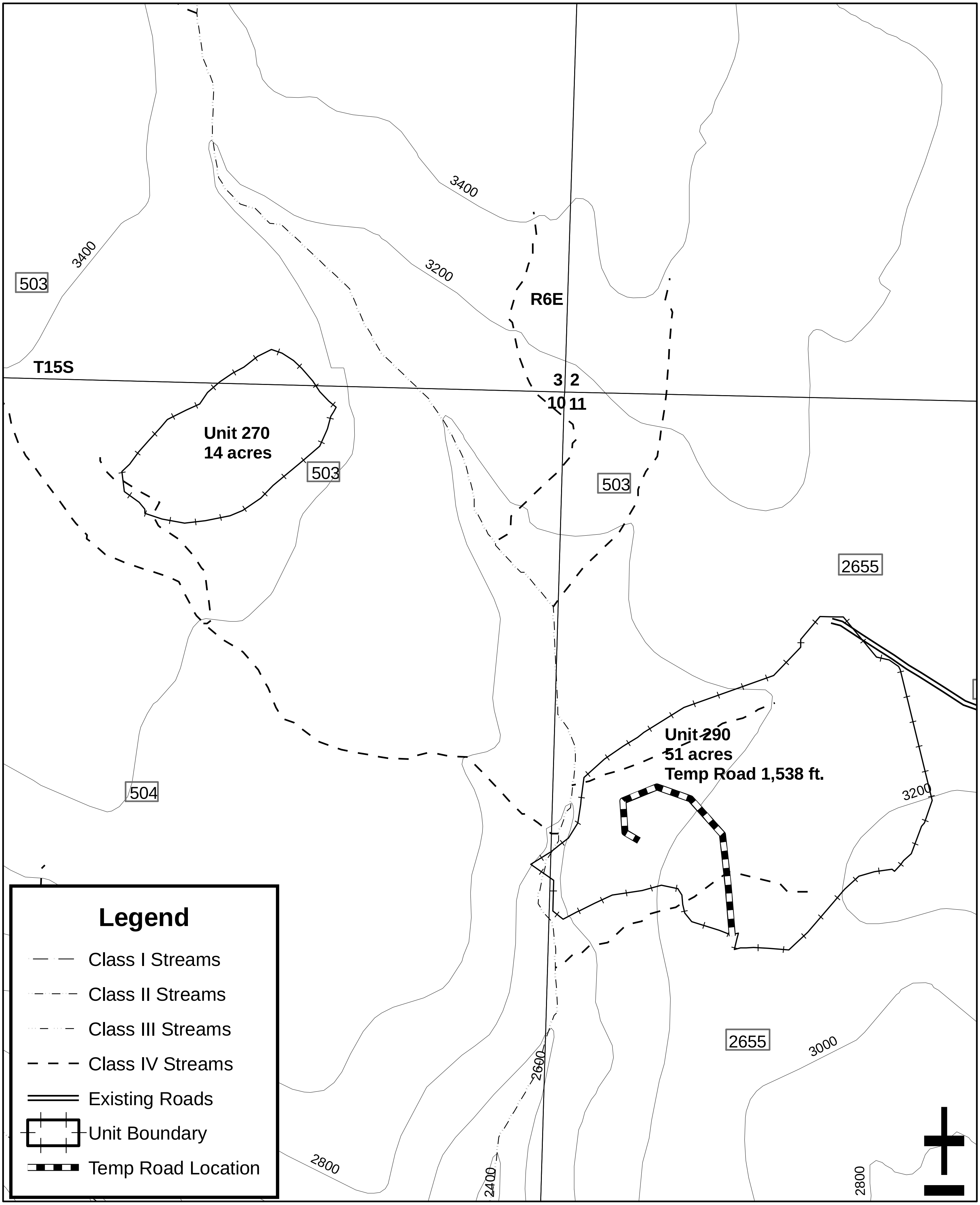



**Figure 14. Approximate Unit and Temporary Road Map - Unit 270 and 290** **1 inch equals 660 feet**

# Ball Park Thin Unit #310

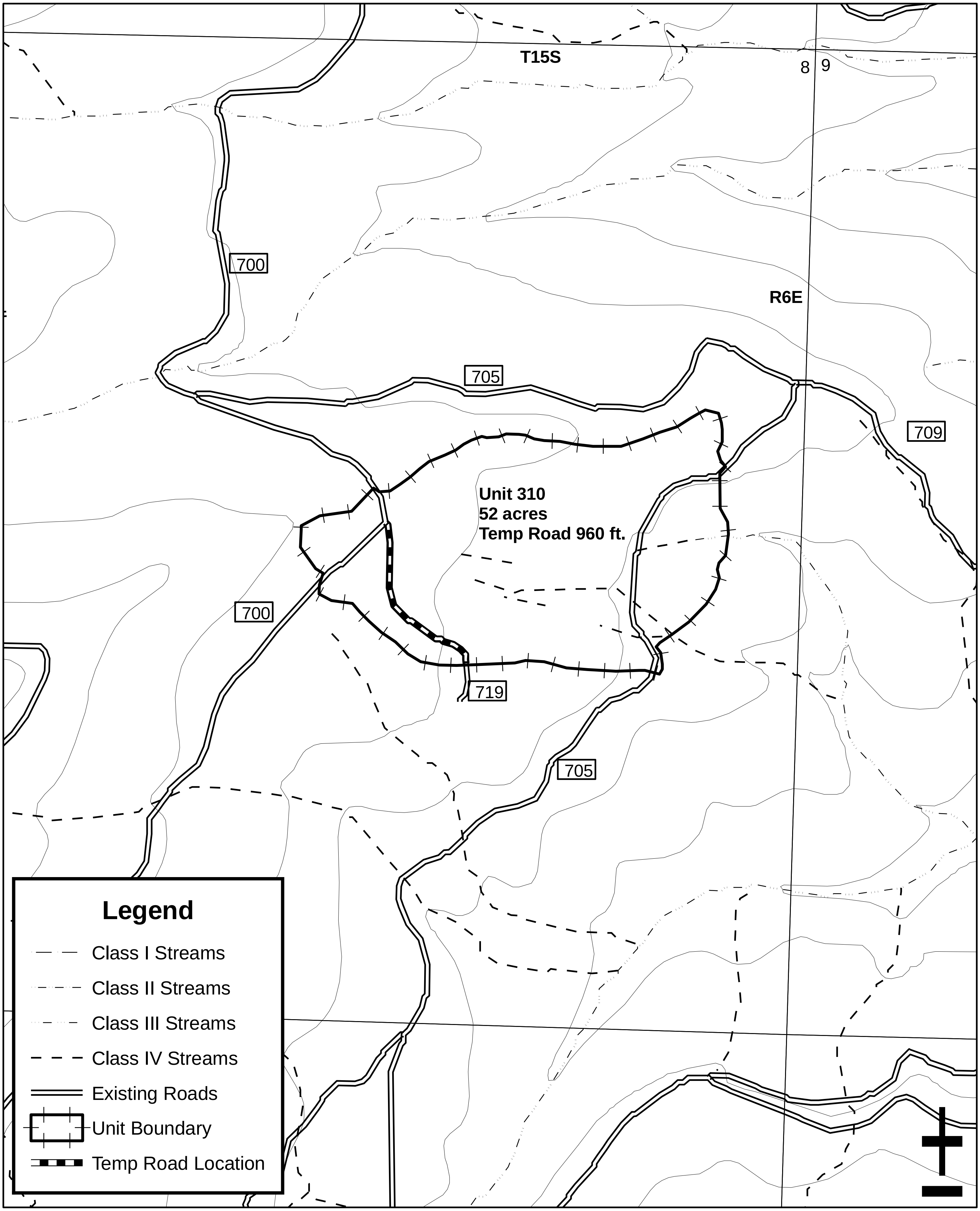



**Figure 15. Approximate Unit and Temporary Road Map - Unit 310** **1 inch equals 660 feet**

# Ball Park Thin Unit #330

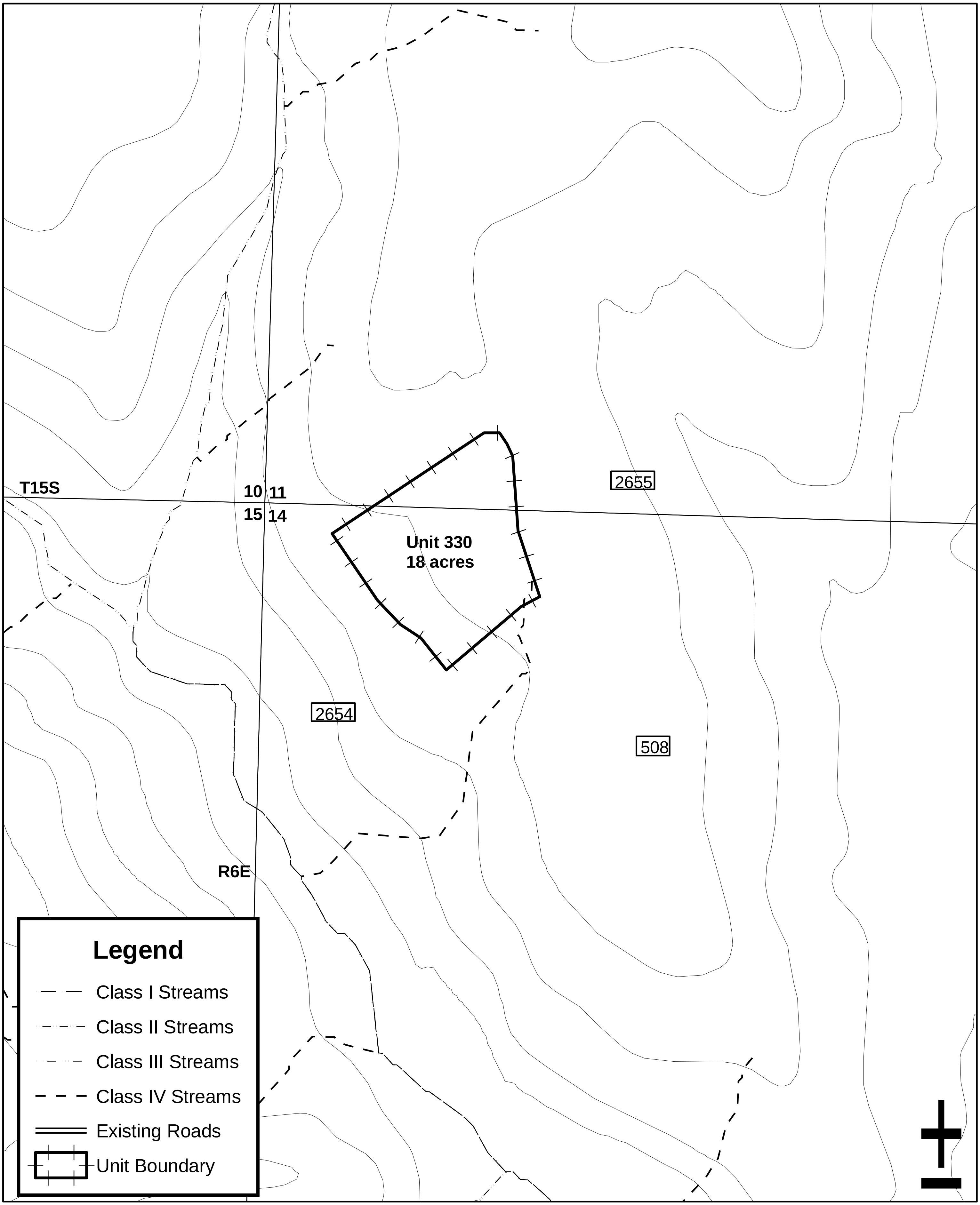



**Figure 16. Approximate Unit Map. No Temp Roads - Unit 330** **1 inch equals 660 feet**

# Ball Park Thin Unit #360, #370, and #390

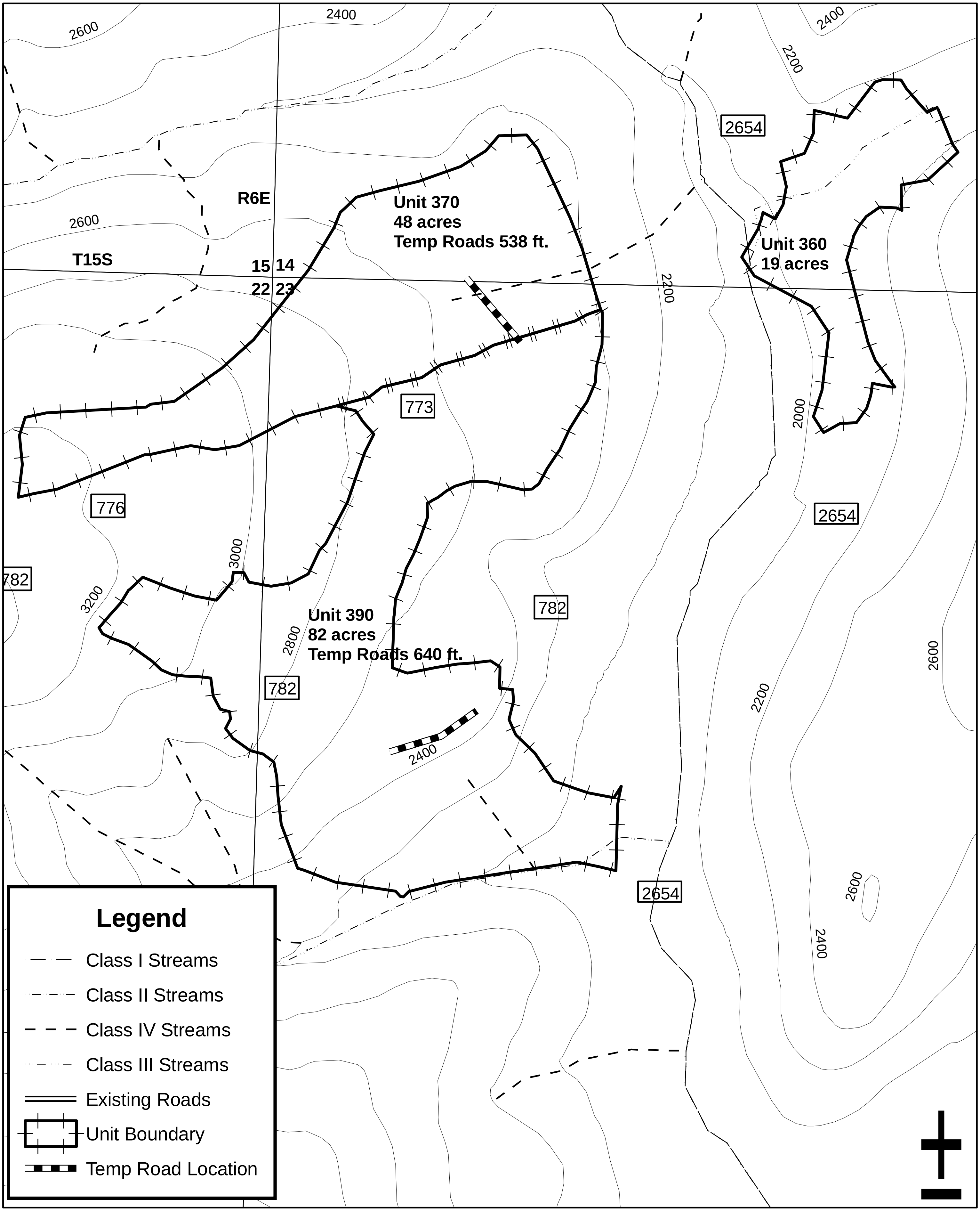



Figure 17. Approximate Unit and Temporary Road Map - Unit 360, 370, and 390 **1 inch equals 660 feet**

# Mitigation and Design Measures Common to All Action Alternatives

| Council of Environment Quality (CEQ) Regulations (§ 1508.20) defines Mitigation as: |
|---|
| Avoiding the impact altogether by not taking a certain action or certain parts of an action. |
| Minimizing impacts by limiting the degree or magnitude of the action and its implementation. |
| Rectifying the impacts by repairing, rehabilitating, or restoring the affected environment. |
| Reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action. |
| Compensating for the impact by replacing or providing substitute resources or environments. |

Design measures are also specifically described in this section are the controlling guidelines for the project as adopted by the responsible official in the Decision Notice. Mitigation measures and design measures would be implemented through project design and layout, contract specifications, contract administration, and following monitoring activities performed by Forest Service officers.

## Silviculture

1. Plant as necessary to augment natural regeneration within gaps to ensure regional stocking levels are met. Plant with species that are not susceptible to the disease, when the gap is the result of root rot. Under-represented species should be planted to help increase diversity.

## Soil, Watershed, and Fisheries Protection:

In addition to the following soil, water, and fisheries protection measures, all project design criteria documented in the Project Consistency Worksheet for the Not Likely to Adversely Affect Programmatic Consultation will be implemented. In the event of discrepancy between these items, the terms of the consultation document which is located in Appendix B of this document will apply.

1. Any project activity such as culvert replacement that must occur within fish-bearing and other perennial streams would comply with Oregon Department of Fish and Wildlife (ODFW) seasonal restrictions on in-stream work activities (July 1$^{st}$ – August 15$^{th}$). Best Management Practices (BMP's), including placement of sediment barriers, provision of flow bypass, and other applicable measures, would be included in project design as necessary to control off-site movement of sediment.

2. Native surfaced roads would be restricted from hauling during the winter rainy season between October 16 and May 15. The objectives are to maintain water quality and fish habitat.

3. Construction or maintenance of roads would not be done when soils are saturated or run-off occurs, to minimize erosion and sedimentation. A stable fill would be constructed across all streams when crossed by new temporary roads.

4. All haul roads would be maintained in stable condition. Winter hauling may be allowable when the road surface is either covered with a relatively continuous snow pack or frozen, when run-off from the road is unlikely. Watering the road surface would be used if roads becomes excessively dusty during the summer.

5. Ground-based equipment used for yarding, processing, fuel treatment, or other project activities would operate only when soils are relatively dry following the rainy season in the spring through the summer, or during the winter months when there is a continuous snow pack of at least eighteen inches deep or when soils are frozen to a depth of six inches or greater. Operations would be suspended before rainfall or precipitation results in off site movement of muddy water into drainage courses.

6. Designated skid trails would be required in all ground-based yarding units except over snow yarding. Skid trails would be located outside drainages, seeps, springs and/or concave landforms, which could accumulate and transport overland flow and sediment. Existing skid trails that are outside drainages, seeps and springs that meet the needs of the yarding system should be used wherever possible. During over snow yarding, designation of skid trails is not required. This will disperse routes within ground-based units. A fisheries biologist, hydrologist and the timber sale administrator will discuss over snow yarding prior to implementation.

7. Sedimentation and water quality are criteria in determining if ground based equipment can be operated on short slopes >30%. Soil displacement, a key factor in productivity also has an increased probability on slopes >30% and should be identified as a factor to evaluate if ground-based logging equipment is allowed on steeper slopes. Ground-based equipment would be limited to slopes less than 30 percent for harvester/forwarder and conventional ground skidding operations. Short, isolated pitches up to 40 percent on otherwise suitable slopes may be approved after consultation with soil/watershed specialist determines that sediment transport to streams would not occur as a result. Adverse skidding conditions would be avoided through skid trail layout and use of alternative yarding systems.

8. Ground-based equipment used for yarding, processing, fuel treatment, or other project activities would not be permitted within 120 feet of the stream channel of Class 1, 2, and 3 (fish bearing and perennial non fish bearing streams) streams. Ground-based equipment would not be permitted within 50 feet of the stream channel in Class IV (seasonal, non-fish bearing) streams. In the remainder of the riparian reserve, ground-based equipment is permitted, but would be restricted to existing skid trails from previous entries. Alternative low disturbance ground-based equipment such as shovel yarding is also permitted in the remainder of the riparian reserve.

9. Regardless of unit harvest prescription, portions of harvest units that lie within Riparian Reserves would be managed to meet riparian objectives. Prescriptions elements designed to accomplish this are detailed on page 63.

10. Full suspension would be required when yarding over perennial stream channels. Where full suspension is not obtainable over intermittent streams, partial suspension would be required and

yarding would be limited to when the stream is dry. Bump logs to protect the stream channel would be utilized as appropriate

11. Where cable yarding requires corridors through a riparian reserve, corridors would be laid out to result in the least number of trees cut. Trees located within no-harvest buffers that must be cut to facilitate yarding corridors would be felled into the channel and left on site.
12. All skid trails and landings would be water-barred to provide adequate drainage. Water bars location should occur where local terrain facilitates effective drainage of the skid trail or landing. In general, water bars should be constructed every 100 feet on slopes less than 15 percent, and every 50 feet on slopes greater than 15 percent. Water bars should be keyed-in to the cut bank and have a clear outlet on the down hill side. Where available, slash should be placed on skid trails and landings.
13. Skid trails in thinning harvest units with ground-based yarding would be scarified to a depth of 3-6 inches.
14. Skid trails in the gaps and all landings would be sub-soiled to a depth of 18-22 inches.
15. Large areas of exposed soil, such as landings, skid trails, decommissioned roads, and cut and fill slopes associated with road construction or maintenance would be seeded with non-invasive cereal grains such as winter wheat, and native perennial species.
16. Temporary roads would be decommissioned after completion of activities. Decommissioning of roads may include: berming the entrance, removal of culverts, out-sloping the road surface, pulling back displaced material onto the road way, installation of water bars, removal of placed rock, and re-vegetation of the road prism.
17. In units containing stream channels, all existing large down wood would be retained within Riparian Reserves to maintain aquatic objectives.
18. Water sources used by project operations would be reconstructed or maintained as necessary to protect stream bank stability, riparian vegetation, and water quality.
19. Timber harvest and fuels treatments not associated with commercial harvest in Riparian Reserves would adhere to riparian reserve management measures listed below in Table 11.

**Table 11. Riparian Reserve Management Measures** (*: NH = No Harvest)

| | **Timber Harvest – Thinning and Group Selection** (Includes activity fuel treatment) | **Prescribed Fire Treatment (No timber harvest treatment)** |
|---|---|---|
| Stands Adjacent to Listed Fish Habitat<br><br>(Units: 360, 390) | Class 1 and 2.-. 100' NH and retain 50% Canopy Closure from 100' – 180<br><br>Class 3 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 4 - 60' NH<br><br>Wetlands - 60' NH | Class 1 and 2 – 180' No Treatment<br><br>Class 3 - 60' No Treatment<br><br>Class 4 - 60' No Treatment<br><br>Wetlands - 60' No Treatment |
| Stands Within 1 Mile of Listed Fish Habitat<br><br>(Units: 290, 330, 370, 1001, 2001) | Class 1 and 2 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 3 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 4 - 60' NH<br><br>Wetlands - 60' NH | Class 1 and 2 – 180' No Treatment<br><br>Class 3 - 60' No Treatment<br><br>Class 4 - 60' No Treatment<br><br>Wetlands - 60' No Treatment |
| Stands Greater Than 1 Mile from Listed Fish Habitat<br><br>(Units:10, 20, 30, 40, 50, 60, 70, 80, 110, 120, 130, 140, 150, 160, 170, 190, 200, 210, 220, 230, 240, 270, 280, 310, 400,.1000, 1002, 1003, 2002 | Class 1 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 2 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 3 - 60' NH and retain 50% Canopy Closure from 60' - 180'<br><br>Class 4 - 30' NH<br><br>Wetlands - 60' NH | Class 1 – 60' No Treatment<br><br>Class 2 – 60' No Treatment<br><br>Class 3 - 60' No Treatment<br><br>Class 4 - 60' No Treatment<br><br>Wetlands - 60' No Treatment |

The preceding list describes the Soil, water, and Fisheries mitigation measures that would be applied in the implementation of the proposed action Alternative B, or with the selection of Alternative C.

These measures, or equivalent effective measures, would be incorporated into individual unit prescriptions by resource specialists as needed to mitigate potential undesirable effects.

## Recreation:

1. Post an advance notice of operations at the following locations:
   - Deer Creek bridge crossing of Forest Road 2654 at the entrance to the project area.
   - Junction of McKenzie River Trail and Forest Road 2654 (on the trail from both directions)
   - Deer Creek Hot Springs parking area
2. Reduce conflict by preventing log trucks to check binders at the Deer Creek Hot Springs parking area or other commonly used areas in the vicinity of the McKenzie River Trail crossing of Forest Road 2654.
3. Require slow speed (10 mph) for log trucks on the approach to Highway 126 in the vicinity of the hot springs and McKenzie River Trail crossing.

## Wildlife:

1. Snags greater than 14" dbh would be retained when not a safety concern to support the prey base of northern spotted owl as well as primary and secondary cavity nesters and bats.
2. To secure a visual screen for Roosevelt elk, black-tailed deer, and other wildlife, a 50-foot no-harvest buffer would be left within harvest units 270 and 290 along Forest Service roads 2655-509 and 2655.
3. To reduce potential disturbance to any northern spotted owls or sensitive harlequin ducks in the area, seasonal restrictions for logging, burning and blasting would be imposed on disturbance activities in Table 12. Cutting of identified danger trees which are used for nesting habitat along the haul route will also occur outside the critical cavity nester breeding period from April 1-June 30. If possible, hazard tree cutting should be scheduled to occur after July 30 to consider late re-nesting birds. With the exception of the harlequin duck and cavity nester seasonal restriction, these may be lifted if surveys are conducted and non-nesting is verified for the year of operation.
4. Hazard trees that are felled within units would be left on site for large woody material and could be counted as decay class I and II.
5. A seasonal operating restriction is required for the Cascade Elk Rifle season, which is typically the third week of October. All public vehicle traffic would be restricted on closed roads beginning the Friday before this week through the end of the following Friday.
6. Avoid habitat disturbance within 30 feet of perennially wet areas. This measure ensures protection for the Crater Lake Tightcoil which may be present in the project area and applies to heavy equipment as well as prescribed burning.

**Table 12. Seasonal Restrictions to Protect Northern Spotted Owl, Harlequin Ducks, and Cavity Nesters.**

| Unit/Area | Seasonal restriction for logging equipment or other heavy equipment | Seasonal restriction burning | Seasonal restriction on blasting |
|---|---|---|---|
| ***130 lower 150 feet near Hardy Creek*** | Yes, April 1-July 30 bottom 150 feet near Hardy Creek | Yes, April 1-July 30 bottom 150 feet near Hardy Creek | NA |
| ***280*** | No | Yes, March 1-July 15 | NA |
| ***360 west of FS Road 2654*** | Yes, March 30-July 15 | Yes, March 1-July 15 | NA |
| ***370 east of FS Road 2654-773 and below 2654*** | Yes, March 1-July 15 | Yes, March 1-July 15 | NA |
| ***390 northeast of FS Road 2654 in the north part of the unit at the junction of the 2654-773*** | Yes, March 1-July 15 | Yes, March 1-July 15 | NA |
| ***Latiwi Rockpit*** | Yes, March 1-July 15 | NA | Yes March 1-July 15 |
| ***Dogwood Rockpit*** | No | NA | Yes, March 1-July 15 |
| ***Boulder Rockpit*** | No | NA | Yes, March 1-July 15 |
| ***Boulder Phase II Rockpit*** | No | NA | Yes, March 1-July 15 |
| ***Haul Route Hazard Tree Falling*** | Yes, April 1-June 30 | NA | NA |

## Sensitive Botanical Species:

1. A no-disturbance buffer would be placed around known occurrences of sensitive plant species. Sizes of buffers are listed in the Botanical BE in Appendix C. Broadcast burning would not be implemented within the no-disturbance buffer. Trees would be felled away from the no-disturbance buffer.

## Special Habitat Areas:

1. A no-harvest buffer would be placed around special habitats listed in Table 29. Sizes of buffers are listed Appendix C. Trees would be felled away from the no-disturbance buffer.

### Heritage Resources:

1. A 150 foot buffer and directional falling of trees away from the buffer will adequately protect site 06180400586 (TSO and Layout crew need to work with the Archaeologist to insure proper buffer width).

2. The District archaeologist will conduct post-harvest monitoring to document the condition of the above listed cultural site.

## Other Design Measures

### Wildlife:

1. Minimize damage to existing adjacent trees and vegetation when falling and yarding hazard trees along the haul-route, especially the large diameter trees and snags retained.
2. If Threatened, Endangered, or Sensitive (TES) wildlife species are found in future field work or during activities associated with this project, and potential for adverse effects exists, project modifications would be pursued and would be implemented. All contracts will include provisions to provide required protection measures in the event of TES species discovery.
3. The wildlife biologist shall be notified of any changes made to this project that would alter the need for seasonal restrictions, resulting in either waiving or applying additional restrictions. Examples include changes in locations where blasting is needed for rockpit development.
4. Implement planned road decommissioning as soon as possible after forest products removal operations are completed to benefit wildlife species needing seclusion.
5. Additional snag creation up to the recommended level of 3 snags over 14” dbh/acre may occur to provide habitat for cavity nesters as well as Pacific Fringe-tailed Bats. Snags created as a result of prescribed underburning or natural mortality would count towards this recommended level.
6. Large down woody material: A level of 240 lineal feet per acre of decay class I and II material greater than 18” diameter would be recommended to be retained within all harvest units. Full tree length down wood material is preferable to maximize wildlife habitat value; lengths less than 20 feet would not count towards the recommended total. Where the preferred size of material is not available, 240 lineal feet per acre of the largest diameter leave trees would recommended to be retained. Some of this material could be created over or directly adjacent to streams if possible. If post-harvest monitoring does not show large down woody material to be present at the recommended levels, falling may take place to create up to one half the amount. The assumption of additional large down wood be created by blow down within several years of the logging activity. The intent of this recommendation is to maintain currently existing levels, as well as the short-term future input that would be expected within these approximate 40 year old stands.

## Invasive Plants Control:

1. All off-road equipment would be cleaned to remove all dirt and debris prior to entering National Forest System lands and when moving from infested to non-infested areas within the project area.
2. If area has invasive plants, equipment should work in non-infested areas first and then move to infested area (USFS would provide map).
3. Pre and post harvest survey and control of Invasive Plants would be applied to all harvest units and associated roads in the planning area.
4. Clean fill (soil or rock free of slash and debris) should be used for construction of temporary roads. Sources of rock and fill material needs to be free of Invasive Plants. Rock quarries that may be used would be surveyed for Invasive Plants prior to use. If Invasive Plants are found, they would be treated as necessary prior to use.
5. Disturbed areas (culverts, road shoulders, closed/obliterated roads, landings, skid trails) would be re-vegetated with weed-free native seed to compete with noxious weed seed. Weed-free mulch would be used if necessary.
6. Roads to be bermed or decommissioned would be treated for noxious and non-native weeds prior to blocking to harvest activities. All roads with disturbed soil would be planted with native plant material to prevent invasion by non-native species.
7. Bermed and decommissioned roads would be monitored for Invasive Plants for three years after the road treatment is completed. Identified weed populations would be treated.

## Fuels Treatment:

1. In Riparian Reserves prescribed fire may be allowed to back through the buffer in order to reduce the amount of fireline constructed along the unit and riparian reserve boundaries.

## Hydropower:

1. Prior to each period of operations, Eugene Water & Electric Board (EWEB) will be consulted to insure coordination between implementation of project activities and EWEB operations.

## Heritage Resources:

1. All NRHP eligible sites and potentially eligible sites must be avoided during all project activities.
2. Changes to the current unit configurations and/or the addition of any new units, will require consultation with the District Archaeologist in order to protect known and unknown heritage resources.
3. Project activities planned outside of the area defined in the heritage resource inventory schema

must be coordinated with the district archaeologist prior to initiation. This includes the establishment of harvest landings, helicopter landings, guy-line equipment anchors, slash burning, removal of roadside danger trees, and ripping of temporary spur roads.

4. Although no other surface or subsurface evidence of cultural resources was found in the proposed project, there remains the possibility that buried prehistoric or historic cultural resources are present and could be uncovered during project activities. If cultural resources are encountered during the course of this project, earth-disturbing activities in the vicinity of the find must be suspended, in accordance with federal regulations, and the zone archaeologist notified to evaluate the discovery and recommend subsequent course of action.

# Silviculture Prescriptions:

**Table 13. Stand Treatment Prescriptions.**

| Stand Treatment (Reserve portions of units are not included in acreage) | % Maximum SDI*+ | Post-Harvest % Canopy Closure+ | Alt. A Acres | Alt. B Acres | Alt. C Acres |
|---|---|---|---|---|---|
| Canopy Thinning | 19-35% | 40-50% | ---- | 664 | ---- |
| Canopy Thinning | 16-35% | 33-50% | ---- | ---- | 642 |
| Riparian Thinning | 26-36% | 50-51% | ---- | 122 | 122 |
| Group Select | ---- | ---- | ---- | 129 | 151 |
| Natural Fuels Underburning++ | ---- | ---- | ---- | 49 | 49 |
| **Total Acreage** | ---- | ---- | ---- | **964** | **964** |

*SDI: Stand Density Index +Calculated on trees >= 7" dbh

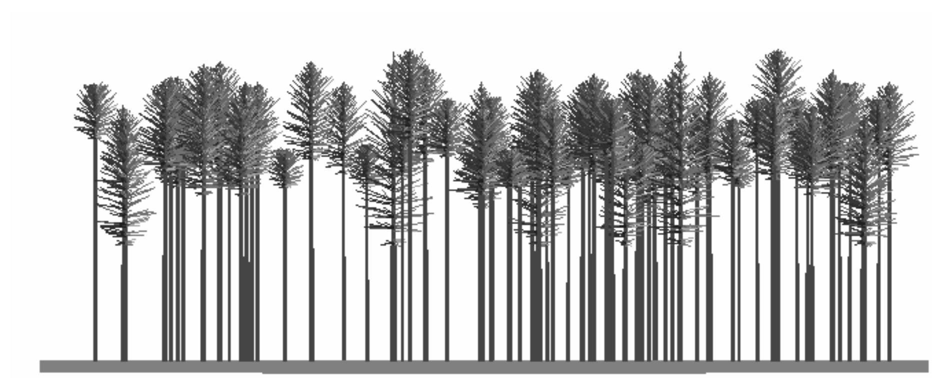
++ No significant change in SDI or canopy closure due to removal of ladder fuels and brush <7" dbh

## Current Stand Conditions

### Previously-managed Plantations

These stands range between 40-80 years old, and are the result of previous clear-cut harvesting. Stands in the 35-45 year age class are the most common age class in the project area. They are

**Previously-Managed Plantations**



predominantly comprised of Douglas-fir trees at moderate to high density stocking levels. Root rot exists in scattered areas and at low intensities. Units with a unit number less than 80 are previously managed plantations.

## Silviculture Descriptions

### Thinning

Intermediate cuttings of stands used for the reduction of stand density or management of species composition are called thinning. The main objective is increasing the overall growth potential of the residual trees, while removing trees that would ultimately die from suppression. Thinning can be applied to stands that exhibit a wide range of densities. A very light or salvage thinning confines removals to overtopped or suppressed trees where the canopy remains unbroken or only slightly broken. In contrast, a heavier thinning removes additional and higher crown classes opening the canopy to accelerate growth and crown expansion of the remaining trees. The remaining trees also develop into a healthier and more stable stand over time

In 2007 Davis et al. published an article that was based on an ongoing study called the "Young Stand Thinning and Diversity Study" with four study blocks located on the Willamette National Forest, two of which are on the McKenzie River District. The study results indicate that thinning "promotes growth of remaining overstory trees" and supports the establishment of "a prominent understory layer, thereby adding complexity to these young stands and perhaps accelerate the development of late-successional habitat". In addition the study shows that thinning enhances the "development of understory shrubs and herbs associated with wildlife habitat."

The Davis et al study shows that overstory cover closed in significantly in all thinning treatments within five years. The heaviest thin exhibited the greatest benefit in overstory treatment; while light thin was the least successful resulting in overstory conditions similar to untreated areas. The study recommends heavy thinning to "ensure canopy opening is maintained for several years" and leaving species other than Douglas-fir to prevent "initial simplification of canopy structure." Heavy thinning was identified as effective in preventing the "homogeneous dominance of a few understory species" because the treatments ensured an uneven distribution of light. Diameter growth increased the most with heavy thins because it reduced densities and elevated resources available to residual trees.

### Group Select

This prescription would provide for gaps in the stands to increase diversity and forage. . Alternative B has 129 acres of Group Selects identified in Table 6. Alternative C has 151 acres of Group Selects identified in Table 8. Group selects would be placed in units 10, 20, 30, 40, 60, 70, 80, 110, 120, 150, 170, 220, 240, 270, 290, 310, 370, 390, and 400 in both alternatives, in addition alternative C will also include unit 210. Group selects would be small holes approximately one acre in size in alternative B and one to three acres in alternative C. Group selects would be randomly placed, unless a root rot pocket is identified. See description of group select on page 58 for more information. Within the stand, another prescription would be applied to the area outside the group select. Large downed wood on the forest floor would be maintained or increased. Snags would be maintained on site, if not a hazard to logging operations.

## Silviculture Prescriptions

Silvicultural treatments prescribed for the selected units include canopy thinning, riparian thinning, group selects, and fire hazard reduction. This combination of treatments are prescribed by the IDT in order to meet the various resources objectives derived from Forest Plan and project-level management direction, as well as the site specific conditions of the project area.

**Stand Density Index.** The stand treatments developed for the Ball Park Thin project units are based on the Stand Density Index (SDI), which is a relative measure of the stand's density with a maximum SDI that varies for each tree species. SDI is based on a percentage of $SDI^{max,}$ which is the maximum stem density a stand can support. At approximately 50% maximum SDI, maximum stand production occurs and individual tree vigor would begin to decline (Long, 1985). Thus, lower levels of SDI should be maintained in order to meet stand objectives, like growth for sustainable timber and mean tree growth for various wildlife habitat objectives.

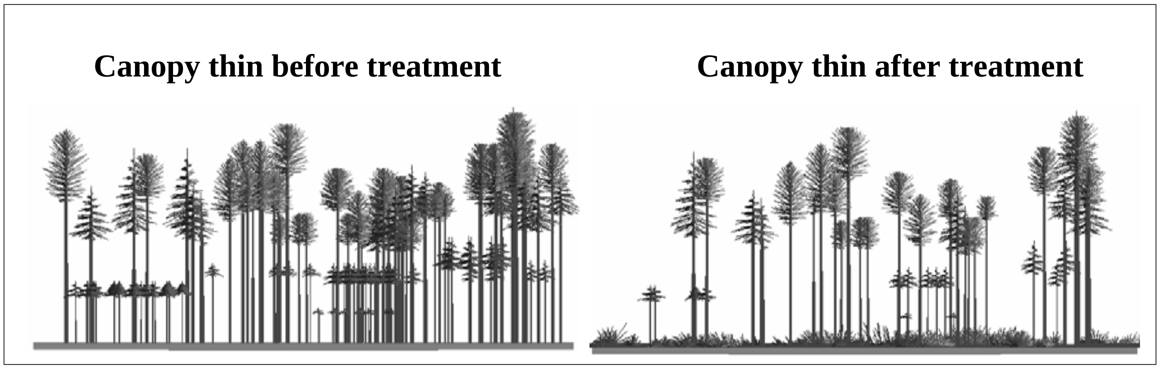
Treatments would maintain or improve overall stand growth and vigor by reducing competition for limiting resources, like light, water, and soil nutrients. Thinning may increase individual tree stability making them more resistant to wind-throw as they mature. Trees may also be more resistant to insect infestations and disease. Understory shrubs and other vegetation would become established, or expand beyond areas where they currently exist into the openings created. Some natural regeneration of trees may also occur. Residual trees would respond over time with increased diameter growth and crown expansion. Consequently, another commercial thinning would likely be necessary in approximately 15 to 20 years when the maximum SDI levels again exceed 50%.

### Activites associated with all Thinnings

Trees removed would primarily be the smaller diameter Douglas-fir trees in the stands. The goal is to increase growth and vigor of remaining trees, with emphasis placed on maintaining non-Douglas-fir species. This prescription would maintain or increase vegetative diversity and resistance to future insect infestations and disease. Thinning the younger stands would also increase individual tree stability making them more resistant to wind-throw as they mature. Decreasing the tree density would also reduce fire susceptibility. Large wood on the forest floor would be maintained or increased. Snags would be maintained on site if not a hazard to logging operations.

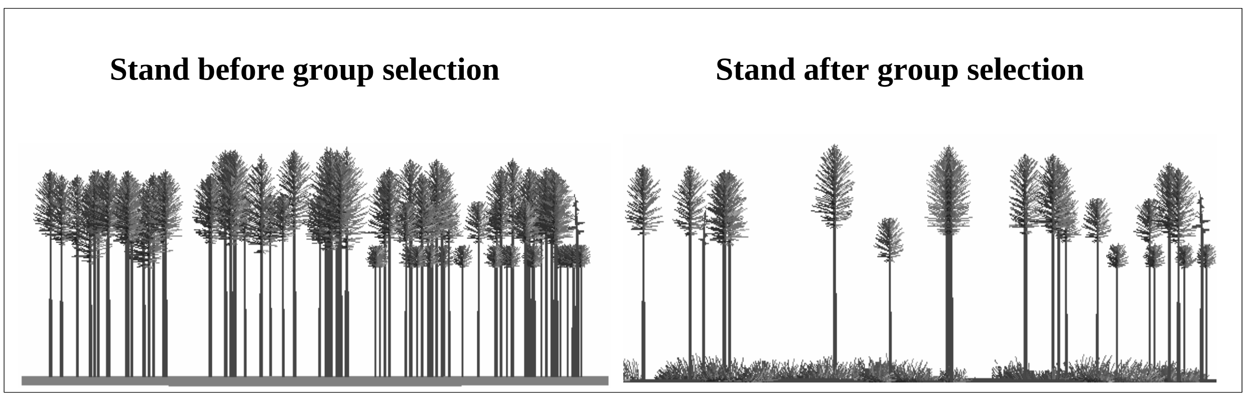
### Canopy thinning

The canopy thinning prescription will enhance the stands by increasing health and vigor of the stands while also increasing lag time between re-entries. Alternative B has 664 acres of Canopy Thinning identified in Table 6 with thinning to be maintained at 19-35% SDI and 40-50% canopy closure. Alternative C has 642 acres of Canopy Thinning identified in Table 8 with thinning to be maintained at 16-35% SDI and 33-50% canopy closure.



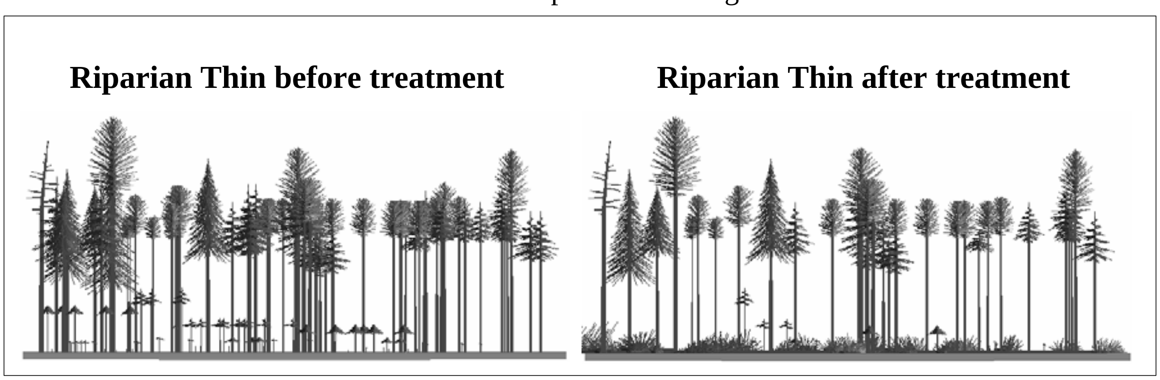

**Group Select**

This prescription would provide for gaps in the stands to increase diversity and forage. Alternative B has 129 acres of Group Selects identified in Table 6. Alternative C has 151 acres of Group Selects identified in Table 8. Group selects would be placed in units 10, 20, 30, 40, 60, 70, 80, 110, 120, 150, 170, 220, 240, 270, 290, 310, 370, 390, and 400 in both alternatives, in addition alternative C will also include unit 210. Group selects would be small holes approximately one to three acres in size depending on the alternative. Group selects would be randomly placed, unless a root rot pocket is identified. See description of group select on page 58 for more information. Within the stand, another prescription (i.e. wildlife thin) would be applied to the area outside the group select. Large downed wood on the forest floor would be maintained or increased. Snags would be maintained on site, if not a hazard to logging operations.




**Riparian Thinning**

The riparian thinning prescription is proposed in riparian areas to maintain an average of 50% canopy cover. Alternative B and C have 122 acres of Riparian Thinning identified in Table 6 and 8. The



stands would have a post-treatment SDI of 31-52% of $SDI^{max}$. The creation of large woody debris for in-stream process would be accelerated by riparian thinning, which provides more growing space for the residual stand creation. Hardwoods would also be left to add diversity within the riparian areas.

## Comparison of Alternatives

This section provides a summary of actions and the connected actions described above for each alternative.

**Table 14. Comparison of Alternatives by Activity.**

| Management Activity | Units of Measure | Alt. A No Action | Alt. B | Alt. C |
|---|---|---|---|---|
| *Harvest Treatments* | | | | |
| **Canopy thinning** | Acres | 0 | 664 | 642 |
| **Riparian Thinning** | Acres | 0 | 122 | 122 |
| **Group Select** | Acres | 0 | 129 | 151 |
| **Total Acres of Timber Harvest** | Acres | 0 | 915 | 915 |
| **Gross Estimates of Timber Output** | (MBF/ CCF) | 0/ 0 | 12,347/ 24,347 | 13,133/ 25,759 |
| *Treatments Not Associated with Harvest* | | | | |
| **Natural Fuels Underburn** | Acres | 0 | 49 | 49 |
| *Logging System (total unit acres, including reserves)* | | | | |
| **Ground-based** | Acres | 0 | 606 | 606 |
| **Skyline** | Acres | 0 | 459 | 459 |
| *Other* | | | | |
| **Temp Roads** | Feet | 0 | 13,694 | 13,694 |
| **Present Net Value** | Dollars | 0 | 129,286 | 184,232 |

**Comparison of Alternatives by Significant Issues**

The following tables summarize the detailed analysis presented in Chapter 3 on the effects of the alternatives.

**Table 15. Comparison of Alternatives by issue**

| Issue Measurement | Units of Measure | Alternative A (no action) | Alternative B | Alternative C |
|---|---|---|---|---|
| ***Issue #1:Water Quality/Aquatics Resources*** | | | | |
| ***Indicator # 1:*** ***Increase in Stream Water Temperatures**** | **Degrees Celsius** | 0.8° to 2.3° | 0.8° to 2.3° | 0.8° to 2.3° |
| ***Indicator # 2:*** ***Changes in risk of altered peak flows*** | **Aggregate Recovery Percentage (ARP)** | 93.4% | 92.8% | 92.8% |
| ***Indicator #3:*** ***Sediment Yield After Project (Road Origin Sediment)*** | **Sediment Cubic yards** | 183 | 159 | 159 |
| ***Indicator #4:*** ***The amount of riparian area receiving thinning treatment.*** | **Acres treated/ Percentage of Riparian in the project area** | 0/ 0% | 122/ 2.1% | 122/ 2.1% |
| ***Issue #2: Diverse Early Seral Habitat*** | | | | |
| ***Indicator #1:*** ***Amount of diverse early seral habitat created*** | **Acres and Canopy Retention** | 0 | 1 acre gaps 129 acres; 664 acres thinned at 40% canopy retention | 1-3 acre gaps 151 acres; 217 acres thinned at 30% canopy retention; 425 acres thinned at 40% canopy retention |

# Chapter 3. Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area. It has the potential changes to those environments due to implementation of the alternatives. This section also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2.

The cumulative effects discussed in this section include analysis that are primarily based on the aggregate effects of the past, present, and reasonably foreseeable future actions for the all of the actions listed in this document. Individual effects of past actions are not listed or analyzed, and are not necessary to describe the cumulative effects of this proposal or the alternatives. (CEQ Memorandum, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, June 24, 2005.)

## Forest and Stand Structure

### Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Forest and Stand Structure includes the project activity units and the Deer Creek 6th Field sub-watershed, which is also the Ball Park Project area.

### Affected Environment—Forest and Structure

The Ball Park Analysis Area (Figure 1) consists of 14,746 acres within the Deer Creek $6^{th}$ field watershed located on the McKenzie River Ranger District. Timber harvesting has been a dominant disturbance on the forested landscape in the $20^{th}$ century impacting approximately 7,254 acres (49%) of the Deer Creek watershed. Prescribed burning, wildfires, windthrow, and insect and disease have had much less effects during that time.

Based on acreage in the Willamette National Forest's VEGIS database, the following table provides a summary of timber harvest type by decade. Regeneration harvest activities include clearcutting and shelterwood. Treatments which were not identified as regeneration or commercial thinning were considered salvage.

**Table 16. Historic Harvest in the Ball Park Thin Analysis Area.**

| Decade | Historic Management on Federal Land; Acres by Activity Category | | | |
|---|---|---|---|---|
| | *Regeneration Harvest* | *Commercial Thinning* | *Salvage* | *Pre-commercial Thinning* |
| Pre 1960 | 456 | 0 | 0 | 0 |
| 1960s | 1,686 | 0 | 0 | 0 |
| 1970s | 1,520 | 367 | 165 | 191 |
| 1980s | 1,510 | 0 | 611 | 1,717 |
| 1990s | 384 | 0 | 555 | 1,408 |
| 2000-Present | 0 | 0 | 0 | 553 |
| Total | 5,556 | 367 | 1,331 | 3,869 |

Approximately 5,556 acres of the Deer Creek Watershed (38%) was modified with regeneration-type timber harvest, which is now in plantations 70 years old or less. Many of the existing plantations in the analysis area are now becoming ready for intermediate thinning treatments. Over the next decade younger plantations will continue to become both old enough and large enough for commercial thinning.

The project area consists of a mosaic of managed and natural forests with various stand ages and structures. Stands identified for harvest are previously managed stands consisting of plantations from even aged harvest. For the most part, the stands are entering stem exclusion (self-thinning) with reduced growth and limited regeneration. Canopy gaps in the canopy created from self-thinning or disturbance from wind-throw and root rot are promoting regeneration of conifer species in some areas. Regeneration is primarily of shade tolerant species both in the gaps and incidental trees within the stands.

Natural disturbance from windthrow and disease has also created low amounts of snags and moderate amounts of large down wood of various decay classes. Stands being proposed for thinning in the Ball Park Project do not contain remnant Douglas-fir trees that have survived past fires and other natural disturbances. The two natural fuels underburn stands do contain large remnant trees. Plantations being proposed for thinning generally contain a sparse understory. True firs (Noble and Silver fir) and western hemlock are regenerating in the upper elevations with primarily western hemlock in the lower elevations where regeneration is occurring.

The stands contain from 107 to 430 overstory trees per acre with average diameters of 13 inches dbh with a site tree potential estimated at 180 feet. Canopy closures of trees seven inches or larger diameter breast height average 67% within the planning area. Stands have scattered root rot pockets of armillaria root disease (*Armillaria ostoyae*) and laminated root rot (*Phellinus weirii*), both of which are common on the McKenzie River Ranger District. The diseases are often associated with insects such as bark beetles.

The Ball Park planning area stand exams were conducted in 2007. The data indicates that tree growth and vigor have been in decline over the years, and would continue to decline with future increases in stand size and stand density. For stands in the planning area the Stand Density Index (SDI) is relative to Douglas-fir, the major species in the stands. Douglas-fir has a maximum SDI of 595 before it reaches full site occupancy (Reineke, L.H. 1933). An SDI of 60% of the maximum SDI is often considered the lower limit of self thinning. To maximize overall growth a SDI up to 35% the maximum SDI is desired. The stands proposed for harvest average 55% maximum SDI with a range of 34-110%.

## Environmental Consequences—Forest and Structure

For the following analysis of environmental consequences, the current condition of forest stands, including measures of SDI and stand development, was modeled using the Forest Vegetation Simulator (FVS) (USDA FS 2006 PNW model with Western Cascade variant).

### Alternative A (No Action) — Direct, Indirect, and Cumulative Effects

No stand treatments would occur with implementation of Alternative A. Stands growth rates would continue to decline at current rates, and natural processes that affect tree vigor and cause changes in stand structure over time would continue. Tree mortality occurring within known root rot pockets would continue unabated. Populations of Douglas-fir beetle would increase and decline in response to pockets of root rot mortality.

Many stands are overstocked; site resources are being fully utilized and inter-tree competition is intense. Effects of overstocking include decreased growth, increased rates of mortality and high risk of insect attack. High rates of mortality would increase fuel loading; this combined with understory ladder fuels puts these stands at high risk for a stand replacement wildfire. These conditions are not sustainable over time. Decline in underrepresented species, like Sugar Pine (*Pinus lambertiana)* and Western redcedar (*Thuja plicata*), would continue.

Seral stage diversity within the stands would remain low. In the absence of treatments species tolerant to regenerating and growing under thick canopies would dominate the site over time. High stocking density and canopy closure would continue to restrict regeneration of Douglas-fir and Sugar Pine. The species composition in many stands would slowly shift from being dominated by species less tolerant of shade to more tolerant species like western hemlock. Early quality seral habitat for wildlife species from butterflies to Roosevelt elk would continue to be scarce in the planning area. Quality early seral habitat for wildlife species from butterflies to elk would continue to decline affecting their population. There is no ongoing or reasonably foreseeable timber harvests planned on Forest Service lands in the Ball Park Project area.

**Alternatives B and C — Direct and Indirect Effects**

**Actions associated with All Thinning**

Trees removed would primarily be the smaller diameter trees in the stands. The objective is to increase growth and vigor of remaining trees. Emphasis is on maintaining non-Douglas-fir species. This prescription would maintain or increase vegetative diversity and resistance to future insect infestations and disease. Reduced stand densities and greater diameter growth of residual trees would increase their stability making them more resistant to windthrow as they mature (Tappeiner, et al. p.213). The residual trees should also be less susceptible to fire and root diseases such as armillaria spp. and associated insects.

Thinning creates openings in the canopy allowing for the release of some existing understory trees and shrubs. The residual canopy closures would also provide opportunity for the establishment new vegetation and shade intolerant tree seedlings (Tappeiner, et al. p.230-231). These openings would, increase structural diversity and the future creation of large snags and down wood in treated stands.

Existing species composition, which is dominated by Douglas-fir, would result in a remaining overstory that is primarily Douglas-fir and respond to the reduced density with increased crown growth. Eventually the understory vegetation would be suppressed. As canopy closure and stand density increase over the next 12 to 15 years, an opportunity for subsequent thinning would emerge. A future thinning would maintain growth of residual trees and the growth and development of the stand.

**Canopy thinning**

Canopy thinning maintains or increases overall stand growth and vigor by reducing competition for limiting resources such as light, water, and soil nutrients. Reduced stand densities and competition allows the residual trees to maintain a higher growth rate than would occur with no thinning.

All units for both alternatives have Canopy thinning prescriptions. Areas within stands that are outside of Riparian Reserves, group selects, or other non-treated areas (botanical area, heritage area, etc.) will have the Canopy thin prescriptions applied.

Stands would be thinned to maintain an average canopy closure percentage that would be determined by the selected alternative (see chapter 2 for description). Post-treatment Stand Density Intensity (SDI) of 16-35% the $SDI^{max}$ would be maintained. Sugar Pine natural regeneration will be promoted by the removal of non-Sugar Pine competition within a radius of 50 foot around Sugar Pine trees 24 inches and greater.

**Riparian Thinning**

Riparian thinning maintains or increases overall stand growth and vigor by reducing competition for limiting resources such as light, water, and soil nutrients. Reduced stand densities and competition allows the residual trees to maintain a higher growth rate than would occur with no thinning. The Riparian Thinning Rx would occur in the riparian area of units: 10, 20, 30, 40, 60, 70, 80, 110, 120, 130, 150, 170, 220, 240, 280, 290, 310, 360, 390, and 400 in both alternatives.

The stands would be thinned to maintain a combined average of at least 50% canopy closure within the secondary shade zones and a post-treatment SDI of 26--36% the $SDI^{max}$. Thinning will not occur within the primary shade zone.

**Group Selection**

The objective of group selections is to develop gaps of early seral forest by creating openings with minimal canopy cover. Shade intolerant species that need full sunlight for successful establishment and growth would be able to regenerate in openings created by group selection. Because of the small size of the group selections, there would be an edge effect (shade from residual trees around the edge of the group). Height growth would be higher towards the center of the groups, away from the edge and any leave tree or snags left in the group.

Groups would be randomly placed throughout the units with a minimum separation of one chain (66 foot) between groups. Groups would consist of approximate one-acre gaps with undulating edges to avoid circles or square edges in the stands. In areas where an insect or disease problem exists, like root rot disease, the group would be strategically placed on the root rot pocket. A minimum 50' area surrounding root rot pockets would be cleared, resulting in the group select. Openings created by the removal of root rot pockets would maintain a one acre size limit in Alt B, and three acre maximum in Alt C. In areas with large root rot pockets multiple groups will be utilized while maintaining the one chain separation. Within the groups, all but the four largest green trees per acre are to be removed. Any existing snags that are not a hazard to the logging operation and downed trees are to be left on site. Trees adjacent to the group would serve as a seed source, in addition to those left within the groups. Natural regeneration is unpredictable based on timing of cone crops and occupation of the site by competing vegetation. To ensure reforestation treatment success, post harvest treatments may be utilized. Edge effect and retention of overstory trees could inhibit growth in some seedlings by reducing light and moisture availability.

**Underburning**

Low to moderate intensity underburn would occur in some units following thinning. Desired silviculture objectives are to reduce the slash generated from the harvest activities and enable more shade intolerant species to further growth and regeneration. Thinning and underburning reduces competition, opens the canopy allowing for more sun and less fuels on the ground to enhance the growth and regeneration of species such as Douglas-fir. Please see Fire/Fuels Chapter 3.

**Alternatives B and C —Cumulative Effects**

Cumulative effects analysis is focused on the USDA Forest Service (FS) land within 14,746 acre Deer Creek 6th field watershed, the Ballpark Analysis Area. The entire analysis area is FS property Past management activities, including logging and fire suppression, have molded the analysis area. As displayed in Table 16, in the last 50+ years approximately 7,254 acres have been managed with regeneration, commercial thinning, or salvage logging and an additional 3,869 acres have been pre-commercially thinned. The 7,254 acres represents 49% of the entire watershed.

Both action alternatives propose 49 acres of natural fuels underburning in stands greater than 120 years old. The natural fuels underburning will increase acres of managed stands by less than 1% of the watershed acreage. As stated above, there would be a temporary increase in tree growth in the residual trees within treated units, which would also lead to development of a more diverse understory. The opening of the canopy and holes created with the group selects would increase the amount of wildlife forage and early seral forest stands on the landscape in varying amounts. Timber sale activities would reduce the number of natural snags that currently exist within the harvest units, but they would be replaced to some extent by burning induced tree mortality. There are no other foreseeable future projects that would add to the cumulative effects of past timber harvest and the proposed stand treatments.

# Soil Productivity and Slope Stability

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Soil Productivity and Slope Stability includes the project activity units in the Ball Park Thin Project area.

## Affected Environment—Soil Productivity and Slope Stability

### Geology

This project area is located in the Deer Creek drainage in the McKenzie River basin. Deer Creek straddles the boundary between the older Western Cascades sequences of volcanic and volcaniclastic rocks more common to the north and west, and the younger High Cascade volcanic rocks to the east. Considered part of the Western Cascade physiographic region, the Deer Creek study area is composed primarily of basaltic andesite and andesite flows and flow breccias, lahars, and volcanic conglomerates. These rocks range in age from about 17 million years ago to about 10 million years old. Over lying this strata on most ridges are 4 to about 10 million year old olivine basalt, basaltic andesite and dacite lava flows. Some ridge capping flows of this time period are lithologically similar to flow rocks of the oldest flows of the High Cascade volcanic sequence, and some are more like flows that have been mapped as part of the Sardine Formation in the Western Cascade Province.

The surface expression of these rock formations has been extensively modified by erosion, especially from the Pleistocene through the Holocene with glacial activity. Glacial forms are common in the study area, and ice cap glaciers probably covered the High Cascade platform to the east several times during the Pleistocene. Valley glaciers likely traveled both down and up Deer Creek as it acted both as a valley glacier and as an outlet for excess ice accumulation to the east from the High Cascade platform. Small cirque basins, hanging valleys, and assorted morainal deposits all reside on the landscape, but some have been extensively altered by stream erosion and slope instability.

### Soils

Locally, some of the bedrock materials tend to weather to form deep colluvial and residual soils that can give rise to unstable terrain with both rotational and translational failures. This complex geologic history has produced a myriad of diverse landforms and soils. The area consists of geomorphically complex terrain with a distinctive and diverse topographic expression. Landforms range from highly glaciated upland benches and flats with extensive ground moraine like Conroy Creek, to steep rocky canyons and crags, to the large scale stabilized slump/earth flow complexes and associated glacial deposits of Carpenter Creek, to the flat stable river terraces and outwash plains along the main stem of the McKenzie River at the confluence with Deer Creek.

Soils developed from both the volcanic and glacial deposits, even on the steeper side slopes, are usually stable and productive. The various soils associated with the numerous land types are generally well drained where permeability is rapid in the surface soil and moderately rapid in the subsoil. Because of high infiltration rates, overland flow is generally uncommon except during periods of high rainfall and snow melt. In the proposed units, side slopes range from near zero to about 30% on the gentler slopes to 40 to 80% on the steeper terrain. Offsite erosion is generally not a concern because of the vegetative ground cover, the high infiltration rates, and the gentle to moderate side slopes for many units

For the most part, the soils of the planning area are in good condition. Previous harvest activities did not result in excessive erosion, loss of effective ground cover, or slope instability that could have affected the long-term viability of the soils to support productive healthy forests. However, prior harvest with ground based equipment has resulted in residual soil compaction in many units. The adverse effects and extent of the compaction are within the Willamette National Forest Plan Standards and Guidelines (1990). A more detailed discussion can be found in the Soils Specialist Report in Appendix E.

## Environmental Consequences—Soil Productivity and Slope Stability

### Alternative A (No Action) — Direct, Indirect, and Cumulative Effects

Under this alternative, the soil resource in the near term of a few years would remain relatively unchanged. Stands would continue to develop. Intermediate and suppressed trees would slowly be removed from the stand through mortality and decay. In areas of heavy stocking, stands would stagnate. Overstocked stands would rapidly see density increase, growth slow, and mortality rise. Fuel accumulations would continue to increase. With bio-turbation and freeze/thaw, compaction would slowly be reduced. Short-term impacts from harvest, such as soil disturbance, dust, and slash accumulation, would not occur. There are no ongoing or reasonably foreseeable projects within the analysis area for soils productivity and slope stability.

### Alternatives B and C — Direct and Indirect Effects

A field review of the project area was completed in 2007 by a Forest Geologist to verify the present SRI land type boundaries, determine the location of unsuited and unmanageable land types, and to evaluate potential soil impacts from management (see Appendix E).

The activity most likely to result in adverse effects on soil is yarding of timber with ground-based systems. Both action alternatives propose ground-based yarding on approximately 606 acres. Soil compaction, displacement, and reduced infiltration can occur during timber harvest and road construction activities, which could adversely affect the re-establishment of vegetation. However, best management practices to manage these impacts within acceptable levels have been included in each of these action alternatives. In addition, sub-soiling is proposed in ground based units to further reduce compaction levels. Mechanized fuel treatments on many of these acres are also proposed. Past experience with these treatments that typically result in single pass operations that operate on top of slash and on existing skid roads as much as possible is that they do not add substantially to soil impacts. This is supported by a recent study of similar mechanized fuel treatments that involve ground based vehicle mounted mastication equipment (Moghaddas and Stephens. 2008). Through the use of suspension and duff retention objectives, short-term impacts of these alternatives would remain within Forest Plan standards and guidelines. Substantial erosion is not likely based on the infiltrative capacity of the coarse textured soils and the implementation of required erosion management BMPs discussed in Chapter 2. Long-term adverse effects from the loss of productivity or instability would either be within established limits or are not anticipated.

In 2001, McKenzie River District personnel monitored the impacts resulting from the use of ground- based yarding systems in two partial cutting units similar to those proposed in the action alternatives, and on similar landtypes in the Thin Within Timber Sale monitoring, Willamette National Forest (USDA Forest Service, 2001). In both monitoring units, soil impacts were within the acceptable limit of 20% total detrimental condition as required by the Forest Plan. In one of the units, approximately 15% of the area was impacted, and in the other unit, approximately 8 % of the area was impacted. Compaction and displacement on these monitoring units were maintained within acceptable levels by using designated skid trails, placing slash on skid trails to buffer impacts, and operating machines on continuous snow pack. It is reasonable to anticipate similar results for the proposed treatment units in the Ball Park Thin Project.

#### Alternatives B and C — Cumulative Effects

Many of the previously managed stands that were harvested several decades ago were harvested with ground-based systems. Transects through these units indicate that existing compaction from skid roads and landings is approximately 2 to 17%. Bare soil areas no longer exist, although some evidence of disturbance is still evident. The Forest standard for disturbance and compaction is 20% of the unit area, including all roads and landings. Without the implementation of best management practices (BMPs), the potential exists for compaction from this entry to exceed those standards. To minimize the potential for cumulative adverse compaction, all skid road locations would be approved prior to use, and existing skid roads would be utilized as much as possible. After harvest, secondary skid roads would be scarified in order to avoid excessive root pruning. Primary skid roads and landings are proposed for sub-soiling to reduce compaction levels. Based on professional experience, it is estimated that upon completion of activities, compaction would remain at or below the existing levels. These results fall within the range permitted by Willamette National Forest standards and guidelines. There are no reasonably foreseeable future actions that would add additional soil impacts to the cumulative effects of past actions along with this proposed action.

## Water Quality/Aquatic Resources (Significant Issue #1)

For each of the analysis items in this section, a discussion of the affected environment precedes the analysis of environmental consequences. The affected environment discussion provides a description of the existing condition, including important physical and biological components of the 6$^{th}$ field watershed in which the project occurs. It also identifies relevant information from applicable watershed analyses that was used to design and assess the project. The environmental consequences discussion describes the effects of the project on the existing condition.

## Scale of Analysis

Unless otherwise noted, the geographic scale used to assess direct, indirect and cumulative effects for Water Quality/Aquatic resources includes the project activity units and the Deer Creek 6th Field sub-watershed, which is also the Ball Park Thin Project area.

## Affected Environment—Stream Shade and Stream Temperature

Road construction and timber harvest began in the project area in the 1950s, peaking on National Forest System lands in the 1970s and 1980s. Much of this activity that occurred prior to implementation of the Willamette Forest Plan in July 1990, resulted in removal of riparian vegetation that provided shade for streams in the project area. The removal of shade likely resulted in elevated stream temperatures that appear to be represented in current temperature data.

Reaches of Deer Creek and it's tributaries, Budworm and County Creeks, have been identified as having impaired water quality within the Ball Park Thin Project area for temperatures in excess of water quality standards. (Oregon DEQ. 2004/2006. 303(d) List of Impaired Waters). Table 17 displays the listing information and applicable standards for each reach.

**Table 17. Oregon 303(d) Listed Stream Reaches.**

| Stream Name | River Miles | Season | Standard (Degrees Celsius) | Beneficial Use |
|---|---|---|---|---|
| **Budworm Creek** | 0 to 3.1 | Year Around | 12 | Bull Trout Spawning and Rearing |
| **County Creek** | 0 to 2.4 | Year Around | 12 | Bull Trout Spawning and Rearing |
| **Deer Creek** | 0 to 8.3 | Summer | 17.8 | Salmonid Rearing |
| **Deer Creek** | 0 to 2.6 | Sept 1 – June 15 | 13 | Salmon and Steelhead Spawning |
| **Deer Creek** | 0 to 2.6 | Year around | 16 | Core Cold Water Habitat |

Actual fish distribution and habitat usage differ from the information presented above and are discussed in the Affected Environment Discussion for Aquatic Resources later in this chapter.

From June through September of 2004 through 2007, stream temperature data were collected at two locations in the project area to support project analysis. A summary of this data is provided below in Table 18 along with data from French Pete Creek, which is an unmanaged wilderness stream of similar size and basin characteristics to Deer Creek.

The existing conditions for stream temperatures in the Ball Park Thin project area appear to be slightly elevated above control conditions. Deer Creek above the EWEB power line is on average approximately 0.8 degrees C warmer than geologically and hydrologically similar control streams that have been predominantly un-impacted by land management activities. This is not a definitive difference based on only a few years of data, but one could speculate that the difference is attributable to past harvest that has reduced shade in these drainages.

**Table 18. Average Stream Temperatures.**

| Stream Name | Average 7-day average of Maximum Temp. ° Celsius 2004 Data | Average 7-day average of Maximum Temp. ° Celsius 2005 Data | Average 7-day average of Maximum Temp. ° Celsius 2006 Data | Average 7-day average of Maximum Temp. ° Celsius 2007 Data | Range of Values | Average Value | Change from Control |
|---|---|---|---|---|---|---|---|
| **French PeteCreek (Control)** | 16.7° C | 15.6° C | 16.7° C | 16.4° C | 1.1° C | 16.4°C | NA |
| **Deer Creek Above EWEB Power Line** | 17.6° C | 16.7° C | 17.4° C | 17.2° C | 0.9° C | 17.2°C | 0.8°C |
| **Deer Creek Near Mouth** | NA | 19.0° C | NA | 18.4° C | 0.6° C | 18.7°C | 2.3°C |

Deer Creek at its mouth is warmer by approximately 1.5 degrees C than the site above the power line, and by approximately 2.3 degrees C above the control. This would appear to be due to EWEB's power line maintenance requirements that keep vegetation well trimmed. However, there is known geothermal influence in the area with Deer Creek hot springs located along the McKenzie River just downstream from Deer Creek. The observed difference is in all likelihood, the result of a combination of power line maintenance and geothermal influence with the exact contribution of each source unknown.

The range of maximum temperatures from one water year to the next did not substantially differ, nor did the annual timing of the maximum temperature, which occurred between July 15 and August 15 in all instances. This suggests that management has impacted only the increased value for maximum temperature and has not affected inter-annual variability or annual timing of peak temperatures.

## Environmental Consequences—Stream Shade and Stream Temperature

### Alternative A (No Action) — Direct, Indirect, and Cumulative Effects

Activities that affect stream-shading vegetation would not occur, and direct, indirect, or cumulative effects of this alternative on stream temperature are not anticipated. Water temperatures in streams in the project area would continue to recover toward more natural levels, as riparian vegetation that was disturbed or removed by management activities prior to implementation of the LRMP re-grows and re-establishes streamside shade.

### Alternatives B and C — Direct, Indirect, and Cumulative Effects

For all action alternatives, treatments within riparian areas have been designed to fully comply with "Northwest Forest Plan Temperature TMDL Implementation Strategies – Evaluation of the adequacy of the Northwest Forest Plan Riparian Reserves to achieve and maintain stream temperature water quality standards" (USDA Forest Service and USDI Bureau of Land Management. 2005). This document was prepared in collaboration with Oregon Department of Environmental Quality and United States Environmental Protection Agency to provide documentation of Northwest Forest Plan compliance with the Clean Water Act with regard to state water quality standards for stream temperatures. As such, it redeems several of the Forest Service responsibilities identified in "Memorandum of Understanding between USDA Forest Service and Oregon Department of Environmental Quality To Meet State and Federal Water Quality Rules and Regulations" (USDA Forest Service and Oregon DEQ, 2002). The Implementation Strategy provides current scientific guidance for management of riparian vegetation to provide effective stream shade, including appropriate methods of managing stands for riparian objectives other than shade, such as production of large wood for future recruitment.

Trees within the stands proposed for treatment are currently 60 - 100 feet tall, and slopes typically fall within a 10% to 70% range. All fish bearing and perennial streams (Class 1 -3) are provided with a minimum of 60- feet of primary shade buffer to retain effective shade for stands of this height and these slopes. Intermittent (Class 4) streams are dry during the portion of the year that elevated temperatures and therefore are not a problem. However, bank stability trees and 30 to 60 foot no harvest buffers would be retained for other resource objectives, and would provide substantial shade regardless. For all classes of stream, an average of at least 50% crown closure would be retained within the entire remainder of the riparian reserve, including that portion which may provide secondary shading benefits.

Based on implementation of the design criteria outlined in the preceding discussion and field observations during project reconnaissance, no measurable direct, indirect, or incremental cumulative increases of stream temperature are anticipated within the project area, as a result of these alternatives. Consequently, as in the No Action Alternative, water temperatures in Deer Creek and other streams in the project area would continue to recover toward more natural levels, as riparian vegetation re-grows and re-establishes streamside shade. Incremental increases or a decrease in the rate of recovery as a result of implementation of either action alternative is not anticipated.

#### Alternatives B and C—Conclusions

Based on the previous discussion and field observations, no measurable direct, indirect, or incremental cumulative increases of stream temperature are anticipated within the project area as a result of any of these alternatives. The magnitude of cumulative increases resulting from past management activities were disclosed in the earlier Affected Environment discussion and there are no reasonably foreseeable actions that would not comply with TMDL requirements for the McKenzie Basin.

## Affected Environment—Stream Flows/Disturbance History

Traditionally, projects involving timber harvest on the Willamette National Forest are analyzed for their cumulative impact on the quantity and timing of peak flows and water yields using an accounting methodology known as Aggregate Recovery Percentage or ARP, as specified by the Forest Plan. The ARP model compares the amount of an analysis area within the transient snow zone that is recovered against a threshold value (Midpoint) that was calibrated for the area during development of the Forest Plan. The midpoint values were developed based on the soil, geology, vegetation, climate, and stream channel conditions of each sub-watershed, and are intended to represent a minimum safe level of vegetative recovery in the sub-watersheds to prevent significant alteration of peak flow regimes as a result of management activities. Recovery generally occurs when stand diameters average 8" dbh and crown closures exceed 70%. The transient snow zone is generally considered to include those areas of the forest between the elevations of 1,500 and 4,000 feet respectively. The analysis is based on data extracted from the Forest's VEGIS database, which includes information about all past harvest activities in the sub-watershed. Currently, ARP levels in the Deer Creek Sub-watershed stand at 93.4%, which is far above the Forest Plan Midpoint of 75%.

## Environmental Consequences—Streams Flow/Disturbance History

### Alternative A (No Action)—Direct, Indirect and Cumulative Effects

Alternative A, No Action, would result in no changes to existing peak flows, having no direct, indirect, or cumulative effects on streams flow in the project area.

### Alternatives B and C—Direct and Indirect Effects and Cumulative Effects

Table 19 summarizes levels of recovery immediately after implementation of the project for each of the alternatives. The incremental change associated with each alternative is determined by comparing these values with current condition values that were presented in the affected environment discussion.

**Table 19. Recovery Levels Immediately after Project Implementation (2010).**

| Sub-watershed | Alternative A (No Action) | Alternative B | Alternative C | Midpoint ARP |
|---|---|---|---|---|
| ***Deer Creek*** | 93.4% | 92.8% | 92.8% | 75% |

Examination of this information indicates that ARP levels are maintained well above recommended values by all alternatives in the affected sub-watershed, even immediately after implementation when the potential for impacts to vegetative recovery would be greatest. Therefore, no altered peak stream flow regimes are anticipated from implementation of the proposed actions.

There are no reasonably foreseeable future actions within the project area that would result in effects that differ from those already disclosed for each of the alternatives.

## Affected Environment—Sedimentation and Roads

The geologic terrain and soils of the Ball Park Thin project area are not inherently prone to extensive erosion unless disturbed as discussed in the Soils Specialist Report in Appendix E. However, beginning in the 1950s road construction and timber harvest began in the project area, peaking on National Forest system lands in the 1970s. As discussed in the Soils Report, past timber harvest methods were employed that managed for minimal soil; disturbance. Road construction on the gentler portions of the project area and on the terraces mentioned in the Soils Report resulted in displacement, but little off site transport of sediment to streams, except at crossings.

But roads on the deeply dissected slopes between terraces, especially those roads constructed during the earlier part of the time period, employed construction methods such as cut and fill that resulted in relatively unstable facilities. These roads continued to produce sediment during storm events as unstable portions of road fills failed and resulted in debris torrents. Since implementation of the Forest Plan in 1990, road maintenance activities have worked to eliminate many of these unstable fill situations. Many were repaired to the higher standards after their initial failure. Even so, roads continue to be the largest source of human caused sedimentation in the project area, especially at stream crossings where road sediment can enter streams and undersized culverts can fail during flood events. Based on observations of existing road conditions during field reconnaissance for the project, sediment outputs from roads were estimated using the roads module of the Watershed Erosion Prediction Project (WEPP) model. The current sediment yield from roads is estimated at 247 cubic yards per year for the project area. The McKenzie River Sub-Basin, including the Ball Park Thin Project Area, provides municipal water to the City of Eugene by way of the Eugene Water and Electric Board's intake at Hayden Bridge, approximately 60 miles downstream from the project area. Sedimentation and associated turbidity are the most likely consequences of the Ball Park Thin project that could adversely affect municipal water quality.

## Environmental Consequences—Sedimentation and Roads

### Alternative A (No Action)—Direct, Indirect and Cumulative Effects

Alternative A, continues the current management situation regarding roads maintenance in the project area. This alternative would not change the potential for sediment delivery to streams from roads in the project area.

### Alternatives B and C—Direct and Indirect Effects

Road work associated with the Ball Park Thin Project includes replacement of a number of culverts that are currently in poor repair or inadequately sized to pass "Q100 flows", or a flood that has a 1% probability of occurring in any given year. Replacement will require in-stream work in these locations. Work will be done during non-flow periods for intermittent streams, and engineering practices such as sediment barriers and flow bypass will minimize impacts on perennial streams. Flows in perennial streams are all expected to be less than 1.0 cubic feet per second when work occurs, based on personal observation during project reconnaissance. It is not possible to do this work without some sediment delivery, and accurate estimates are not predictable. Depending on weather behavior and other variable factors, sediment yields should fall between 0.5 and 2.0 cubic yards per installation based on professional experience. The culverts currently represent an elevated risk of fill failure because the culverts to be replaced are in poor condition or are undersized for Q100 flows. Discussion with engineering personnel indicated that the average fill volume is 250 cubic yards. This material is at risk of entering the streams and potentially generating debris torrents if the existing culvert fails. Table 20 provides a summary of these replacements and the potential amount of fill material that would have a reduced risk of entering streams, as well as estimates of the amount of sediment produced from the culvert replacements. The maximum estimate of sediment yields from the culvert replacements would be 81 cubic yards for Alternatives B and C. In comparison, the estimated volume of fill stabilized for Alternatives B and C are 11,750 cubic yards

**Table 20. Approximate Culvert Replacements in Perennial and Intermittent Streams by Alternative.**

| | Stream Type | Number of Culverts Installed/Replaced/Removed | Cubic Yards of Fill Stabilized | Sediment Yields from Culvert Replacements (Cubic Yards) |
|---|---|---|---|---|
| ***Alternative A (No Action)*** | Intermittent | 0 | 0 | 0 |
| | Perennial | 0 | 0 | 0 |
| | **Total** | **0** | **0** | **0** |
| ***Alternative B and C*** | Intermittent | 34 | 8,500 | 34 - 68 |
| | Perennial | 13 | 3,250 | 6.5 - 13 |
| | **Total** | **47** | **11,750** | **40.5 - 81** |

All of temporary roads (approximately 3 miles) that would be used in the action alternatives are situated on stable terrain, and all are situated where the potential for extension of drainage networks is negligible. Consequently minimal amounts of sediment are expected to reach stream channels as a result of this activity.

All action alternatives would implement the road management activities listed in the description of each action alternative, as detailed in Chapter 2. The following table provides additional information about road maintenance:

**Table 21. Road Maintenance Summary.**

| | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| **Miles** | 0 | 43.9 | 43.9 |
| **New/Replacement Relief Culverts not in Perennial or Intermittent streams** | 0 | 57 | 57 |

As a minimum, these activities would include maintenance of proper drainage through maintaining existing structures, installing water bars, or restoring natural drainage features. Also included would be the installation of new-ditch relief culverts and replacement of existing ditch-relief culverts that are currently in poor condition. These actions would reduce the likelihood of sediment leaving the road with runoff by reducing the average distance between drainage structures and consequently, the amount of water that each structure needs to handle. Less water translates to less sediment-carrying capacity

**Alternatives B and C—Cumulative Effects**

As was disclosed in the discussion of the affected environment, an analysis of estimated sediment outputs from roads in the project area was completed using the roads module of the Watershed Erosion Prediction Project (WEPP) model. The same analysis was conducted for the project area road system for each of the alternatives, incorporating all project related road maintenance and temporary construction activities, as well as product haul routes. Results were calculated to estimate sediment production rates during the implementation of the project as well as conditions following completion of the project. The results are summarized in the following table.

**Table 22. Estimates of Sediment Production Rates.**

| | Alternative A (No Action) | Alternative B and C |
|---|---|---|
| **Road Sediment Yield During Implementation (CuYd/Yr)** | 183 | 190 |
| **Road Sediment Yield after Implementation (CuYd/Yr)** | 183 | 159 |

Rates of road related sediment yield remain constant under the Alternative A (No Action), reflecting no specific changes in ongoing road treatments or conditions. For each of the action alternatives, annual sediment yield increases during the life of the project as a result of project activities. This represents an incremental increased contribution of sediment that cumulatively adds to sediment already produced under the existing road system. However, each of the action alternatives also shows a net incremental decrease in annual sediment yield after completion of the project. This reflects the lasting results of improvements made to the existing road system as part of the project, and represents an incremental reduction in the cumulative amount of road generated sediment.

## Affected Environment—Riparian Habitat Improvement

Road construction and timber harvest began in the project area in the 1950s, peaking on National Forest system lands in the 1970s. Much of this activity that occurred prior to implementation of the Willamette Forest Plan in 1990 resulted in removal of riparian vegetation that provided large wood and shade to streams in the project area. The effects of these actions on stream shade and stream temperatures were included in analysis discussion. From these discussions, it is clear that the removal of wood resulted in reduced availability of large wood for in-stream and riparian habitat. The purpose of this analysis is to disclose some the effects of this project as well as other recent projects which begin to address the need to restore the large wood component to riparian stands.

Past management activities include logging, road construction, maintenance, fire suppression, and utility right-of-way construction. In the past 50 years approximately 7,254 acres have been managed with regeneration, commercial thinning, or salvage logging. Pre-commercial thinning of 3,869 acres has occurred within previously managed stands in more recent history. The 7,254 acres represents 49% of the entire 6th field sub-watershed (or the Ball Park Project Area). Road density within the sub-watershed is 3.1 miles/square mile. Total system road length within the sub-watershed is 70.9 miles.

The watershed is located in the Western Cascades geology. The landforms in this area are a product of alpine glaciation and subsequent valley filling processes such as glacial outwash and moraine deposits. The on-going fluvial processes have provided a mechanism for large mass wasting and erosion events involving side slope and toe slope deposits. Significant tributaries to Deer Creek include (from lower elevations, upstream) Budworm Creek, Fritz Creek, County Creek, Carpenter Creek, Conroy Creek, Brush Creek and Cadenza Creek. Between its confluence with the McKenzie River and Deer Creek Falls (a distance of about 4.9 miles) the channel is characterized by a moderately low gradient averaging 2.8%. Mainstem Deer Creek gradient changes in its upper reaches, typical of a large tributary draining western Cascades geology. Above Deer Creek Falls to its headwaters (a distance of about 5.3 miles) the channel steepens, averaging over 6% gradient. Erosion processes in Deer Creek are an important source of substrate in the upper McKenzie sub-basin, playing a vital role in fisheries habitat development and maintenance.

Essential aquatic habitat events such as landslides, torrent events and mass wasting, are completely natural. Over a large scale and long term development, these events periodically provide transport to side slopes and side slope tributaries leading into the main stem Deer Creek.

## Environmental Consequences—Riparian Habitat Improvement

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

#### Direct and Indirect Effects

Tree mortality would be expected to increase and contribute to accelerated recruitment from riparian stands into stream channels. The aquatic benefit of small trees is limited due to their small diameter, namely through the reduced ability to store sediments and contribute to habitat development. The longevity of recruited small diameter trees is short-lived, as small diameters will break down through abrasion and decomposition more rapidly compared to significantly sized trees (>24 inch diameter). As compared to action alternatives, the no action alternative will provide a greater volume of in-stream wood in the short-term, but the wood will be of limited value to aquatic habitat quality and its presence will be of short duration. A continued suppression of diameter development of even-aged riparian reserve trees may be expected to exceed 40 years and delay the availability of significantly sized wood to channels.

Development of future sources of in-stream wood would depend on natural thinning events (stem mortality and disturbance) and to achieve stand diversity. Pulses of woody material recruitment in response to fire disturbance have occurred on this landscape for thousands of years. The composition of woody material pulses originating from a plantation, compared to a structurally diverse stand, is expectedly less stable and shorter lived in the channel.

**Cumulative Effects**

Alternative A will provide an accelerated rate of in-stream recruitment from 60-100 feet of perennial channels compared to action alternatives. This recruitment will be provided mostly by stem mortality from competition, disease, wind and snow downed trees. The rate of wood recruitment from 0-60 or 0-100 feet (depending upon thinning prescription) from perennial channels is expected to be at rates similar to action alternatives. Riparian stand composition will be expected to retain their uniform character. With continuing fire suppression in managed forest landscapes, the opportunity for fire disturbance to provide a process restoring diversity is limited. Desired stand diversity within 6th field Riparian Reserves is expected to occur at a delayed rate. A shortage of significant sized trees of value in-stream will continue into the foreseeable future.

### Alternatives B and C—Direct and Indirect Effects

In Alternatives B and C, 122 acres of Riparian Reserves is proposed for thinning. Table 23 summarizes the percentage of riparian reserve area in the sub-watershed affected by thinning harvest.

**Table 23. Percent of Sub-watershed Prescribed for Riparian Reserve Thinning**

| 6th Field Deer Creek Sub-watershed Acres | Deer Creek Sub-watershed Acres of Riparian Reserve | Alt. B and C Riparian Reserve Acres Thinned | Alt. B or C Percent of Sub-watershed Riparian Reserve Thinned |
|---|---|---|---|
| 14,746 | 5,696 | 122 | 2.1% |

A desired benefit of thinning in Riparian Reserves is the influence on stand structure and the development of large diameter trees. The even-age character of the previously managed stands is expected to respond favorably to thinning in terms of growth rate. Thinned riparian reserve stands are expected to provide a greater degree of diversity of size in the long-term as compared to no thinning of reserves in the no action alternative.

Plantation thinned in the project area Riparian Reserves are expected to accelerate stream adjacent trees toward diameters considered better suited to provide stable in-stream large woody material. Within 40 years, adjacent trees to the stream in this project, will begin to approach the size considered “significant” (greater than or equal to 24 inches in diameter at breast height) to function as in-stream sediment storage elements and valuable in aquatic habitat development. The future rate of wood recruitment to channels following thinning will depend largely upon natural disturbance events such as wind-throws, snow-downs, mass failure/debris torrent, floods, and fires.

Portions of the riparian reserve that remain un-thinned are within 60-100 feet of perennial channels. Those portions of the reserve will remain unmodified by Alternative B and C. The exceptions are openings created by skyline corridors. Along skyline corridors some release of plantation trees would occur and be expected to accelerate tree growth. Trees yarded through skyline corridors will require full suspension over perennial waterways. Channels adjacent to skyline corridors will receive a management induced pulse of in-stream wood that will be left in place (Soil, Watershed, Fisheries Protection measure 11; Chapter 2).

Due to the area of riparian reserve treatment proposed, 2.1% of reserves in either action alternative, influence over the long term on stand structure and future large wood recruitment will be minor on the 6th field scale. Site specific benefits are expected to provide for a greater diversity of available aquatic habitat over the long term. Aquatic habitats currently characterized as simplified may be expected to improve in substrate storage and habitat complexity, improving their ability to meet aquatic life history needs at the site scale.

### Alternatives B and C —Cumulative Effects

At the 6th field watershed scale, under Willamette and NW Forest Plan management direction, riparian areas in the sub-watershed are expected to contribute an increasing level of recruitment potential compared to current contribution. The quantity of significantly-sized large woody material (>24'' dbh) available to sub-watershed channels is expected to increase through time. In part, through accelerated riparian reserve treatments proposed in the Ball Park Thin project. Deficits of in-stream wood identified during surveys of channels in the project are expected to begin gaining in density. Combined with riparian reserve protections provided by the Forest Plan, and thinning treatments proposed with action alternatives, the composition of thinned Riparian Reserves is expected to look less uniform and contribute a higher quality habitat element. The Ball Park project riparian reserve thinning proposal will maintain existing hardwood elements within the reserve and maintain hardwood stand diversity and complexity.

A short-term reduction in current stem number available to channels adjacent to thinned reserves would occur with Alternative B and C. Riparian stand thinning within 60 to 100 feet of perennial channels (consisting of skyline corridors) is low in magnitude, and is expected to maintain aquatic habitat quality. The removal of thinned trees capable of contributing immediately to in-stream habitat (as influenced by action alternatives) is generally located between 60 and 100 feet distant from the channel. A similar rate of recruitment from among stands 0-60 feet or 0-100 feet from perennial channels is expected (compared to Alternative A).

## Affected Environment—Aquatic Resources

The aquatic resources analysis examines project area habitat and fish species considered Management Indicator Species (native and anadromous fishes) in the Willamette Forest Plan. The scale of analysis for aquatic species examines the 6th field watershed, evaluated at this scale due to project footprint and potential effects of project activity downstream.

#### Management Indicator Species

Native rainbow trout (*Oncorhynchus mykiss*) are river dwelling in the main stem McKenzie River and larger tributaries including Deer Creek. Deer Creek is one of the largest upper McKenzie sub-basin tributaries, providing significant habitat for all life stages of Deer Creek resident rainbow trout. It also serves as spawning and rearing habitat for migratory McKenzie River trout, which are, trout that spend most of their adult life in the McKenzie River. The robustness of McKenzie River rainbow trout populations is believed diminished. The combination of habitat condition and ODFW stocking of non-native rainbow and introduced summer steelhead, is believed to suppress native rainbow trout abundance in the project area through habitat degradation and competition with non-native species.

Native cutthroat trout (*Oncorhynchus clarki clarki*) are the most widely distributed fish in the landform, ranging from headwater streams (Class 1 and 2 perennial and intermittent fish-bearing streams in the project area provide habitat for cutthroat trout) to the main stem of the McKenzie River. Previous timber management in riparian areas has affected aquatic habitat quality in tributaries by altering the quantity, size and supply of in-stream woody material, substrate storage and water temperature.

**Listed Species Distribution and Habitat Requirements**

Native spring Chinook salmon (*Oncorhynchus tshawytscha*) migrate, reproduces, and rear downstream of the project area, in the main stem of the McKenzie River. Historically, it is believed Chinook salmon utilized Deer Creek as spawning and rearing habitat. However, current salmon use of Deer Creek is believed limited due to higher stream temperatures. High summer stream temperatures and low flow conditions are believed to discourage juvenile Chinook use of lower Deer Creek during warmer months. Spring Chinook spawning migration would occur during the low flow/warm water periods (late August through September) in Deer Creek. Currently, flows are typically too low and warm to provide for the reproductive and rearing habitat needs of spring Chinook. The lower 2.6 miles of Deer Creek, downstream of Fritz Creek confluence, is designated as Critical Habitat for spring Chinook salmon. Elevated stream temperatures, beyond the life history needs of Chinook salmon, are believed to be the result of past timber management, presence and maintenance of roads in close proximity to lower Deer Creek, and maintenance of a power line corridor in lower Deer Creek by Eugene Water & Electric Board. Further description of spring Chinook salmon habitat requirements are located in the Ball Park Thin Aquatic Specialist Report.

Budworm and County Creeks are described as Bull Trout Spawning and Rearing streams in ODEQ 303d temperature listed waters (exceeding $12^{o}$ C 7-day maximum average). However, based upon geological and hydrological understanding of known bull trout spawning and rearing streams in the upper McKenzie River sub-basin (those tributaries present in High Cascades Geology), the Budworm and County Creek drainages do not naturally provide cold spring-fed conditions necessary for bull trout reproduction. Rather, both tributaries are typical of Western Cascades geology and warmer in stream temperature regime. Further descriptions of bull trout habitat requirements are located in the Ball Park Thin Aquatic Specialist Report.

**Aquatic Habitat Quality**

Deer Creek and tributary channel conditions reflect past timber management and high road density in their aquatic habitat condition. Low in-stream wood volumes, altered sediment storage capacity and aquatic habitat quality are less able to provide for the life history requirements of native aquatic organisms. The existing road system is routing soil to stream channels at higher than natural rate, the road system is in need of repair, upgrading, drainage improvement, closures and decommissioning where necessary to reduce fine sediment delivery rate.

**Endangered Species Act Consultation – Fisheries**

The scale of analysis to address the direct, indirect, and cumulative effects on aquatic resources examined the Deer Creek six-field watershed, evaluated at this scale due to the project footprint and potential effects of project activity downstream. The proposed action was evaluated for potential project effects on the Matrix of Indicators found within the *Biological Assessment for Fiscal Year 2007-2009 Low-Risk Thinning Timber Sales on the Mt. Hood and Willamette National Forest, and portions of the Eugene and Salem Bureau of Land Management*

*Districts* (Appendix B).

These indicators are Temperature, Sediment, Large Woody Material, Peak/Base Flows, Road Density, Disturbance History, and Riparian Reserves. Potential effects occur primarily as a result of timber harvest, road reconstruction, haul and fire treatments. Effects from the proposed action are expected to be negligible due to treatment scale, low severity and proximity of activity to stream channels (as direct and indirect effects).

The project is located in close proximity to Critical Habitat for spring Chinook salmon in lower Deer Creek and the McKenzie River. Assessment of project effects on population, habitat and non-habitat indicators were evaluated to determine project effects on listed species. Although some project activities will have localized and minor negative effects at the site scale, the effects to habitat occupied by spring Chinook salmon (including Critical Habitat for spring Chinook) and bull trout are considered to be either insignificant or discountable, primarily due to project design to minimize negative effects to aquatic species and their habitat. As effects were found to be either insignificant or discountable, the effects determination is described as Not Likely to Adversely Affect listed species; bull trout and spring Chinook salmon. The implementation of this project will not adversely modify habitat important to bull trout and spring Chinook, including habitat designated Critical Habitat for bull trout or spring Chinook salmon.

The ESA effects determination and rationale is described as Not Likely to Adversely Affect and has been found consistent with the *Biological Assessment for Fiscal Year 2007-2009 Low-Risk Thinning Timber Sales on the Mt. Hood and Willamette National Forest, and portions of the Eugene and Salem Bureau of Land Management Districts.* ESA informal consultation was completed with a signature of concurrence from USFWS (April 8, 2008) agreeing with the Forest Service determination that the proposed action was Not Likely to Adversely Affect bull trout, and it would have no adverse modification of Critical Habitat. ESA informal consultation was completed with a signature of concurrence from NMFS agreeing with the Forest Service determination that Ball Park Thin Project (Alternative B, proposed action) was Not Likely to Adversely Affect spring Chinook salmon (April 8, 2008). The quality of Critical Habitat important to listed aquatic species, including spring Chinook salmon and bull trout, is expected to be maintained with implementation of the proposed action or any action alternative.

## Environmental Consequences—Aquatic Resources

Additional description of effects of the proposed action to aquatic resources is located in the Fisheries Programmatic Consultation (Appendix B).

### Alternative A (No Action)—Direct and Indirect Effects

The no action alternative would leave roads untreated, yielding sediment similar to current levels. Project recommendations described would not be implemented. Landscape delivery of fine sediment, as modified by the road network, would remain largely as it is. The current fine sediment delivery rate as modified by the road network would remain within the range of conditions necessary to sustain native aquatic biota. Periodic stream crossing failures may occur at undersized and outdated culverts. Culvert failures may induce stresses on resident fish populations, but not at magnitudes that would be expected to extirpate management indicator species. The effect of no action upon MIS habitat use and distribution in tributaries to Deer Creek or the McKenzie River would be to yield fine sediments similar to current levels, with potential to produce sediment pulses associated with crossing failures. Ground disturbing activities associated with thinning operations, timber haul, temporary road construction, gravel removal and haul from pit locations, and fuels treatment would not occur.

**Alternative A (No Action)—Cumulative Effects**

Alternative A would be expected to function at or near the current level of fine sediment yield, temperature and flow regime, and serves as the baseline/existing condition for comparison to action alternatives. The current road density in the Deer Creek sub-watershed would remain near 3.1 miles per square mile. Road and culvert decommissioning along 0.53 mile of road within the riparian reserve would not occur.

The current fine sediment delivery rate as modified by the road network would remain within the range of conditions necessary to sustain native aquatic biota, but not optimally so. Periodic stream crossing failures may induce stresses on resident fish populations, but not at magnitudes that would be expected to extirpate management indicator species. The effect of no action upon listed species habitat use and distribution in the McKenzie River (with yield of fine sediments similar to current levels) has potential to produce sediment pulses associated with crossing failures. Degradation of habitat quality or loss of habitat use by listed/management indicator species would not be expected through selection of Alternative A, when combined with past, present or foreseeable actions.

**Alternatives B and C—Direct and Indirect Effects**

Habitat of importance to management indicator species could be subjected to short-term increases in turbidity if reconstruction activity were to occur in the immediate vicinity or during wet periods. However, distance of culvert replacements and seasonal restrictions are expected to maintain habitat conditions for aquatic species. Three culverts in close proximity (450 feet and 1,600 feet) to Listed Fish Habitat along Forest Road 2654 and 2655 have potential to yield approximately 1 cubic yard of fill into intermittent channels tributary to Deer Creek. The net effect of road reconstruction activity is to simultaneously reduce road origin fine sediment while replacing undersized and aged culverts. The use of best management practices and mitigation measures to trap fine sediments during culvert replacement is expected to minimize potential impacts to aquatic habitat and resources, with a negligible increase in sources of suspended sediment. A potential 1 cubic yard increase to the existing level of sedimentation in the sub-watershed (estimated annual sediment yield of 8,200 cubic yards) represents a 0.01 to 0.02% increase above current levels. The small potential increase delivered seasonally through intermittent channels would not present a perceptible increase in perennial channels lower in the sub-watershed. A slight potential increase in suspended sediment presents negligible risk to native aquatic biota. Localized increases in turbidity during and following the season of culvert replacement, is believed to remain within the habitat needs of aquatic MIS species. Decommissioning of road surfaces and culvert removal will similarly be required to meet seasonal restrictions, limiting the transmission of fine sediment. A post-project reduction of fine sediment yield following system road upgrades, estimated at 24 cubic yards per year, is expected to present a slight improvement in aquatic habitat quality.

Rock pit use will take place in existing pits located along forest roads. Current stock piles will be utilized with no enlargement or development of existing sites necessary. Approximately 4,000 cubic yards of material will be extracted to use for road reconstruction and maintenance activities. The nearest stream channels to existing pits are over 500 feet away. The potential to transmit fine sediment is minimal.

Road reconstruction and maintenance activities will occur during dry season and will be required to be maintained in stable condition during hauling (mitigations 3 and 4). Combined with improved and new ditch relief placements, the improved transportation system is expected to have negligible effect on aquatic habitat in the immediate vicinity of roads (from reconstruction and haul) and minimal effect on listed species habitat, most of which is 0.5 miles or greater from road locations. Short-term, localized increases in sources of fine sediment would not be discernable over background levels of sediment supply, particularly in perennial, fish-bearing channels located further from reconstruction and hauling activity.

Haul routes in close proximity to Deer Creek are largely paved (lower Forest Road 2654) or are aggregate roads that would be reconstructed to accommodate haul. Portions of the haul route in close proximity to the McKenzie River are paved (lower Forest Road 2654 and Hwy 126) and pose little potential to transmit significant quantities of fine sediment to the McKenzie River. An estimated increase of 7 cubic yards per year during seasons of haul would have negligible effect on aquatic organisms.

Wet season hauling will be allowed only on maintained aggregate or paved roads (mitigation measure 2 and 4) to protect water quality and fish habitat. When roads become excessively dusty, watering of roads is required. The effect to fish-bearing habitat and organisms is negligible and based upon observations during timber harvest operations in similar landforms on McKenzie River Ranger District.

Construction of approximately 3 miles of temporary road would occur only on stable landforms. Where stream crossings are necessary, clean stable fill material will be used. Seasons of temporary road construction are limited to dry season only, to limit potential to transmit fine sediment.

Logging and yarding systems are subject to a variety of restrictions. Soil, Watershed, and Fisheries Protection measures 5–17 are designed specifically to maintain water and habitat quality. The effect of minimizing skyline corridors and requiring riparian corridor trees to be left on site, is to ensure ground disturbance remains insignificant and stream bank stability is maintained. Alternative B and C will utilize 105 skyline corridors over perennial channels, and 31 corridors over intermittent channels.

**Table 24. Skyline Corridors Through Stream Buffers and Proximity to Listed Fish Habitat**

| Unit | Acres by Yarding System | | Skyline Corridors Across Streams | | | |
|---|---|---|---|---|---|---|
| | | | Perennial | | Intermittent | |
| | Grd | Sky | Number of Crossings | Distance to LFH/CH (ft) | Number of Crossings | Distance to LFH/CH (ft) |
| 10 | 12 | 30 | 17 | 33,800 | 3 | 33,800 |
| 20 | 0 | 42 | 0 | N/A | 3 | 29,800 |
| 30 | 0 | 52 | 34 | 29,500 | 4 | 29,500 |
| 40 | 0 | 40 | 2 | 27,200 | 2 | 27,200 |
| 50 | 6 | 0 | 0 | N/A | 0 | N/A |
| 60 | 52 | 0 | 0 | N/A | 0 | N/A |
| 70 | 13 | 26 | 5 | 23,200 | 0 | N/A |
| 80 | 34 | 0 | 0 | N/A | 0 | N/A |
| 110 | 0 | 44 | 23 | 18,900 | 3 | 18,900 |
| 120 | 57 | 0 | 0 | N/A | 0 | N/A |
| 130 | 18 | 0 | 0 | N/A | 0 | N/A |
| 140 | 24 | 5 | 0 | N/A | 0 | N/A |
| 150 | 36 | 8 | 4 | 18,100 | 0 | N/A |
| 160 | 36 | 10 | 0 | N/A | 4 | 18,400 |
| 170 | 37 | 10 | 5 | 19,900 | 7 | 19,900 |
| 190 | 20 | 19 | 0 | N/A | 0 | N/A |
| 200 | 5 | 0 | 0 | N/A | 0 | N/A |
| 210 | 10 | 0 | 0 | N/A | 0 | N/A |

| Unit | Acres by Yarding System | | Skyline Corridors Across Streams | | | |
|---|---|---|---|---|---|---|
| | | | Perennial | | Intermittent | |
| | Grd | Sky | Number of Crossings | Distance to LFH/CH (ft) | Number of Crossings | Distance to LFH/CH (ft) |
| 220 | 24 | 0 | 0 | N/A | 0 | N/A |
| 230 | 11 | 0 | 0 | N/A | 0 | N/A |
| 240 | 43 | 0 | 0 | N/A | 0 | N/A |
| 270 | 14 | 0 | 0 | N/A | 0 | N/A |
| 280 | 0 | 9 | 0 | N/A | 0 | N/A |
| 290 | 51 | 0 | 0 | N/A | 0 | N/A |
| 310 | 27 | 25 | 2 | 13,400 | 3 | 13,400 |
| 330 | 0 | 18 | 0 | N/A | 1 | 2,300 |
| 360 | 16 | 3 | 0 | N/A | 0 | N/A |
| 370 | 38 | 10 | 0 | N/A | 0 | N/A |
| 390 | 22 | 60 | 0 | N/A | 1 | 260 |
| 400 | 0 | 48 | 13 | 32,800 | 0 | N/A |
| **Total** | **606** | **459** | **105** | | **31** | |

Removal of stream adjacent trees includes an increased risk of transporting fine sediments in channels immediate to the corridors. Short-term and local increase in turbidity is expected during the season of yarding. The magnitude of effect is expected to remain within the range of life history needs of aquatic management indicator species. The ability of channels to transport fine sediment to listed fish habitat is limited by proximity to LFH (ranging from 260 feet to 6.4 miles) and mitigations requiring full suspension and retention of corridor trees over channels. In intermittent channels, where full suspension is not possible, yarding is limited to when the stream is dry (mitigation measure 10). These measures are in place to maintain management indicator species habitat located downstream in the sub-watershed.

Fire treatment site conditions (when fuel moisture is sufficient to maintain duff and soil stability) will sufficiently protect aquatic resources in the project area. The potential to increase nutrient levels of phosphorous and nitrate to channels increases with use of fire. However the level of nutrient delivery would not exceed the range of conditions approached during historic fire disturbance. Aquatic species have adapted to a more frequent fire disturbance regime than is currently provided in a managed forest landscape. Removal of duff through burning and exposure of soil to mobilization with precipitation is of very low risk. The potential to adversely affect aquatic biota or habitat is negligible; due to the distance fire is utilized from the channel and low intensity of fire used in unit treatment.

### Alternatives B and C—Cumulative Effects

The current road density in the sub-watershed will remain approximately 3.1 miles per square mile as no new system roads are added and a few are removed (0.53 miles) with the action alternatives.

Reconstruction of system roads in Alternative B and C is expected to withstand flood events through improved ditch relief drainage and up-sized stream culverts which may be expected to be more resistant to culvert related failure (compared to current condition). Both action alternatives would result in a slight increase in sediment input (up to an additional 7 cubic yards per year) in the sub-watershed in the short-term. A less than 4% increase would not be expected to adversely increment this indicator. The expected magnitude and duration of increase (the first fall storm following project activities) is of short duration and within the tolerance of native aquatic organisms to sustain or avoid sediment increase. The range of conditions necessary for aquatic resources in the project sub-watershed is maintained in the short-term, with localized increases perceptible at the site scale, and improved slightly in the long-term.

With the limited extent of disturbance within Riparian Reserves in close proximity to stream channels with the project, existing aquatic habitat conditions are expected to be maintained. As described in previous effects discussion, project effects on shade and water temperature, sedimentation, and stream flows are expected to be negligible at the sixth field watershed scale. Site-specific disturbance may be expected to be of short duration (approximately 3 years, during timber harvest and haul activity) and of insufficient magnitude to place native aquatic organisms at risk.

Following examination of the cumulative effects of past actions, the proposed project, and reasonably foreseeable actions in the analysis area, has determined that the additional management-induced effects from this project would not change the following:

1) The timing or magnitude of peak flow events (planning sub-drainage ARP remain above the Willamette Forest Plan recommended levels);
2) Instability of stream banks (recommended ARP midpoints are exceeded, and exclusion of bank destabilizing activity);
3) Adverse alteration of the supply of sediment to channels (fine sediment supply would be localized and of short duration);
4) Adverse alteration of sediment storage and structure in channels (channel conditions would be maintained with proposed action alternatives).

Blue River and Cougar Dam fragmentation of aquatic habitat in the McKenzie continues to be a major influence on the aquatic landscape and plays a crucial role in at-risk species viability. The Ball Park Thin Project would not incrementally contribute to increased fragmentation of habitat. Upstream passage measures at Cougar Dam are under NEPA evaluation (a trap-and-haul facility with evaluation by Army Corps of Engineers) and may be implemented following ACOE NEPA analysis. A favorable response by Management Indicator Species would be anticipated with reconnection of the South Fork McKenzie River to upstream reaches of the McKenzie River, primarily through population(s) access to historic refuge areas. Other projects are not foreseeable within the Ball Park Thin Project area that would add cumulatively to past and current actions. Habitat conditions necessary to aquatic MIS species (spring Chinook salmon, bull trout, rainbow trout, cutthroat trout) including ESA listed species (bull trout and spring Chinook) habitat in the upper McKenzie River are expected to be maintained within and downstream of the project area.

# Distribution and Amount of Diverse Early Seral Habitat for Wildlife (Significant Issue #2)

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for diverse early seral habitat for wildlife was the Ball Park planning area, as well as the larger Upper McKenzie Watershed and the McKenzie Sub-basin. Effects to early seral habitat quality as it pertains to Roosevelt elk are discussed separately in this Chapter under Elk Habitat.

## Affected Environment—Diverse Early Seral Habitat for Wildlife

Changes in forest management on federal lands within the past 25 years have resulted in significantly less acres in early seral openings. Early seral habitat is still plentiful on private lands adjacent to the Willamette National Forest. However the Willamette National Forest is lacking the quality early seral habitat resulting from natural disturbances such as wildfire and un-natural disturbances such as logging. Diverse early seral habitat has forbs and young shrub components that can be associated with disturbances. It also includes a variability of dead wood structure that is an important component of wildlife habitat. This includes snags and large down logs of various sizes, decay classes, and species. Flowering forbs and shrubs are abundant and provide forage and nectar. Although adjacent private lands consisting of managed plantations temporarily provide early seral habitat, they do not provide the quality nor the duration for longer term early seral habitat because they are being managed for intensive timber production instead of habitat. In addition, the current distribution of early seral habitat is unbalanced in terms of elevation and location. Near the Willamette National Forest, much of the early seral habitat occurs at the lower elevations interspersed and west of the forest boundary, on private land. In 1995 it was projected that creation of early seral habitat would decrease by 50% by 2005 (USDA Forest Service, 1995).

Diverse quality early seral habitat is of key importance to wildlife. This is supported by the Upper McKenzie Watershed Analysis done in 1995, which states that 14% of the wildlife species within this watershed depend on early seral habitat (USDA Forest Service, 1995). This does not take into account the 40% of wildlife species that are classified as generalists or the 5% of species that require edge habitat that use early seral habitat as well. The majority of the early seral species are birds, although several voles and reptiles also require this type of habitat. This habitat was historically produced primarily from fire disturbance. The size and composition of early seral habitat patches varies by vegetation series and topography. Over 40% of early seral species require snags or large down wood for breeding. Early logging from the 1940s through the 1960s usually left abundant amounts of large down wood but not many snags. Later logging practices from the 1960s to the 1980s transitioned to “sanitation” practices which resulted in clearcuts devoid of any large dead wood component. Currently available early seral habitat within the Ball Park project area is only partially effective at being quality diverse habitat. Early seral habitat is present in natural open meadows at the higher elevations of the planning area.

On a broader scale in Oregon and Washington, a total of 156 wildlife species have been documented to depend on early seral habitat (O’Neil et.al 2001). This includes 10 species of amphibians, 88 species of birds, 42 species of mammals, and 16 species of reptiles.

**Table 25. Distribution of Seral Stages within Ball Park**

| Vegetation Stage | Stand age | Acres | % of Planning Area |
|---|---|---|---|
| **Non-forested** | NA | 984 | 7 |
| **Early seral*** | <40 | 3953 | 27 |
| **Mid seral** | 40-79 | 1704 | 12 |
| **Mature** | 80-199 | 1784 | 12 |
| **Older mature/old-growth** | >200 | 6083 | 42 |
| **Total** | >200 | 14,093 | 100 |

* Many of these acres do not consist of diverse quality early seral habitat.

An analysis of early seral habitat by vegetation series in the Upper McKenzie Watershed compared the amount present in the historic reference year 1900 with the year of analysis in 1995. The amount of early seral habitat on the landscape within the Upper McKenzie Watershed was greater in 1995 than in the historic reference year 1900. Only within the Douglas-fir vegetation series was the quantity of early seral habitat considerably lower in 1995 when compared to 1900 (USDA Forest Service 1995). The 2008, levels of early seral habitat across the landscape has dropped further from 1995 and currently represents 27% of the landscape (Table 25). This trend exists on federal lands throughout the Pacific Northwest.

The levels of early seral habitat for Pacific silver fir in 1900 and 1995 are shown in Figure 18 for the Upper McKenzie Watershed Analysis area. Although the figure displays conditions for the entire watershed, it also reflects the condition of the Ball Park Project area. Early seral stages include grass/forb, open sapling/pole, shelter-wood, and shrub conditions. Mid-1 seral includes closed sapling/pole. Mid-2 seral includes open small saw logs and closed small saw logs condition; Late seral includes large saw logs and old growth. The dark solid line in the figures 18-20 (all figures are found in the Upper McKenzie Watershed (USDA Forest Service, 1995)). represents a historical range of variability from 1600 to 1850.

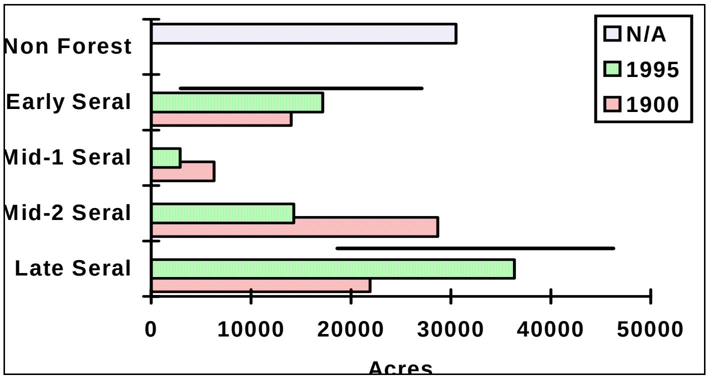



**Figure 18. Acres of Pacific silver fir Seral Stages in 1900 and 1995**

The vegetation distribution shows an increased level of late successional forest in 1995 compared to 1900 in western hemlock (Figure 19). The amount of early seral vegetation in 1995 was twice the level it was in 1900. In 1995, the level of early and late successional forest within the western hemlock vegetation series was within the historical range of variability.

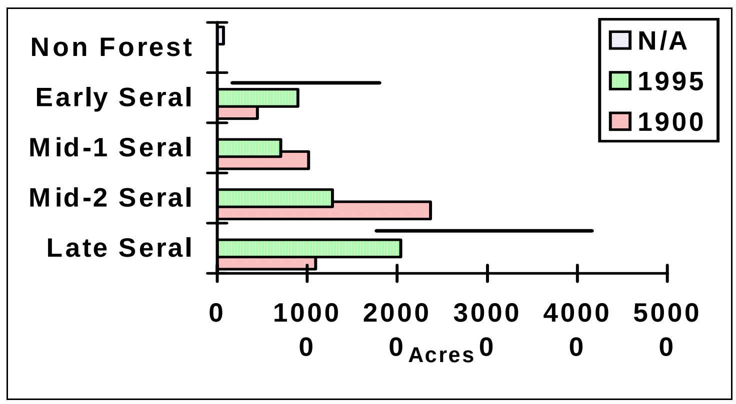
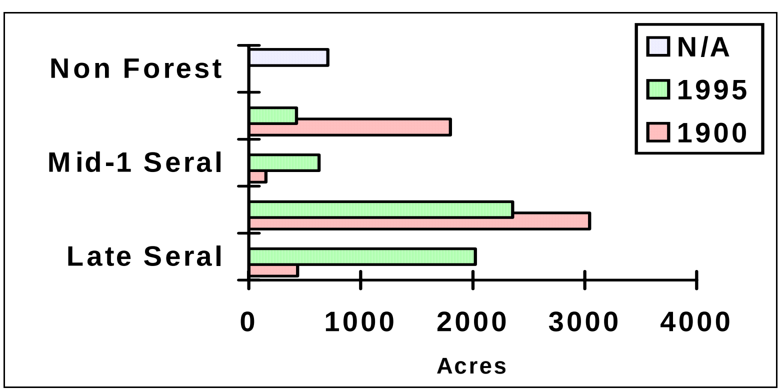



**Figure 19. Acres of Hemlock Seral Stages in 1900 and 1995**




The shift in dominance from mid to late seral in figure 20 corresponds to our era of fire suppression. Historic information on the composition and distribution of vegetation was not compiled specifically for Douglas-fir forests during the Regional Ecosystem Assessment Project (REAP 1993).

**Figure 20. Acres of Douglas-fir Seral Stages in 1900 and 1995**

## Environmental Consequences— Diverse Early Seral Habitat for Wildlife

**Alternative A (No Action)—Direct, Indirect, Cumulative Effects**

Under this alternative, the current amount of diverse early seral habitat in the Ball Park project scale would not change in the near-term future. Natural tree mortality within Ball Park thinning units from root rot pockets or blowdown is not expected to be significant nor likely to produce many openings, resulting in no noticeable change in early seral habitat across the landscape. Risk of stand replacing wildfire on the landscape would not undergo stand stratification for another century or more. A stand replacing wildfire would provide many acres of diverse early seral habitat.

**Alternative B—Direct and Indirect Effects**

Diverse early seral habitat will be created by cutting 1-acre gaps that are distributed across the units in Alternative B. An average canopy closure of 40% will be left on all stands after thinning, post-harvest burning, and snag creation. Canopies are expected to close back in to the current condition within 7-10 years. Prescribed natural fire in two units, totaling 49 acres, may result in minor overstory tree mortality creating some additional small openings. Commercial thinning would provide temporary forage. Thinning would also increase use of the young forests and make them more suitable to a wider range of wildlife species, compared to the current dense closed canopy condition.

| **Some species strongly dependent on diverse early seral habitat are (Altman 1999):** |
|---|
| • Western bluebird – near large snags >40 feet tall suitable for nesting. |
| • Rufous hummingbird – near nectar-producing plants and diverse vegetative structure, especially currant, penstemon, and paintbrush. |
| • Olive-sided flycatcher – near residual canopy trees and large snags. |

Other species that would benefit from increased forage include Roosevelt elk, black-tailed deer, turkey vulture, sharp-shinned hawk, Cooper's hawk, California quail, long- and short-eared owls, Vaux's swift, Anna's hummingbird, rufous hummingbird, as well as the overall avian biodiversity (see Migratory Land Birds section).

**Alternative C—Direct and Indirect Effects**

Diverse early seral habitat would be created using 1 to 3 acre gaps within 151 acres out of the total of 915 acres of thinning units in Alternative C. An average of 30% canopy closure would be maintained on 217 acres with an average of 40% canopy closure remaining on 642 acres of the total acres. The 30% canopy closure would slightly improve early seral wildlife habitat conditions compared to Alternative B. The six units with 30% canopy closure were selected for heavier thinning based on locations in the high emphasis elk management areas, as well as one unit within a moderate elk emphasis area being an expected high quality forage area for elk. These six selected units show high understory vegetation suitability for forage development. The prescribed natural fire units and effects are the same as Alternative B.

**Alternatives B and C—Cumulative Effects**

The analysis area chosen for considering cumulative effects to diverse early seral habitat was the Ball Park Planning Area. Past management activities initially resulted in an abundance of early seral habitat with the many acres of regeneration harvesting that occurred (Figures 20-21). At the time clearcutting resulted in evenaged stands with no snag or large tree retention. Plantations established before the mid 1980s did not contain high levels of structural diversity resulting in a lack of quality early seral habiat. Large snags with remnant under and overstory were rarely retained. In some cases large down wood was left on site which is now in the more advanced decay classes of IV-V. Thinning these plantations now will provide some improvement in structural diversity. The more recent lack of regeneration harvest has allowed the plantations to grow into dense closed canopy stands with less open quality early seral habitat than in the more recent past. The overall impact of the proposed action is that dense closed canopy mid-seral forests would be thinned to a more open condition with small gaps that provide some early seral habitat. These more open habitat conditions are expected to last approximately 7-10 years, depending on the site and final canopy closure. At the present time, there are no foreseeable actions that would modify additional habitat in the Ball Park Planning Area.

# Elk Habitat

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Elk Habitat includes the project activity units and five Emphasis Areas within which management activities would occur. These emphasis areas were used for the scope of analysis because of established ratings for elk habitat as described in the Willamette National Forest Plan Standards and Guidelines. These Emphasis Areas do not include private lands.

## Affected Environment—Elk Habitat

Management objectives for deer and elk habitat apply to specific mapped “Emphasis Areas” within the Willamette National Forest. Each emphasis area has been assigned a rating of high, moderate, or low. Standards and Guidelines for management of these areas were developed in cooperation with the Oregon Department of Fish and Wildlife.

The Ball Park planning area includes portions of five designated emphasis areas: Latiwi, County, Upper Westside, Deer, and Belknap-Paradise Camp (See Figure 21). These areas are managed for elk habitat under guidance from the Willamette Forest Plan Standards and guidelines (FW-137) with the assumption that providing high quality elk habitat would adequately address the needs for black-tailed deer.

### Elk Model for Ball Park Project Area

*A Model to Evaluate Elk Habitat in Western Oregon* (Wisdom 1986) is used to estimate habitat effectiveness (HE), which is defined as the proportion of achievement relative to an optimum condition. The management intent is to maintain effectiveness within a range of values with the optimum value being 1.0. HE incorporates and qualifies four key habitat attributes: size and spacing of forage (HEs), quality of forage (HEf), cover areas (HEc), and open road density through elk habitat (HEr). Each habitat variable is calculated individually and allows for a comparison by variable or as a whole (HEI). The elk model considers past and ongoing activities and results in an evaluation of the cumulative impacts on habitat from the past, present, and foreseeable future actions in the Emphasis areas.

Maintaining a balance between cover and forage areas is a key component of elk habitat management in the Wisdom model. Using tightly controlled experimental conditions, Cook et al.(1998) found that thermal cover did not enhance elk survival and production. They also found that thermal cover was not required by elk where food was not limiting, and could not compensate for inadequate forage conditions. Further research has shown that high summer and fall forage quality is critical to elk reproduction, survival, and population growth and stability (Cook et al. 2004). The increased importance of available forage abundance and quality, compared to thermal cover has also been supported by nutritional and physiological studies of black-tailed deer (Parker et al. 1999).

The Wisdom model was developed to evaluate landscape areas where quality forage areas were provided primarily by clear cutting and associated post-harvest burning and fertilization. With the dramatic decline in regeneration timber harvest under the Northwest Forest Plan, there has been a corresponding decline in high-quality elk forage habitat. This trend, coupled with recent studies, has increased the importance of providing foraging habitat for elk. A drawback of the Wisdom model is that forage is evaluated based on the *average value* of defined forage areas and does not consider the amount of forage provided. Areas that provide meaningful forage are not considered in the forage effectiveness calculations. For example, providing substantial acres of temporarily improved elk and deer forage conditions by commercial thinning may result in a lower forage score in the Wisdom model. Published research supports the idea that increasing the amount of available forage by commercial thinning should improve overall habitat conditions for elk and deer within the analysis area regardless of the average forage value derived from the Wisdom model.

Another example for which the model does not effectively show results due to the averaging nature of the values is for cover values. If thermal habitat is thinned and temporarily loses its' thermal value, the model increases the cover value because a greater amount of remaining cover may be optimal cover (compare Tables 26a and 26b below).

**Table 26a. HEI Analysis for Elk Habitat in the Ball Park Project Area, 1995 and Alternative A.**

| Emphasis Area Name | Emphasis Rating | Results for Each Model Variable | | | | | |
|---|---|---|---|---|---|---|---|
| | | Year | HEs | HEr | HEc | HEf | Overall HEI |
| **Upper Westside McKenzie*** | High | 1995 | 0.82 | 0.49 | 0.47 | 0.42 | 0.53 |
| | | 2008 | 0.71 | **0.32** | 0.64 | **0.39** | **0.49** |
| **Latiwi** | Moderate | 1995 | 0.83 | 0.38 | 0.40 | 0.52 | 0.51 |
| | | 2008 | 0.79 | **0.33** | 0.58 | 0.55 | 0.54 |
| **County/Deer*** | Moderate | 1995 | 0.90 | 0.48 | 0.41 | 0.48 | 0.51 |
| | | 2008 | 0.88 | 0.44 | 0.53 | 0.44 | 0.55 |
| **Belknap-Paradise Camp** | Moderate | 1995 | 0.52 | 0.54 | 0.45 | 0.45 | 0.48 |
| | | 2008 | 0.82 | 0.54 | 0.65 | 0.45 | 0.60 |

*Upper Westside was analyzed with Upper Westside McKenzie which is not within the Ball Park Project Area. The County Emphasis Area was analyzed with the Deer Emphasis Area. Values shown in bold are below recommended minimum threshold levels in the Willamette NF Land Management Plan. Target Levels: **High Emphasis Area Individual Index**: >0.5 Overall index: >0.6 Moderate **Emphasis Area Individual Index**: >0.4 Overall Index: >0.5

Low Emphasis Area Individual Index: >0.2 Overall index: increase any variable <0.2Table 26a displays the condition of habitat values for patch size and spacing (HEs), open road density (HEr), cover quality (HEc), forage quality (HEf), and overall habitat quality (HEI) that existed for big game habitat when the Upper McKenzie Watershed Analysis was conducted in 1995 and also current conditions that existed in 2008.

**Table 26b. HEI Analysis for Elk Habitat in the Ball Park Project Area, Alternative B and C.**

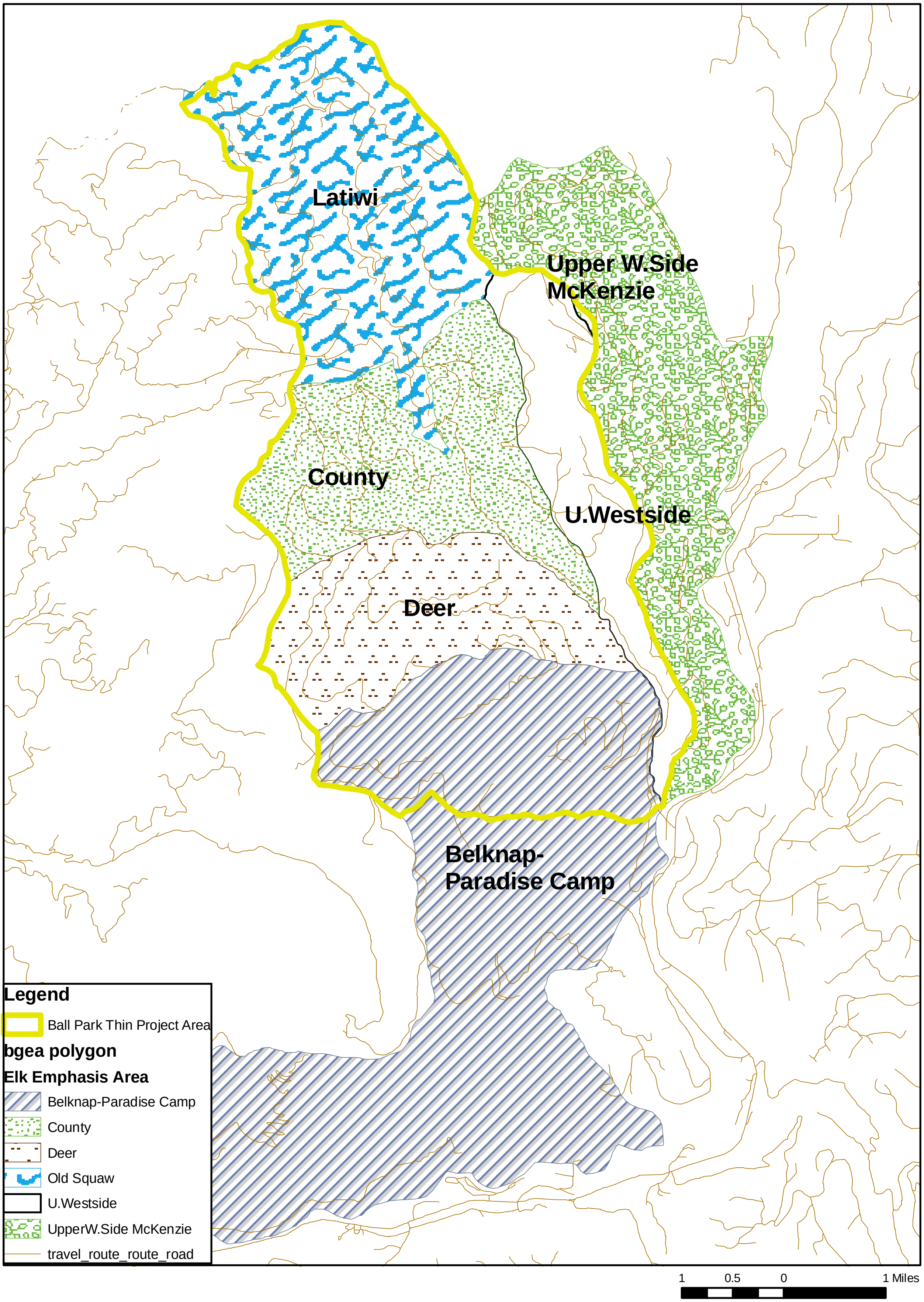
(In most cases values for Alternative C are the same and are only shown as a second value if different)

| Emphasis Area Name | Emphasis Rating | Results for Each Model Variable | | | | |
|---|---|---|---|---|---|---|
| | | HEs | HEr | HEc | HEf | Overall HEI |
| **Upper Westside/Upper Westside McKenzie*** | High | 0.74/0.73 | 0.32 | 0.65 | 0.37/0.40 | 0.48/ 0.49 |
| **Latiwi** | Moderate | 0.93 | 0.33 | 0.60 | 0.27 | 0.47 |
| **County/Deer*** | Moderate | 0.92 | 0.44 | 0.55 | 0.33/0.37 | 0.52/0.53 |
| **Belknap-Paradise Camp** | Moderate | 0.85 | 0.54 | 0.65 | 0.41 | 0.59 |

*Upper Westside was analyzed with Upper Westside McKenzie which is not within the Ball Park Project Area. The County Emphasis Area was analyzed with the Deer Emphasis Area.
Values shown in bold are below recommended minimum threshold levels in the Willamette NF Land Management Plan. Target Levels:
High Emphasis Area Individual Index: >0.5 Overall index: >0.6
Moderate Emphasis Area Individual Index: >0.4 Overall Index: >0.5
Low Emphasis Area Individual Index: >0.2 Overall index: increase any variable <0.2Forage, Hiding, Thermal,

| Summary of Existing Elk Model Variables for the Ball Park Project Analysis Area |
|---|
| • **Size and Spacing of Forage**: The size and spacing habitat effectiveness rating (HEs) for forage and cover in all four elk emphasis areas is excellent. Management goals for size and spacing are currently being met. |
| • **Road Density:** Road densities in two areas are currently adequate with HEr values of County/Deer (0.44) and Belknap-Paradise Camp (0.54). Road densities in the Upper Westside (0.32) and Latiwi (0.33) areas are currently below Forest standards. |
| • **Cover:** The habitat effectiveness value for cover (HEc) in all four elk emphasis areas are excellent and meeting Forest Plan standards. |
| • **Forage:** Forage quality habitat effectiveness ratings (HEf) for Latiwi (0.55), County/Deer (0.44), and Belknap-Paradise Camp (0.45) areas are currently meeting Forest Plan standards. The Upper Westside (0.39) emphasis area is currently below Forest Plan standards. |
| • **Habitat Effectiveness Index (HEI):** The overall ratings of (HEI) indicate that three emphasis areas are currently above Forest plan standards: Latiwi (0.54), County/Deer (0.55), and Belknap-Paradise Camp (0.60). The overall HEI rating for Upper Westside (0.49) is currently below Forest Plan standards. |

**Figure 21. Elk Emphasis Areas in the Ball Park Thin Project Area.**



### Optimal Cover and Road Densities

Past harvest activities have shaped the landscape in terms of the types of elk habitat. Harvest treatments were primarily regeneration, which included clearcuts and shelterwoods. These harvested units once provided a wealth of quality forage for elk but have since grown into hiding and thermal cover. No specific data is available for the local elk/deer population within the five Emphasis Areas that this project overlaps. Current ODFW biological data are not sufficient to provide an accurate estimate of the black-tailed deer population in western Oregon (ODFW 2002). Recent ODFW elk population estimates show that the state management unit in vicinity of the project area (McKenzie) has elk herds with population numbers near their current management objectives (Bill Castillo pers com; ODFW 2005).

## Environmental Consequences—Elk Habitat

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Current trends of elk habitat development would continue to occur naturally over time with Alternative A. Existing elk foraging habitat within open plantations may continue growing denser into hiding cover and then to thermal cover. Some of the current foraging habitat areas are in higher elevation frost pockets that may be maintained in a long-term foraging habitat condition. Meadow habitats may undergo slight levels of tree encroachment. With Alternative A, the current elk effectiveness ratings would not change significantly within the next few decades.

In ten years, some forage availability would be expected to decrease in this area as current harvest openings grow into hiding cover. In the absence of additional harvest or wildfire, no new foraging areas would be created. The current optimal and thermal cover would not significantly change. In 50 years, approximately 30% of the existing thermal cover would shift into optimal cover. Road density and big game security would not change. Overall habitat quality may decrease from the loss of forage. No foreseeable timber or fuels management activities are scheduled to occur in the analysis area that could contribute to incremental cumulative effects on elk habitat.

### Alternative B —Direct and Indirect Effects

The proposed thinning (915 acres) for the Ball Park Project would change the function of elk habitat from thermal cover to mostly lower quality thermal cover that contains small inclusions of forage areas. Opening of the canopy is expected to temporarily improve understory shrub and forb development by increasing sunlight within stands. Small one-acre gaps within thinning units would provide small forage openings (129 acres) scattered across the units. Forage quality would be highest within the gap centers to the north of the clearing where the most sunlight would encourage forb and shrub development. Gaps should try and be placed in southern facing aspects to increase sunlight within the openings. Forage quality along gap perimeters would be lower due to increased shade. Thermal habitat quality in these 40 year old plantations is currently moderately low due to the young age of the stands. After thinning to an average of 40% canopy closure thermal habitat quality would be low for several years, and is expected to fully recover when the canopy again closes in approximately 7-10 years. At this time, thermal habitat quality would be improved slightly compared to before thinning since trees would have been released growning taller and larger canopies. Additional understory development would also benefit thermal habitat quality.

Forage values with Alternative B show a reduction in all four emphasis areas. In reality, forage values would temporarily increase due to increased sunlight from canopy thinning, however the forage habitat in the thinning would be relatively short lived. Gap forage values may remain higher longer, depending on tree regeneration within created gaps.

**Alternative C—Direct and Indirect Effects**

With Alternative C, effects will be similar to Alternative B. The difference is in a higher acreage of forage gaps totaling 151 acres which will better benefit elk and other species that depend on early seral habitats. In addition, six units totaling 217 acres will have more intensive thinning treatments resulting in 30% average canopy retention. These units were selected based on the excellent potential they offer for improved understory forage development.

Elk Model results for Alternative C show a small improvement in forage values for both the Upper Westside and County/Deer emphasis areas compared to Alternative B (Table 26b). This slightly increases overall HEI scores by 0.01 for both the Upper Westside and County/Deer emphasis areas. In addition, the Size and Spacing variable in the Upper Westside emphasis area shows a decrease from 0.74 to 0.73. Other values within the elk model for Alternative C are identical to those for Alternative B.

**Alternatives B and C—Direct and Indirect Effects**

The proposed road decommissioning of 0.53 miles may benefit elk and other wildlife species susceptible to human disturbance by more permanently blocking off access. Both roads (2654-795 and 2654-812) are currently bermed and not driveable. Decommissioning will reduce or eliminate soil compaction to better allow establishment of herbaceous forage until trees colonize the former road surface. Potential disturbance to elk and other wildlife species in the Ball Park Project area would temporarily increase during implementation of this project due to additional miles of temporary roads and increased traffic to access thinning stands. However, all these temporary roads would be closed once the activaties are completed. The Elk Model road densities would not change.

The proposed prescribed burning of two stands totaling 49 acres would slightly reduce thermal cover quality for several years due to opening of the canopy and expected tree mortality. Burning may create small understory forage patches of high value to elk and other early seral wildlife species. This would slightly improve forage habitat quality in the County/Deer Emphasis Area.

**Alternatives B and C—Cumulative Effects**

Past management activities initially resulted in an abundance of forage habitat with the many acres of regeneration harvesting that occurred. The more recent lack of regeneration harvest has allowed these forests to grow into hiding and thermal cover to create the current condition represented by the no action alternative in Table 26a. The overall impact of the proposed action is that thermal cover in treated stands would be changed to lower quality thermal cover, hiding cover, or forage, which again according to Cook et al.(1998), thermal cover did not enhance elk survival or production. There are no foreseeable actions that would modify habitat in these Elk Emphasis Areas.

#### Alternatives B and C—Conclusions

Proposed activities would increase habitat quality for elk and deer in all five Emphasis Areas. Open road densities would not change in the long-term. Forage quality would noticeably increase on the 129 acres gaps in Alternative B and 151 acres gaps with 217 acres of 30% canopy retention thinning in Alternative C. Beneficial effects to elk and other early seral species' forage from thinning and prescribed burning are not expected to be reflected in individual or overall habitat effectiveness values in the elk model given that the majority of acres would remain in a thermal cover classification under both Alternatives B and C. A limited number of animals would benefit from the small-sized openings that would be created by the project, so there would be little potential for any noticeable population response as a result of the proposed actions. Project effects to elk and deer are essentially unquantifiable on an individual basis relative to the amount of habitat modified or disturbed against the amount available to these species on a daily basis in the affected Emphasis Areas. Direct and indirect effects are largely limited to potential temporary displacement of individuals during implementation of proposed activities. Short and long-term increases in forage habitat would be evident within the project area. In the context of the Emphasis Areas and adjacent $5^{th}$ field watersheds, project effects would result in a minor contribution to cumulative effects that have already occurred from past management actions surrounding the project area. Given what is currently known about local deer and elk populations, the future viability of these species is assured as long as habitat restoration opportunities continue to be implemented – especially when conducted at an appropriate scale.

# Threatened Northern Spotted Owl

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for threatened northern spotted owl was a 1.2 mile radius buffer around all project units that may alter habitat conditions for the spotted owl. The analysis area is within the H.J. Andrews northern spotted owl demographic study area where monitoring of owl populations has occurred since 1987 (Anthony et al. 2006). Occupancy modeling by USFWS predicted no new home ranges undetected by surveys, thus this effects analysis is based on actual survey data.

## Affected Environment—Threatened Northern Spotted Owl

The northern spotted owl is considered a Management Indicator Species (MIS) for old growth habitat in the Willamette Forest Plan (USDA Forest Service 1990) and represents the 4% of wildlife species associated with late seral forests (USDA Forest Service, 1995). Past surveys for spotted owls have documented ten spotted owl activity centers within 1.2 miles of project units. All ten spotted owl activity centers have established, 100-acre late successional reserves. Effects not specifically discussed here pertaining to new threats to the spotted owl (USDI 2004, Anthony et al. 2004, Courtney et al. 2004) such as wildfire, west Nile virus, and barred owls are further discussed in the Biological Assessment in Appendix D.

Challenges to spotted owl conservation are wide ranged, which includes potential threats from wildfires, barred owl competition, great horned owl predation, West Nile Virus and sudden oak death. A detailed discussion of these potential threats can be found in the Biological Assessment in Appendix D. Disturbances on the landscape from wildfires and wind storms have affected spotted owl habitat. Loss and fragmentation of suitable spotted owl habitat and other interior forest species' habitat in this planning area have had detrimental effects on this species. Fragmented habitat increases flight distance and energy consumption for foraging, and increases habitat suitability for predatory and competitive owls such as great horned and barred owls. This fragmentation may increase spotted owl mortality, especially for juveniles.

The U.S. Fish and Wildlife Service has determined that reduction of suitable spotted owl habitat below 40% of the median home range (1,182 acres) has a notably higher likelihood of leading to disruption of essential breeding, feeding, and sheltering behaviors (USDI Fish and Wildlife Service, 1992). A 1.2-mile radius around the activity centers defines the median home range in the Oregon Cascades (Thomas et al. 1990). Eight of the ten known activity centers in the Ball Park Project area are currently above the 40% habitat threshold.

Suitable spotted owl habitat has been defined in various documents: The ISC Report, USFWS Critical Habitat Determination, Memorandum Decision and Injunction for Judge Dwyer's Decision, and the FSEIS on Management of the Northern Spotted Owl in the National Forests. General guidelines for suitable spotted owl habitat are forested stands of Douglas-fir, Western hemlock, Western redcedar, or Ponderosa pine older than 200 years and having a moderate to high canopy closure of 60-80%. An understory of multi-layered conifers and hardwoods open enough to still allow owls to fly within and beneath it. Moderate to high snag densities, and large logs are also found in typical spotted owl habitat. However, all of the above characteristics do not need to be present for spotted owls to make use of an area, and for habitat to be determined suitable.

Dispersal habitat typically does not contain large, old-growth nest trees, a multi-layered canopy, or many large snags and logs. The minimum canopy closure for dispersal habitat is 40%. Past logging activities in the Ball Park Project area have removed many acres of spotted owl habitat. Remaining suitable habitat in the project area is now fragmented, lowering the overall quality of habitat on the landscape.

## Environmental Consequences—Threatened Northern Spotted Owl

The Ball Park Project would not downgrade or remove existing suitable spotted owl habitat, which consists of nesting, roosting, and foraging habitat. Acres that were consulted on in the BA to consider the effects of this project on the northern spotted owl were higher than those which are being proposed for treatment within this EA. After preparation of the BA in February 2008, additional acres were dropped from the Ball Park Thin project which decreases overall effects. Dispersal habitat would be modified with Alternatives B and C. Alternative C only would remove 217 acres of dispersal habitat. Within the analysis area, dispersal habitat is not limited within and between home ranges. The following definitions apply to these terms:

- **Downgraded:** to alter the functionality of spotted owl suitable habitat so that the habitat no longer supports nesting, roosting, and foraging behavior. This downgrading of habitat can result when the canopy and understory are thinned yet still retain a minimum of 40% average canopy closure.
- **Removed:** to alter suitable spotted owl habitat so that the habitat no longer supports nesting, roosting, and foraging behavior. In addition, to alter dispersal habitat so that canopy cover results in less than 40 percent and no longer functions as dispersal habitat.

Effects on habitat are in compliance with Standards and Guidelines from the Willamette National Forest Plan and U.S. Fish and Wildlife Service guidance. All sites at risk from noise disturbance would be protected with seasonal restrictions. None of the proposed project units are located in Critical Habitat or within Late Successional Reserves.

Informal consultation with the U.S. Fish & Wildlife Service for effects to the northern spotted owl was initiated with a Biological Assessment submitted on February 29, 2008 for potential effects to terrestrial species from four vegetation management projects on the Willamette National Forest. Ball Park was one of these projects. At issue in this consultation were the effects from four vegetation management projects on the Willamette National Forest (WNF) that may effect northern spotted owls and critical habitat. The Biological Assessment (Appendix D) contains an analysis of spotted owls including effects of project related activities. A letter of concurrence dated April 4, 2008 was received from the U.S. Fish and Wildlife Service that concurred with the Biological Assessment that the Ball Park project may affect, but is not likely to adversely affect spotted owls and spotted owl critical habitat (FWS *reference*: 13420-2007-I-0038).

**Alternative A (No Action)—Direct, Indirect, Cumulative Effects**

Under this alternative, no actions would be implemented that change spotted owl nesting, roosting or dispersal habitat. Forest stands in the area would continue to grow following natural successional pathways. Fragmented forest blocks would aggregate into contiguous forest over time. Trees within younger stands would thin out naturally over a span of several decades, and may reach low quality spotted owl foraging habitat suitability in approximately 50 or more years. Due to the previous clearcuts and relatively tight spacing in plantations, tree diameter growth would be slower than with thinnings. Self-thinning would take place over time mostly due to tree competition, some wind throw, and from root rot which currently exists in the area. Down wood would be provided as tree mortality occurs, which contributes to maintaining the spotted owl prey base.

The Sweet Home Ranger District which is located just north of the Ball Park project area is currently planning the Parks Smith timber sale. This project would remove additional dispersal habitat from spotted owl home ranges on the north end of the planning area and may be implemented during the same timeframe as the Ball Park project. Spotted owl dispersal habitat connectivity would remain adequate with implementation of this project because dispersal habitat functionality in thinned units would be maintained with a 40% canopy closure.

**Alternatives B and C—Direct and Indirect Effects**

This project proposes no habitat modification activities in Critical Habitat Units. Approximately one mile of road reconstruction (no habitat modification) may occur in CHU OR-16. Underburning with no other treatment is proposed on 49 acres of suitable spotted owl habitat within the Matrix and AMA land use allocations to reintroduce fire back into the ecosystem.

The introduction of prescribed fire into older, suitable spotted owl habitat may reduce the long-term risk of stand-replacing fires across the landscape. The 49 acres is not within any spotted owl core area, known or predictive site. Additionally these areas will be spring burned to retain large coarse woody debris. The proposed underburning is expected to open the forest canopy slightly which may encourage use of these stands by raptors that may compete with spotted owls. In the long term, when these stands undergo further structural development, they may become more suitable for spotted owls and their prey.

Three of the existing rock sources that would be used are within the disturbance/disruption distance of a known or predicted owl site and will have seasonal restrictions applied for blasting, as needed. No spotted owl habitat would be altered or removed. Subsurface blasting, rock crushing and use of heavy equipment for loading rock would occur. Since no habitat would be altered, use of these rock sources would have no effect on the habitat of spotted owls.

There are no proposed activities in spotted owl Critical Habitat Units other than minor road reconstruction for the haul route. Although hazard trees and brush will be removed, the functionality of the habitat will be maintained.

**Alternative B—Direct and Indirect Effects**

No suitable spotted owl habitat would be downgraded or removed.with the implementation of alternative B. In this alternative 915 acres of owl dispersal habitat would be thinned, without the use of helicopters. The functionality of the habitat will be maintained post treatment since the stands will retain a canopy cover of at least 40 percent, retention of large down wood and retention of hardwoods. These are all elements positively associated with dispersal habitat and spotted owl use. These stands contain few (if any) large snags at the present time. Some may be lost due to safety hazards at the time of logging, while others may be created as a result of post-harvest underburning. Canopy closures of the thinned stands are expected to close back in to current conditions within approximately 7-10 years (Chan et al. 2006)

**Alternative C—Direct and Indirect Effects**

No suitable spotted owl habitat would be downgraded or removed with the implementation of alternative C. 217 acres of dispersal habitat in 6 units would be thinned down to 30% canopy closure. None of these units are located in Critical Habitat. Canopy closure is expected to recover and exceed the 40% required threshold for dispersal habitat suitability within 7-10 years. An additional 698 acres would be thinned to an average of 40% canopy and maintain spotted owl dispersal habitat functionality.

**Alternatives B and C—Cumulative Effects**

The analysis area chosen for considering cumulative effects on spotted owls was a 1.2 mile radius buffer around all project units that may change habitat conditions for the spotted owl. Ten spotted owl home ranges overlap proposed project activity units. The changing trend in timber management occurring within the past decade, and projected for the future, should positively influence occupancy of suitable habitat for northern spotted owls as previously harvested stands within the Deer Creek and other adjacent watersheds redevelops. More emphasis is placed on recruitment of key structural components missing from harvested stands as well as retention of key structural components present in unharvested stands and restoration/maintenance of special habitats as key components of biodiversity at a landscape level.

The Biological Assessment found in Appendix D contains a detailed analysis of spotted owls. Past timber harvest resulted in the removal or fragmentation of many acres of suitable spotted owl habitat since the 1940s. At the present time, some of the previously managed stands are currently providing dispersal habitat conditions. Other stands are still too young with tree diameters that are too small to be considered dispersal habitat at this time, but they will grow into dispersal habitat over time.

Alternative B, the proposed action, would not remove suitable or dispersal spotted owl habitat. While canopies will be more open in the short-term. Long-term habitat conditions will improve with larger tree sizes and increased structural diversity. This is also the case for the two mature stands where fire is proposed as the only treatment. The projected overstory tree mortality of approximately 10% is expected to enhance structural habitat conditions within those stands for spotted owls and their prey. The USFWS has concluded that this proposed action, would not jeopardize the continued existence of the spotted owl.

One foreseeable future project is being planned in the 6$^{th}$ field watershed just north of the Ball Park project area. The Parks Smith Thinning Project is proposed on 1,291 acres in Matrix (918 acres dispersal habitat and 370 acres non-habitat) and Administratively Withdrawn Areas. Functionality of this habitat will be maintained because the post treatment stands are being planned to maintain a canopy of at least 40 percent, retention of snags (especially large diameter snags), retention of large down wood, and retention of hardwoods. These are all elements positively associated with dispersal habitat and spotted owl use. While the Parks Smith Thinning Project may be implemented during the same timeframe as Ball Park, it will also include seasonal operating restrictions to minimize effects to spotted owls during the critical breeding season. There is the potential that even with seasonal operating restrictions around nesting spotted owl pairs, owls present in this larger landscape area of both Ball Park and Parks Smith may be impacted by noise disturbance outside the nesting season on a larger scale. This could lead to increased energy needs and behavior modifications, temporarily affecting their fitness. In addition, thinning of stands in both projects combined may over the long-term benefit the structural development of spotted owl dispersal habitat on this landscape, while it may also temporarily increase habitat suitability for competitive raptors such as great horned or barred owls on a larger scale than if only one of these projects was being implemented throughout a longer timeframe.

# Sensitive Species

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Threatened, Endangered, and Sensitive Species includes the project activity units and Forest Service lands within the Deer Creek 6th Field sub-watershed.

## Affected Environment—Wildlife

Sensitive species have specific requirements under the Willamette National Forest Plan to maintain viability. Protection includes managing habitat to minimize impacts, as well as prohibition of noise disturbance during the breeding season.

Table 27 lists the sensitive wildlife species on the Willamette National Forest (USDA Forest Service, 2004) and whether there is potential habitat in the planning area. Additional detailed information about these species is in the Appendix D Biological Evaluation for Wildlife.

## Environmental Consequences—Wildlife

### Alternative A—Direct, Indirect, and Cumulative Effects

Under this alternative, no actions would be implemented to change sensitive species breeding, foraging or dispersal habitat. Forest stands in the area would continue to grow following natural successional pathways. Fragmented forest blocks would aggregate into contiguous forest over time. Trees within younger stands would thin out naturally over a span of several decades. Due to the previous clearcuts and relatively tight spacing in plantations, trees would grow slower in diameter than if thinning were to occur. Self-thinning would take place over time mostly due to tree competition, some wind throw, and root rot over time. Snags and large down wood would accumulate as tree mortality occurs. No foreseeable timber or fuels management activities are scheduled to occur in the analysis area that could contribute to incremental cumulative effects to sensitive wildlife species.

### Alternatives B and C—Direct and Indirect Effects

Ball Park Alternatives B and C meet all applicable Standards and Guidelines from the Willamette National Forest Plan and the Northwest Forest Plan Standards and Guidelines. Under Alternatives B and C, changes in the amount or characteristics of required habitat for sensitive species that may occur in the area would be minimal, and therefore maintain persistent populations. Potential effects and impacts of action alternatives of the Ball Park Project on sensitive wildlife species can be found in the Biological Evaluations in Appendix D.

### Alternatives B and C—Cumulative Effects

The wildlife species listed as MIS for the Willamette National Forest which are known or suspected to be present in the project area are discussed elsewhere in this EA. Cumulative effects on deer and elk are also discussed above. There would be minimal additional incremental effects from Alternatives B and C on sensitive species including their habitat within the project area, when considering the effects from all past actions. There is no foreseeable future habitat management actions planned within the Ball Park project area that would add to cumulative effects of the past or action alternatives.

**Table 27. Potential for Occurrence of Sensitive Species in the Project Area**

| Species | Habitat Present in the Ball Park Project Area? |
|---|---|
| ***Amphibians and Reptiles*** | |
| *Oregon Slender Salamander* | Yes |
| *Cascade Torrent Salamander* | Yes |
| *Foothill Yellow-legged Frog* | No |
| *Oregon Spotted Frog* | No |
| *Northwestern Pond Turtle* | No |
| ***Birds*** | |
| *Least Bittern* | No |
| *Bufflehead* | No |
| *Harlequin Duck* | Yes |
| *Northern Bald Eagle* | No |
| *American Peregrine Falcon* | Yes |
| *Yellow Rail* | No |
| *Black Swift* | No |
| *Tri-colored Blackbird* | No |
| ***Mammals*** | |
| *Baird's Shrew* | Yes |
| *Pacific Shrew* | Yes |
| *Wolverine* | Yes |
| *Pacific Fisher* | Yes |
| *Pacific Fringe-tailed Bat* | Yes |
| ***Mollusks*** | |
| *Crater Lake Tightcoil* | Yes |
| ***Invertebrates*** | |
| *Mardon skipper* | Yes |

## Affected Environment— Sensitive, Rare, and Uncommon Plant Species

The Forest Service manual gives direction to ensure the viability of sensitive botanical species as well as preclude trends toward endangerment that would result in the need for Federal listing (Forest Service, 1991). There are no listed Threatened or Endangered plant species on the Willamette National Forest. Other rare plants, often not associated with older forests, are compiled on the Regional Forester's Sensitive Species List for the Willamette National Forest. These species and their habitats are often rare and limited in distribution.

During the early stages of project development, a pre-field review determined which sensitive species occur in the Ball Park Thin Project area. The pre-field review identified known populations of Thompson's mistmaiden (*Romanzoffia thompsonii)* along Forest road 2654. From there, intuitive-controlled field surveys conducted during June and July of 2007 investigated potential habitat of sensitive plants. Aside from the aforementioned sensitive plant, subsequent surveys identified an additional sensitive lichen species, and other unique special habitats in the project area. See Table 28.

**Table 28. Sensitive Species in the Ball Park Thin Project Area**

| Proposed Units | Sensitive Species | Buffer |
|---|---|---|
| 280 | *Nephroma occultum* | 180 ft. |
| 370, 390 | *Tetraplodon mnioides* | 180 ft. |
| 280 | *Romanzoffia thompsonii* | 360 ft. |

## Environmental Consequences—Sensitive, Rare, and Uncommon Plant Species

### Alternative A— Direct and Indirect Effects

This alternative would have no direct or indirect effect on sensitive plants or rare botanical species. There would be no ground-disturbance or disturbance of the microclimate with this alternative.

Selecting Alternative A may have potential adverse effects on certain species of sensitive fungi. Without management action, downed wood accumulation would likely increase over time. Landscapes with heavy fuel loads are at greater risk of high-intensity, stand replacing fires. As a result, high intensity fire is more likely to sterilize the soil, thus destroying fungal spores and mycelium found in organic mater on the surface and uppermost soil horizons.

### Alternatives B and C—Direct and Indirect Effects

No direct or indirect effects on sensitive plants or rare botanical species are expected with either action alternatives. All known sensitive plant occurrences have been mapped and would be protected with the *no-disturbance* buffers identified in Table 29 in order to maintain the viability of the populations. The buffers would maintain the microclimate for those species requiring cover or moisture retention and aid in protecting other species from physical damage during project implementation. This buffer applies to all harvest activities, ground disturbing activities, and fuels treatments.

Fungi are difficult to identify in the field, often requiring chemical and microscopic spore analysis. Apart from taxonomy, fungal relationships in ecosystems and seemingly sporadic fruiting from year to year add to the complexity of fully understanding these organisms. Direct effects to fungi (mycelial disruption) may result from either action alternative due to soil compaction, loss of host trees and underburing. Changes in microclimate from thinning would potentially have some indirect effect to unknown fungi species in the planning area.

Alternative C would have the greatest risks to unknown fungi species because it proposes more acreage in group selects then Alternative B. However, neither alternative proposes a level of thinning that would completely alter the forbs and shrub composition of the forest floor. Sunlight would be greatest in the group select units, but the change in temperature would decrease over time as the canopy begins to close.

There is moderate risk of direct and indirect effects to fungi with either alternative. It is not feasible to collect site-specific information on the cobweb-like filaments, found throughout the various soil horizons, which make up the fungi's mycelium. As such, it is not feasible to develop and implement mitigation measures to reduce impacts for most rare and uncommon fungi. In conclusion, since suitable habitat exists throughout the Ball Park Thin planning area for many rare or uncommon fungi, it is assumed that there would be some degree of impacts.

Canopy removal may have an effect on fungi that are sensitive to microclimatic change. Subsequent slash pile/fuels treatments have potential to affect some fungi species in the Ball Park Thin project area. Without knowing the presence or absence of these fungi, a reasonable assumption is that there may be some localized effects to them from timber felling, yarding and fuels treatments. However, these actions have a low risk of adverse effects to sensitive fungi and are not likely to cause a trend toward federal listing of a particular species. For further information on botanical resources, see the botanical resource report in Appendix C.

#### All Alternatives (A, B, and C) – Cumulative Effects

The analysis area for sensitive and rare botanical species cumulative effects is the Ball Park Thin Project area. There are no planned activities adjacent to the analysis area, therefore actions beyond this analysis area would have no effect on sensitive species, or other rare botanical species potentially located in the Ball Park Thin analysis area.

Implementation of the proposed action or any action alternatives would have no cumulative effect on sensitive plants in the project area because of the buffer and no-disturbance mitigation. Based on the analysis of this project there would be no incremental change to existing populations of sensitive species or other botanical species in the project area due to selecting any alternative detailed in the Ball Park Thin EA. Despite limitations in survey reliability, the risk of the proposed project activities endangering the viability of sensitive fungi species is low.

## Affected Environment—Special Habitats

Special habitats are non-forested habitats that are limited in size and distribution across the landscape. It is important to consider the biological diversity and ecosystem function of these small, scattered habitats for a number of reasons. Special habitats often play important roles for not only full-time wildlife residents of the sites, but also for those who use them seasonally, or for only a portion of their life cycles. Numerous factors contribute to the creation or maintenance of special habitats. Among such factors, topography and hydrology often determine the microclimatic conditions at these sites.

Numerous special habitats were located in the Ball Park Thin project area during summer 2007 surveys. They range in size from 2 to 10 acres. The special habitats documented in the Ball Park Thin project area and the buffer sizes recommended in the Willamette National Forest Special Habitat Management Guide (J.Dimling and C. McCain, 1996) are presented in Table 29.

**Table 29. Special Habitats in the Ball Park Thin Project Area**

| Proposed Units | Special Habitat | Buffer |
|---|---|---|
| 390 | Rock outcrop | 180 ft. |
| 380 | Rock outcrop | 180 ft. |
| 130 | Swamp | 1 acre |
| 140 | Wet meadow | 1 acre |
| 150 | Seep | 1 acre |
| 180 | Rock outcrop | 180 ft. |
| 170 | Wet meadow | 1 acre |
| 240 | Rock outcrop | 180 ft. |

## Environmental Consequences—Special Habitats

#### Alternative A—Direct, Indirect, and Cumulative Effects

Selecting the No-Action alternative would allow for the same level of special habitat management annually programmed. This alternative would have no adverse effect on special habitats.

#### All Alternatives – Cumultive Effects

The analysis area for special habitat cumulative effects is the Ball Park Thin Project area. This area was chosen because activities outside the analysis area would have no effect on special habitats located within the project analysis area.

Implementation of the proposed action or any action alternatives would have no cumulative effect on special habitats in the project area because of the buffer and no-disturbance mitigation. Based on the analysis of this project there will be no incremental change to existing populations of special habitats in the project area as a result of selecting any alternative detailed in the Ball Park Thin EA.

#### Alternatives B and C—Direct and Indirect Effects

The action alternatives would have no direct or indirect effects on special habitats. Special habitats would also be buffered from harvest and ground disturbing activities. These buffers would maintain the microclimate, hydrology, and prevent damage to the areas during project implementation. Without the buffer and no-disturbance mitigation, reduced cover could potentially decrease humidity and increase temperature earlier in the growing season, thus altering habitat viability.

# Migratory Land Birds

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Migratory Land Birds includes the project activity units and the Deer Creek 6th Field sub-watershed, which is also the Ball Park Project area.

## Affected Environment—Migratory Land Birds

Altman and Hagar (2007) identify 93 bird species in the Pacific Northwest that regularly breed in conifer forests less than 60 years of age. Over half of these species are experiencing population declines. Thinning generally does not change habitat conditions so dramatically that bird species can no longer use the stand, but often temporarily increases or decreases bird abundance depending on species. Altman and Hagar (2007) summarize studies showing 21 species of migratory birds whose range overlaps the project area increasing in abundance following forest thinning treatments. Seventeen migratory bird species did not change in abundance or had mixed responses in thinned forests, while 7 species generally decreased in abundance, at least temporarily, after thinning. Silvicultural treatments that promote understory shrub development, trees species diversity, deciduous trees, and the growth of larger trees; maintain snags and downed logs; and create gaps in the stand generally improve avian biodiversity. Thinning has not been shown to have long term effects on any sensitive bird species or species of special concern.

## Environmental Consequences—Migratory Land Birds

#### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Alternative A would not alter habitat conditions for migratory landbirds. Existing vegetation conditions would continue to follow natural successional pathways, and bird populations would respond accordingly. While no snag habitat used by certain species of migratory land birds would be lost due to roadside hazard tree removal, no snag habitat would be created within forest stands where it is currently at extremely low densities, or non-existent. Additional snag habitat would be created through natural mortality in forest stands which are currently at low densities. Alternative A would have no direct, indirect, or cumulative effects on habitat of migratory landbirds in the project area.

**Alternatives B and C—Direct and Indirect Effects**

Felling of trees within plantations or along roadsides associated with this project may unintentionally affect habitat for individual migratory birds, but is not expected to have a measurable effect on their overall habitat or populations because of the limited extent of habitat removal. Thinning in young stands and prescribed fire in mature stands may impact habitat for certain species such as Hutton's vireo, golden-crowned kinglet, hermit thrush, and Swainson's thrush by reducing suitable habitat. There would be areas of no harvest, such as buffers of special plant habitats or specific riparian areas, within some of the proposed stands providing potentially less impact.

Species that use early seral stages, such as the winter wren, American robin, and grouse, may benefit from thinning harvest treatments, especially the small gaps. Species which would increase in number as a result of thinning include Dark-eyed junco, Warbling vireo, American robin, Hairy woodpecker, Townsend's solitaire, Evening grosbeak, Western tanager, and Hammond's flycatcher (Hayes, J. et al. 2003).

Snag habitat which may be used by migratory land birds such as western bluebirds or swallows, would be lost due to roadside hazard tree removal under Alternatives B and C. However, snags would be created in some thinning units from the post-harvest burn, as well as throughout the 49 acres of natural fuels underburn. It may take approximately ten or more years before these created snags become functional, although increased insects on these dead trees may increase bird foraging habitat within only a few years.

Spring burning may impact nesting land bird species by leading to nest failure or individual mortality. Species most affected would be those birds which nest relatively low to the ground such as hummingbirds, flycatchers, warblers, sparrows, and thrushes. Most migratory land birds generally fledge in June or July, although this can be later when second nest attempts are made. Juveniles of some species may not be able to fly long distances until late summer, however, many species are independent much earlier and would be able to escape a fire and smoke situation that could harm them.

Alternative B and C would change migratory land bird habitat by thinning 915 acres of young forest plantations. No thinning in Alternative B would reduce final canopy closure to less than an average of 40%. Those species that would be less affected as a result of this thinning, compared to a more intensive canopy thinning, include Pacific-slope flycatcher, Hutton's vireo, and brown creeper (Hayes, J. et al. 2003). Alternative C would create slightly more gap habitat within stands (151 acres compared to 129 acres with Alternative B) which would benefit early seral land bird species. In addition, Alternative C would thin to 30% remaining canopy closure on 217 acres, also benefiting those species that prefer open stand conditions. Species that would respond negatively to Alternative C's six units of 30% canopy retention include Pacific-slope flycatcher, Hutton's vireo, and brown creeper (Hayes, J. et al. 2003). Habitat for these latter bird species would improve once canopies close back in 7-10 years from implementation.

**Alternatives B and C—Cumulative Effects**

Past management activities within the Ball Park Project area have resulted in changes to the seral stage composition across the landscape altering habitat conditions for land birds. Different species occupy different seral stage habitats and therefore the effects to habitat for each species depend on the specific type of change that occurred. Effects from the proposed thinning and underburning activities of the Ball Park Project would be an increase in acres of small openings created across the landscape, which may impact some landbird habitat by reducing suitable, dense nesting habitat in very young trees. The more open nature of the remaining young trees may make nests more available to landbird nest predators, i.e. Stellar's jays or common ravens. There are no other reasonably foreseeable future timber harvest or prescribed fire activities planned for the project area.

# Snags and Down Wood

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Snags and Down Wood includes the project activity units and Deer Creek 6th Field sub-watershed, which is also the Ball Park Project area.

## Affected Environment—Snags and Down Wood

The significance of the ecological role of dead wood, i.e. snags and large down wood in influencing ecosystem diversity and productivity is well addressed in the Willamette National Forest Land and Resource Management Plan (1990) and elsewhere (Brown et al. 2003). The importance of dead wood in coniferous forests of the Pacific Northwest is further emphasized by management Standards and Guidelines (S&G) under the Northwest Forest Plan ROD (1994, 2001), as well as elsewhere throughout published literature (Hagar et al. 1996, Hallett et al. 2001, Laudenslayer et al. 2002, Lewis 1998, Muir et al. 2002, Rose et al. 2001).

Under the Willamette Forest Plan as amended by the ROD, snag habitat shall be managed at levels capable of providing for at least 40% or greater potential populations of cavity-nesting species. Current science has not tested the validity of the potential population approach to species management, yet it remains the basis for Standard and Guidelines involving snag management. Strong support for identifying more appropriate amounts of snag and down wood habitat has resulted in the development of new approaches in addressing these habitat components. One such approach is DecAID - the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon (Mellen et al. 2006). DecAID has been created as a tool to help managers evaluate how varying levels of dead wood provide habitat for different species, and is primarily designed to apply to salvage and green tree projects. A benefit of using DecAID during the planning process is that it determines if current dead wood levels are consistent with reference conditions. In addition, DecAID can be applied to identify dead wood management goals for projects that affect dead wood habitat throughout dominant habitat types. Snag and dead wood habitat levels were compared to DecAID recommendations and Forest Plan Standard and Guidelines based on population potential for this project.

Interpretation and/or application of advice obtained from DecAID for how the Ball Park Project may effect dead wood habitat is based on referencing information available in DecAID for the Westside Lowland Conifer-Hardwood habitat type in the Western Oregon Cascades with a Small/Medium Tree Vegetation Condition (WLCH_OCA_S). With the exception of the two proposed natural fire stands which are in the Large Tree condition, the remainder of the Ball Park Project stands proposed for commercial thinning is entirely within this habitat type. The Ball Park Project planning area is considered an appropriate sized area of similar habitat to consider when evaluating current and future levels of dead wood (Mellen et al. 2006).

**Snags (Current Condition)**

Estimates for current snag size and distribution are displayed in Table 30, and were made based on estimates from a combination of stand exam data, knowledge of previous snag creation activity, and field reconnaissance.
Two approaches were used to assess snag levels for the Ball Park project area:

- Quantitative evaluation of seral stage habitat
- DecAID tool

**Seral stage habitat evaluation:**

Natural forest stands in all seral stages will usually contain large downed wood on the forest floor and snags in the overstory. Many stands that are currently in the early and especially mid seral stages, logged prior to about 1987, do not contain snags and large down wood or only very limited amounts. After that time, snag habitat was sometimes retained and generally created at variable levels of 1-4 snags/acre.

The younger early seral stands (<25 years old) generally contain very little large down wood left after the logging operation. Some of the older early seral stands (26-40 years old) contain much higher levels of very large diameter down wood. This remnant down wood is relatively old, and mostly all in the higher decay classes 3-5 (Bartels et. al 1985).

Snag and down log information from CVS plots was summarized by vegetation series for natural stands in mature and old-growth stages for the Mid-Willamette LSR Assessment. The following table is extracted from additional information, and shows only big snags (>20", >16') and big logs (>21", >21'). The levels of snags and logs are highly variable among stands.

Table 30 is for Mature and Old Growth in the Willamette National Forest (USDA Willamette National Forest et. al 1998). Vegetation Series shown are those which occur in the Ball Park Planning Area. For more discussion on Snags, see Appendix D

**Table 30. Big Snag and Log Ranges by Vegetation Series**

| Series | Big snags per acre | Big logs per acre |
|---|---|---|
| Pacific silver fir *Mature* | 21 (14-29) | 19 (5-13) |
| *Old growth* | 32 (18-43) | 12 (7-16) |
| Douglas-fir *Mature* | 0 (0-5) | 9 na |
| *Old growth* | 21 (11-21) | 13 (9-22) |
| Western hemlock *Mature* | 11 (5-21) | 11 (8-25) |
| *Old growth* | 24 (13-42) | 14 (9-21) |
| Numbers shown in parentheses show within stand variability. | | |

Aerial flight information for unmanaged stands was considered, but was not additive to the above discussed snag totals. Current levels of large tree mortality are not considered to be outside the levels of normally occurring insect and disease mortality. The forest insect and disease detection survey cannot measure older snags in the later decay classes and trees broken by wind, and may not accurately record snag recruitment in the understory due to suppression. Down wood recruitment also has not been recorded. Future areas of tree mortality due to damage from Balsam woody adelgid were also documented, but are not judged to be significantly outside the normal range of occurrence.

**Table 31. Snag levels in the Ball Park Project Area.**

| Unmanaged Stands | Managed Stands |
|---|---|
| • Old Growth stands assumed to have 18 large snags/acre.<br>• Mature stands assumed to contain 50% of old growth stands or 9 large snags/acre. | • In stands with snag creation: 621 wildlife trees created in 1982, 1983, 1986, 1994, and 2001.<br>• Many managed stands had no snag creation.<br>• Average for all managed stands combined: 0.4 snags/acre |
| • Aerial flights: 0.2/acre in all seral stages | |

On a larger scale, dead tree patches have largely been missing in the western Oregon landscape due to fire suppression and post-fire salvaging, at least until the 1991 Warner Creek Fire on the Willamette National Forest, which was not salvaged. Additional large-scale snag habitat was created by the 2003 B&B Complex Fire, although most of this burned on the eastside Deschutes National Forest. Large landscape-scale snag patches, especially in high elevation wilderness, last only a few decades before forest succession reclaims them. About 30 percent of snags less than 40 inches dbh fall down within the first decade (Ohmann and Wadell 2002) and 50 percent of Douglas-fir less than 16 inches dbh fall within the first 15 years (Everett et al. 1999). Larger diameter trees usually remain standing for much longer periods.

In 2002, there were roughly 29 concentrations of large snag patches greater than 10 acres which are currently scattered across the landscape within the Oregon Western Cascade Province (Davis 2003). The average distance between snag patches is about 4.2 miles. This is the average, shortest distance from one cluster of patches to another. Considering this is the best, most concentrated snag habitat, with moderate and lower quality habitat in between, it is expected that this should allow for fairly good connectivity of high quality snag-dependent bird habitat.

**DecAID:**

Snag levels within the project area were compared against those listed in DecAID for Westside Lowland Conifer-Hardwood habitat type, in the Western Oregon Cascades, with a Small/Medium Tree Vegetation Condition (WLCH_OCA_S). Current snag levels throughout the planning area are above average values of the 50% tolerance range representative for snags in unharvested areas in this habitat type and condition.

**Table 32. Current Condition (Alt. A) and Estimated levels of Snag Habitat in Comparison with DecAID**

| | | **DecAID** | |
|---|---|---|---|
| **Snag Size** | **Current Snags per Acre*** | Un-harvested inventory plots (un-thinned managed stands) | All inventory plots (previously thinned and un-thinned managed stands) |
| ≥10” dbh | ≥13 snags/acre | 66th percentile | 85th percentile |
| ≥20” dbh | ≥9.6 snags/acre | 67th percentile | 83rd percentile |

* are in approximate numbers

The majority of large standing snags are Douglas-fir. The majority of smaller snags throughout the area is also Douglas-fir, and as a result of mortality from growth competition. Snag distribution across the project area can be considered patchy and variable, and would be affected equally under either Action Alternative.

Down wood estimates for current size and distribution were made based on reasoned estimates using inventory and stand exams from unthinned managed stands throughout the planning area. Tree mortality largely associated with self-thinning competition, cull logs from previous harvest activity, localized breakout from snow loading, and in one area wildfire has resulted in down wood levels as shown in Table 33.

Smaller logs are generally in decay class I and II, while larger logs are in decay class II and III. Many of the largest pieces of down wood (cull logs from initial harvest activity) exist in decay class III. Existing down wood occurs in patches rather than even distribution across the planning area.

**Table 33. Current Condition (Alt. A) and Estimated levels of Down Wood in Comparison with DecAID**

| Down wood Size | Stand Type | Tons/Acre |
|---|---|---|
| ≥6” diameter | Thinned managed stands | 22.7 |
| ≥20” diameter | | 18.4 |
| **Down wood Size** | **Stand Type** | **Tons/Acre** |
| ≥6” diameter | Unthinned managed stands | 38.1 |
| ≥20” diameter | | 24.8 |

In addition to dead wood levels associated with down logs, it is estimated that decaying wood habitat associated with stumps ≥20” diameter would cover less than 1% of areas treated under either Action Alternative. The amount is considered to be equal under either of these alternatives. Use of stumps throughout a range of decay classes has been documented for a wide variety of organisms (O’Neil et al. 2001, NatureServe 2006, Rose et al. 2001, Zabel and Anthony 2003). This type of dead wood provides a valuable, long-lasting habitat component that supplements the potential to maintain native biodiversity throughout the project area.

Down wood levels for this project were compared against those listed in DecAID for Westside Lowland Conifer-Hardwood habitat type, in the Western Oregon Cascades, with a Small/Medium Tree Vegetation Condition (WLCH_OCA_S). A review of DecAID data discloses current down wood levels throughout the planning area are above average values (within the 50% tolerance range) representative for dead wood in both harvested and unharvested areas within this habitat type and condition. How down wood levels in the Ball Park Project planning area compare to DecAID data is displayed in Table 34.

**Table 34. Current Condition (Alt. A) and Estimated levels of Down Wood in Comparison with DecAID**

| | DecAID | |
|---|---|---|
| **Down Wood Size** | Unharvested inventory plots (unthinned managed stands) | All inventory plots (thinned and unthinned managed stands) |
| ≥6” dbh | 71st percentile | 67th percentile |
| ≥20” dbh | 82nd percentile | 78th percentile |

Normal processes that influence these changes are highly variable in their ability to affect change (Rose et al. 2001). The natural fire interval for the Ball Park project area has been estimated at less than 50 years to 200 years with a mixed fire regime, depending on the area (Lantz, personal communication 2008). Insects and pathogens continually contribute to successional development; however, traditionally this occurs at a small scale relative to the overall landscape. The area is not prone to flooding or landslides which may also affect changes on a small scale. Windthrow is yet another normal process that has occurred, and would continue to occur unpredictably, to influence stand dynamics in this area on a small scale. Because the overall condition of the project area is largely influenced by previous management activities that have simplified stand and landscape structure and diversity, additional stand management may be seen as a method to assist in restoring some landscape conditions, such as stand dynamics associated with creating more normal levels of snags and down wood. Snag creation between

1988 through 2006 has already contributed 621 additional large snags to current stands less than 40 years old. Most of these snags were topped and should develop into useable snag habitat within ~5 years.

With current fire suppression efforts, not many wildfires can burn to create the diversity of snag and large down wood habitat on the landscape. A number of events throughout the watershed, as well as within the project area, have occurred to increase dead wood levels across the landscape. District fire records reveal that from 1970 to 2007, there has been 36 small wildfires averaging less than one acre each. These fires may have produced a small number of snags or down wood throughout the project area. Salvage is not known to have occurred associated with any of these fire events.

Reference information extrapolated from DecAID suggests current size, abundance, and distribution of snags and down wood exceeds average historic levels (50% tolerance) across the project area considering habitat type and vegetation condition. It should be noted that with respect to snags or down wood, the objective of the Ball Park Project is more directed at managing for an average historic dead wood habitat condition rather than focusing on specific dead wood requirements for individual wildlife species.

## Environmental Consequences—Snags and Down Wood

### Alternative A—Direct, Indirect, and Cumulative Effects

Alternative A does not propose management activities at this time and therefore would not alter snag and down wood densities. Existing vegetation conditions would continue to follow natural successional pathways, with snags and down wood responding accordingly. Snags and large down wood would continue to be created by the various natural mortality agents: insects and diseases, wildfire, windthrow, snowthrow, bear damage, as well as suppression mortality. Alternative A would have no direct, indirect, or cumulative effects on snag and down wood in the project area.

### Alternatives B and C—Direct and Indirect Effects

<u>Commercial thinning</u>: Some loss of existing snag habitat would occur under either Action Alternative, due to safety issues. The highest loss of the largest snags, and currently injured trees which may become future snags, would occur as snags are felled along the Ball Park haul route for safety reasons. Most of these are concentrated at higher elevations (> 2500 feet). Current snag levels within Ball Park harvest units range from low to almost none, so loss within thinning units is judged to be minor. Snag loss would be greatest among sizes <10”dbh, intermediate for snags ≥10-20” dbh, and very low among snags ≥20”dbh. All felled snags would be left as down wood. Depending on decay class and burning conditions, some felled snags may be fully or partially consumed during subsequent fuels reduction of underburning. Some of the retained green trees may have defects that would provide future dead wood habitat.

<u>Post-harvest fuels treatments</u>: Underburning many of the thinned stands may produce additional snag habitat, but is not judged to provide much due to the moister spring-like conditions this type of burning would occur in. Tree mortality of up to 10% would be acceptable, but in the past, many underburns have not reached 10%. Underburning may reduce existing large down wood habitat in specific areas when logs are in the older decay classes III or IV. Stands that are not underburned would have pile burning treatments to reduce fine fuels. Existing large down wood would not be impacted because piles are not placed over large existing down wood of

any decay class.  Pile burning treatments are unlikely to result in tree mortality.  Any such mortality would add to an existing patchy distribution of snag habitat throughout the planning area.

Natural Fuels Underburn:  Implementing a natural fuels underburn on two units may slightly increase snag habitat and is not expected to impact large down wood habitat.  The fire prescription calls for 10% live tree mortality (with an acceptable range of 5-20%), which in a mature forest stand translates to approximately 8-10 snags/acre being created on the 49 acres where this treatment is prescribed.

Within stand variability throughout the planning area influences current snag distribution.  This variability would also influence the location of replacement snags, which would be provided for in a patchy rather than even distribution across the area.  This prescription is common to each Action Alternative and would assure compliance with Northwest Forest Plan guidance to maintain 40% of potential populations of cavity nesting species (USDA, USDI 1994 page C-42).

Based on current stand structure, composition, and habitat type there is generally sufficient site-specific potential to support application of the Northwest Forest Plan Standard and Guideline (ROD page C-40) to leave an average of 240 linear feet of logs per acre greater than or equal to 20 inches in diameter or material of the largest diameter class available across areas treated by the Ball Park Project under either Action Alternative.

**Alternatives B and C—Cumulative Effects**

The cumulative effects analysis area was the Ball Park project area.  As mentioned above the project area is considered an appropriate sized area of similar habitat to consider when evaluating current and future levels of dead wood (Mellen et al. 2006).  Approximately 38%, or 5,556 acres, of the Ball Park Project area has been managed by regeneration harvest.

Past management actions related to timber harvest activity are generally responsible for the current condition of dead wood habitat throughout the planning area.  These actions have affected the overall amount and distribution of dead wood habitat by reducing the amount of old-growth habitat and increasing the amount of mid seral habitat.  There are no foreseeable actions that would affect dead wood habitat in this area.  Current science and the changing trend in timber management that has occurred within the past decade, and is projected for the future, should positively influence management of decaying wood as previously harvested stands redevelop, and more emphasis is placed on retention of key structural components in harvested stands.

Data analysis reveals the amount and distribution of snag and down wood habitat would essentially remain unchanged or experience a slight increase under either Action Alternative.  Commercial thinning as proposed under either Action Alternative for the Ball Park Project is therefore likely to have little or no cumulative effect on dead wood habitat throughout the planning area.  The action alternatives would allow trees to grow larger and faster, and to develop characteristics such as large limbs and crowns.  The increased health and resistance of the thinned forest stands to future insect and disease outbreaks would make natural snag development less likely for the next 10-20 years; however some diseases would still occur such root rot.  Whether or not the natural fuels underburn stands show increased or decreased snag development after the first round of tree mortality post-fire is unknown.

Dead wood habitat should exist in a sufficient amount and distribution to support the local wildlife community, including MIS such as pileated woodpecker, marten, and cavity nesters such that their ability to persist or become established would not be limited by this habitat component important to most members of the wildlife community in this area.

**Alternatives B and C—Conclusions**

Under either Action Alternative the Ball Park Project proposes commercial thinning in approximately 53% of mid-seral (stem exclusion) habitat throughout the planning area. This relates to approximately 6% of the entire planning area. There is essentially no difference between Action Alternatives and their effect on dead wood.

The silvicultural prescription calls for protection of existing snags and down logs. However, some amount of loss or disturbance of snags and down wood is inevitable as a result of safety and logging feasibility issues. Measures are identified to address this loss or disturbance. Effects analysis reveals that proposed activities in conjunction with mitigation measures would result in a stable or slight increase in dead wood levels associated with areas treated. Direct and indirect effects would be limited to an undetermined number of snags and logs that may be unavoidably affected or created within harvest units and the prescribed natural fire stands.

DecAID relies on data from unharvested plots to assist managers in setting objectives aimed at mimicking natural conditions. Considering current conditions of snag and down wood habitat along with the information presented above, it is expected that dead wood levels throughout the Ball Park planning area should remain above average in the natural range considered for similar habitat following thinning, subsequent fuels reduction, and prescribed natural fire.

On a smaller stand scale, dead wood levels would be on the low end of the natural range as shown in DecAID and the Willamette Province LSR Assessment. For this reason, snag creation at the level of three per acre at a minimum of 14" dbh is recommended as an enhancement to the project area throughout all units if monitoring following logging and fire activities shows the area to be deficient. Large down wood creation is recommended if monitoring following the activities shows levels to be below 240 linear feet/acre with a minimum dbh of 14".

The Ball Park Project would maintain dead wood habitat throughout a managed forest that typifies the planning area at levels that would ensure its' ongoing central role in the ecological processes affecting this type of forested habitat (Rose et al. 2001). The project would comply with S&Gs for snag and down wood management.

# Management Indicator Species

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Management Indicator Species includes the project activity units and Forest Service land within the McKenzie Deer Creek 6th Field sub-watershed.

## Affected Environment—Terrestrial Species

Management Indicator Species (MIS) were addressed in the Willamette Forest Plan. They include the spotted owl, pileated woodpecker, marten, elk, deer, cavity excavators, bald eagle, peregrine falcon, and fish. All of the management indicator species except the bald eagle may occur in the Ball Park Thin Project area.

Through Region-wide coordination, each Forest identified the minimum habitat distribution and habitat characteristics needed to satisfy the life history needs of MIS. Management recommendations to ensure their viability were incorporated into all WNF Plan Action Alternatives. Current conditions for the spotted owl and bald eagle are discussed in the Wildlife BE in Appendix C. Habitat for elk and deer is discussed in the Elk Habitat section in this chapter.

## Environmental Consequences—Terrestrial Species

### Alternative A (No Action)—Direct and Indirect Effects

Under Alternative A, no change to habitat of management indicator species would occur; forest stands would continue to develop following natural successional pathways and aquatic resources would remain similar to current conditions. Alternative A would be expected to meet applicable Standards and Guidelines from the Willamette Forest Plan. Alternative A would have no direct, indirect, or cumulative effects on habitat of management indicator species in the project area

### Alternatives B and C—Direct and Indirect Effects

Ball Park Thin Alternatives B and C meet all applicable Standards and Guidelines from the Willamette Forest Plan. All alternatives of the Ball Park Thin Project would meet Northwest Forest Plan Standards and Guidelines, and therefore maintain persistent populations of spotted owls, pileated woodpeckers, and martens (USDA Forest Service, USDI Bureau of Land Management. 1994. Appendix J2). Under Alternatives B and C, changes in the amount or characteristics of required habitat for these species would be minimal.

Impacts of the Ball Park Thin Project alternatives on the spotted owl, bald eagle, peregrine falcon, and fish can be found in the Biological Evaluations in Appendices B and D. This project may affect, but is not likely to adversely affect, the northern spotted owl due removal of dispersal habitat and natural fuels underburning in suitable habitat in Alternatives B and C. The spotted owl is discussed further in the previous section. This project has no effects on bald eagles or peregrine falcons. Impacts of the Ball Park Thin Project on elk and deer are discussed in the Elk Habitat section.

While pileated woodpecker and marten may be displaced by harvest and burning activities in this area, populations throughout their range have not been identified as being in decline, as indicated by their absence from the Regional Forester’s Sensitive Species List (USDA Forest Service. 2002).

### Alternatives B and C—Cumulative Effects

Wildlife species listed as MIS for the Willamette National Forest and present in the project area, are discussed elsewhere in this EA. Cumulative effects on deer and elk are also discussed above.

Implementation of either action alternative would not result in significant, incremental negative effects on the remaining MIS species or their habitat within the project area (including pileated woodpeckers, pine marten and non-TES fish), when considering the effects from all past actions in the analysis area. There are no foreseeable future habitat management actions planned within the Ball Park Thin Project area that would add to cumulative effects of the past and currently proposed actions or action alternatives.

## Affected Environment—Fisheries

Management indicator fish species found in this area were described previously in the Aquatic Resources discussion. The MIS fish species described are spring Chinook salmon, bull trout, rainbow trout, and cutthroat trout. Because the distribution and range of these MIS fish overlap and possess similar requirements in water and habitat quality, the analysis findings for spring Chinook salmon and bull trout (main stem McKenzie River), and cutthroat trout (small tributaries) were used to evaluate effects.

## Environmental Consequences—Fisheries

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Under Alternative A, no change to habitat of management indicator species would occur; forest stands would continue to develop following natural successional pathways and aquatic resources would remain similar to current conditions. Alternative A would be expected to meet applicable Standards and Guidelines from the Willamette Forest Plan. Alternative A would have no direct, indirect, or cumulative effects on habitat of management indicator species in the project area.

### Alternatives B and C—Direct and Indirect Effects

Although some project activities will have localized and minor negative effects at the project scale, the effects to habitat occupied by native species considered Management Indicator Species are insignificant and are not expected to have an adverse effect on MIS. Due to project design and mitigation measures, the Ball Park Thin project may be expected to maintain MIS species and habitat in the short-term (during project implementation), and have a beneficial influence on MIS habitat in the long-term (5-50 years), following proposed road reconstruction and as thinned riparian reserve stands begin to contribute to in-stream habitat quality.

Project direct and indirect effects would not adversely affect fisheries MIS. Water and habitat quality would be maintained meeting the objectives of the Willamette National Forest LRMP and Aquatic Conservation Strategy of the Northwest Forest Plan.

### Alternatives B and C—Cumulative Effects

A review of the analysis area for past action, the proposed action, and any foreseeable future actions was completed. Previous road construction and timber management has affected the condition of fish habitat in the analysis area as discussed in Water Quality/Aquatic Resources effects. The proposed action and the action alternatives would not incrementally contribute to loss of aquatic habitat (in action alternatives, primarily through proposed drainage improvements to the existing road network). Timber management activities and their proximity to waterways were designed to maintain existing water quality and minimize potential disturbance to native aquatic biota (as sources of sedimentation). Potential to increase stream temperature with the proposed action and action alternatives does not exist, due to protection of sources of shade to perennial waterways.

Following examination of the cumulative effects from past actions along with the proposed projects, the additional management-induced effects from this project would not change the following:

1. The timing or magnitude of peak flow events (planning sub-drainage ARP remain above the Willamette Forest Plan recommended levels);
2. Instability of stream banks [recommended ARP midpoints are exceeded, and exclusion of bank destabilizing activity);
3. Adverse alteration of the supply of sediment to channels (localized increases of short duration would not adversely modify project area sediment supply);
4. Adverse alteration of sediment storage and structure in channels (current channel conditions would be maintained with proposed action alternatives).

Upstream passage measures at Cougar Dam are under NEPA evaluation (a trap-and-haul facility with evaluation by Army Corps of Engineers) and may be implemented following ACOE NEPA analysis. A favorable response by MIS aquatic species would be anticipated with reconnection of the South Fork McKenzie River to project adjacent reaches of the McKenzie River, primarily through bull trout and spring Chinook salmon access to historic refuge areas.

No other foreseeable project planned in the Ball Park Thin Project area would add incrementally such that the proposed activities, in combination, would adversely alter aquatic habitat conditions. This assertion includes the cumulative impacts of past actions. The quality of Critical Habitat important to listed aquatic species (spring Chinook salmon and bull trout) is expected to be maintained with implementation of the proposed action (Alternative B) or other action alternatives (Alternative C). Similarly, the No Action Alternative would maintain habitat conditions currently available to aquatic MIS.

# Fire and Fuels

## Scale of Analysis

This report identifies direct, indirect effects within the proposed treatment areas of 1,156 acres. The cumulative effects analyzed the Ball Park Thin Project Area of 14,508 acres. The project lies within the Deer Creek Subwatershed ($6^{th}$ field) within the Upper McKenzie River Watershed ($5^{th}$ field). The Fire Regime Condition Class (FRCC) model was done at the $4^{th}$ field. Specific field data within the Project Area was gathered as stated above. Models were used that included project data and data from large landscape level due to the character of fire as a disturbance and how it moves across the landscape. To identify specific effects of fuels treatments, models were zoomed into the area using field information and landscape level data.

## Affected Environment—Fire Fuels

Fire has and will continue to play an active and vital role in our forest ecology. Treatments in this project would help to return the ecological role of fire disturbance. Historically, across the Willamette National Forest, fire created mosaic patterns within the vegetation. This is because fires occurred at different times in the year or locations, which affected the intensity and severity of the fire. Fires were often caused by lightning, and there are references and stories of Native Americans using fire for managing resources, the land, and travel routes (Teensma 1987, Kay 2007). Fire affects forest ecology in multiple ways, some examples of this are the distribution of fungi, changes in understory vegetation, distribution of canopy cover, and diversification of areas for wildlife. Improving the role of fire is needed to decrease the potential of large, high severity wildfires, and to move the ecosystem closer to the natural disturbance process. Teensma studied fire history in an area near Ball Park Thin Project Area. The mean fire return interval (MRFI) he analyzed ranged from <100 years to 166 years.

Kay (2007) notes that low intensity fire was regularly used by Native Americans across the Americas, as well as in the Willamette Valley. Archaeological data, ethnographic, and historical information confirm that Native American travel routes and communities are located in the area. Consequently, it is assumed that controlled fire would have been a tool commonly used before Anglo settlement in the area. Another line of evidence that suggests fire played an important role in developing the forests vegetation due to the presence of shade intolerant tree species at many of the lower elevations on the McKenzie River RD. Teensma's Dissertation (1987) shows how the natural fire rotation changed from times during Indigenous use, Anglo-settlement, and current fire suppression.

- 1772-1830 at 78 years
- 1851-1909 at 87 years
- 1910-1987 at 77 years

**Fire Regimes**

Fire Regimes describe the natural frequency fire occurs across the landscape pre-settlement and includes the historic aboriginal use (Agee 1993). Five Fire Regimes are used at the national level Fire Regime I, II, III, IV, and V (Hann et al. 2003). Within the Ball Park Thin Project Area the following Pacific Northwest Region 6 Fire Regimes have been classified:

| Fire Regimes in the Ball Park Thin Project Area (See Figure 27) |
|---|
| • **Fire Regime I –** < 0-35 year fire return interval; low severity |
| • **Fire Regime IIIa –** < 50 year fire return interval; mixed severity |
| • **Fire Regime IIIb –** 50-100 year fire return interval; mixed severity |
| • **Fire Regime IIIc –** 100-200 year fire return interval; mixed severity |
| • **Fire Regime V –** 150+ year fire return interval; high severity |

Fire Regimes use the description of mixed severity. This term on the Willamette NF explains the varying degrees of fire intensity that can occur given the topography, vegetation, and the ability of larger trees to withstand the intensity creating different levels of mortality. Mixed severity fires range from low intensity (low mortality) ground fires to higher severity fires where canopy fires kill most of the trees, thus mixed severity creates a mosaic of different mortality and seral stage classes across the landscape (Hann et al. 2004). For example a light intensity burn would not leave fire scars or cat-face on larger trees. Due to this light intensity fire understory vegetation would change, but evidence that a fire occurred would be difficult to find through tree scarring. No tree scarring does not discount that fire occurred across the landscape and played an important role ecologically (Kertis, 2008).

In addition to the frequency and severity, fire disturbance is categorized into Fire Regime Condition Class (FRCC). FRCC describes the degree of departure of current vegetation from the historic fire regime and helps to establish reference and evaluate risks to the ecosystem (Hann, et.al. 2001). FRCC 1, 2, and 3 rank the degree of departure:

**Table 35. Fire Regime Condition Class (FRCC) Definitions**

| Condition Class | Departure of Fire Regime from Historic Range | Risk of Losing Key Ecosystem Components | Alteration of Vegetation Attributes form Historic Range |
|---|---|---|---|
| **FRCC 1** | Departure is not more than one return interval | Low | Functioning within the historic range |
| **FRCC 2** | Moderate change in size and intensity has resulted | Moderate | Moderately altered |
| **FRCC 3** | Dramatic changes in fire size has severity have resulted | Severe | Substantially |

**Figure 22. Fire Regime map**

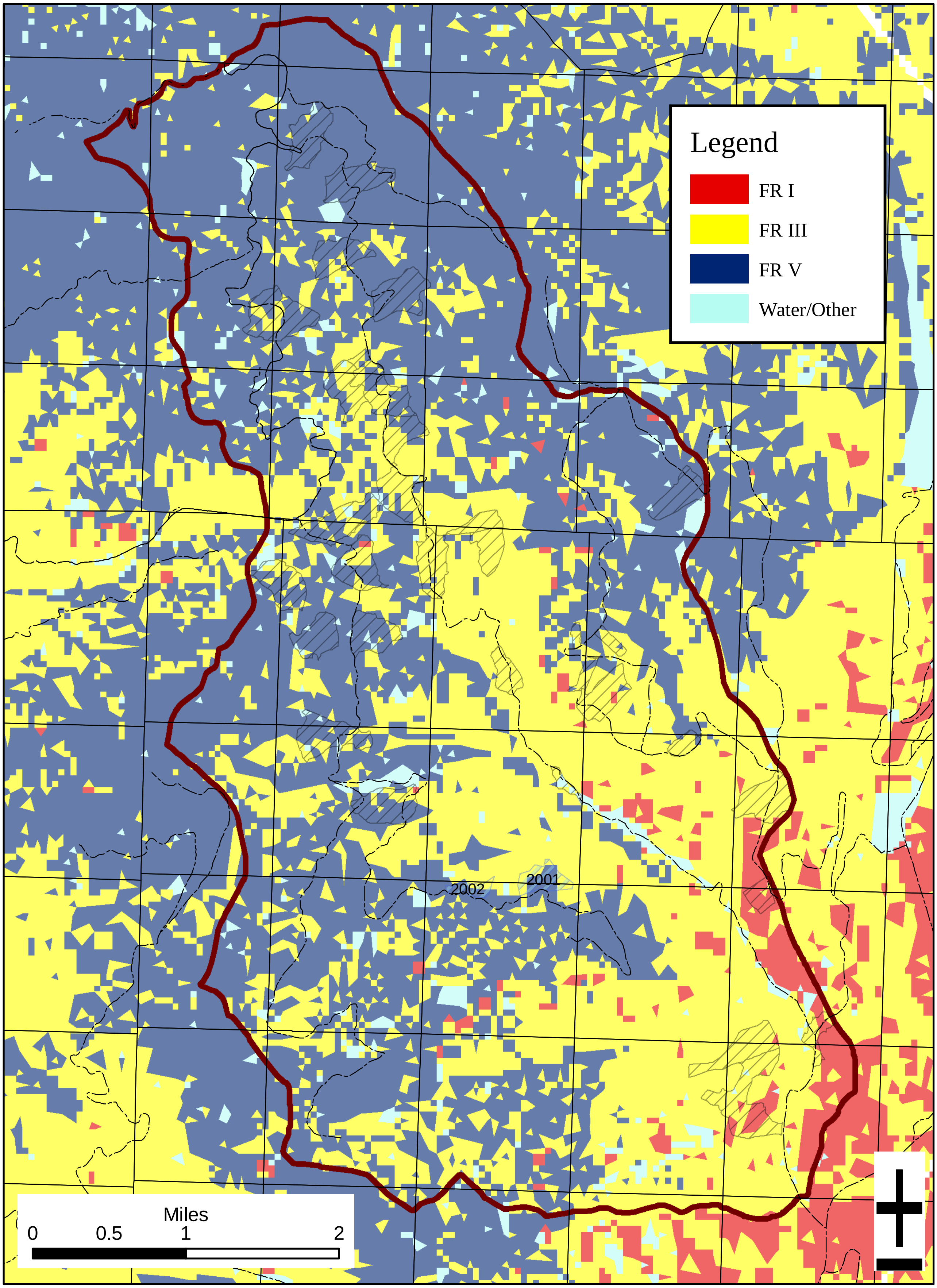


**Figure 23. Fire Regime Condition Class Map**

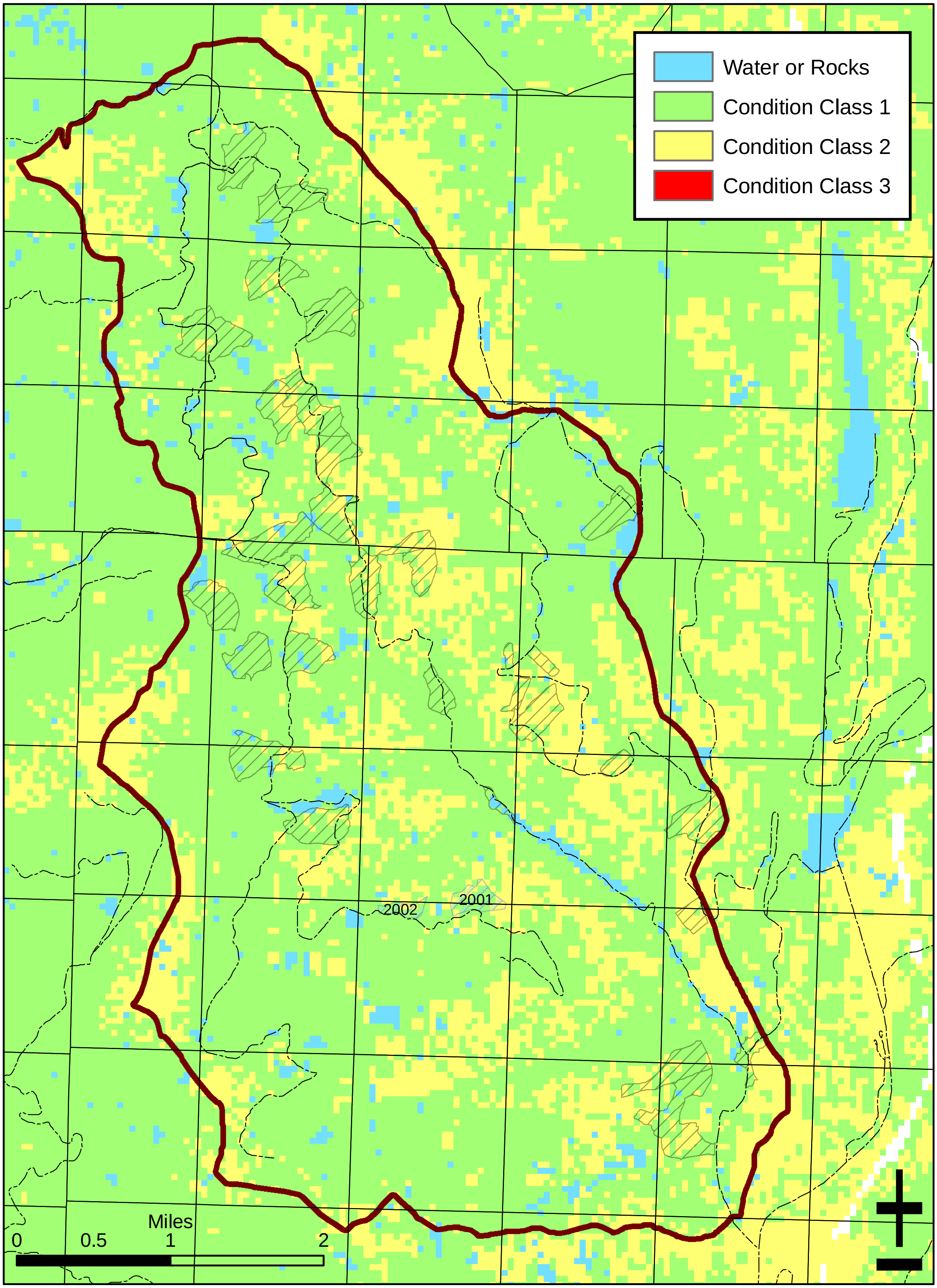
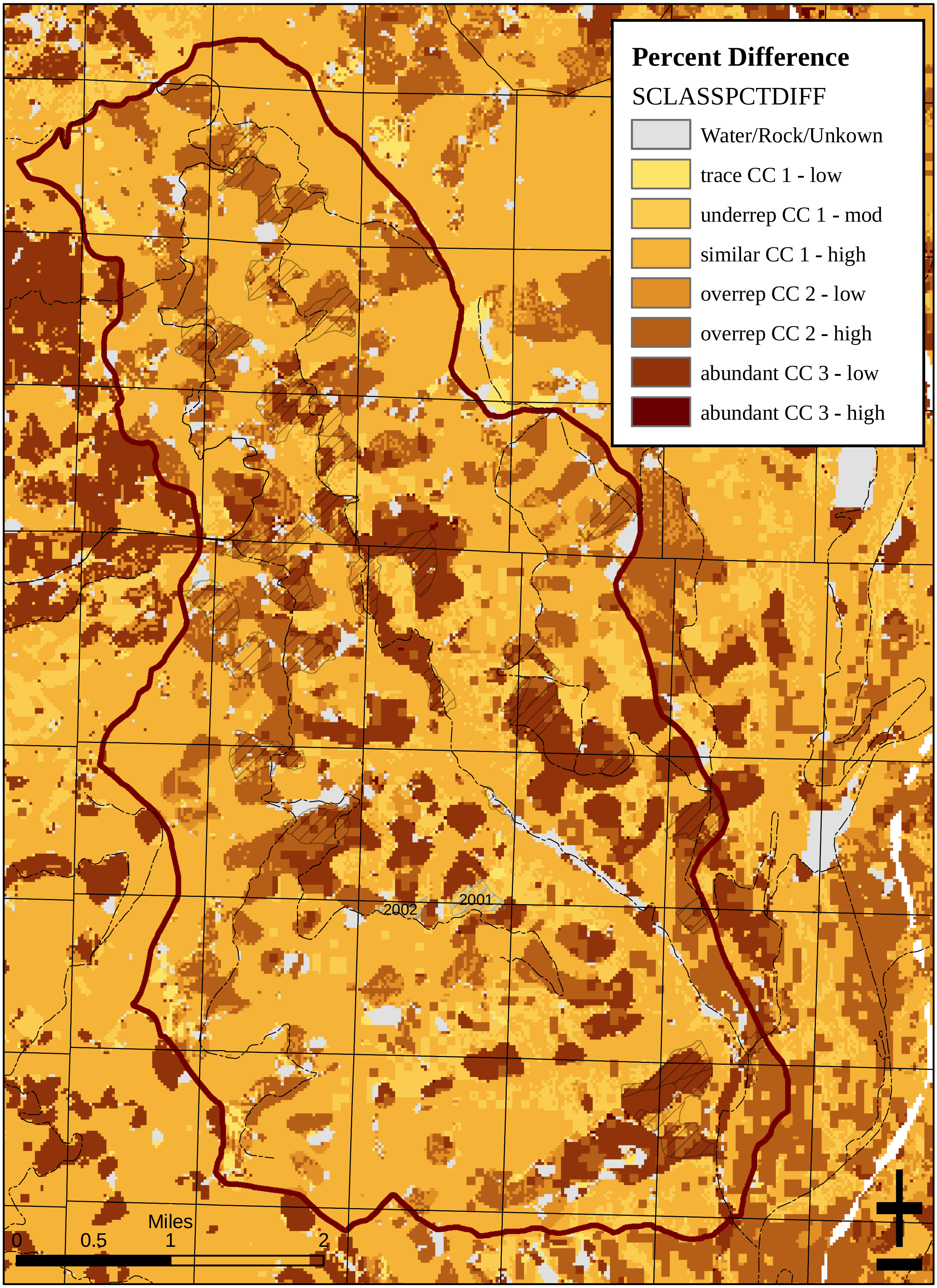


**Figure. 24: Fire Regime Condition Class Map % Difference**



As stated in documentation from the NW Oregon FRCC workgroup in 2004, FRCC evaluation is conducted by identifying the plant communities (biophysical settings, BpS) that would exist given the soils, climate, topography, and the natural disturbance regime. This is followed by identifying current vegetation in five seral stage categories (early, mid-closed, mid-open, late-open, late-closed). The stratum FRCC (4-6th field watershed) categorizes fire as a landscape level disturbance and is evaluated across an area it may naturally occur. Stand FRCC was evaluated at a field level using relationships between current and historical seral stages (Kertis et al. 2007 and Hann et al. 2004). Figures 23 and 24 show the difference of FRCC stratum and stand level. Figures 24 shows a greater amount of the area falls into FRCC 2 and FRCC 3. Much of the Ball Park area currently exists as seral stages: early, mid-closed, or late-closed with very few in the mid-open or late-open.

Given the difference in seral stages, from historic to current, the Ball Park Thin Project Area ranges through all three FRCC levels and on average concludes the area is moderately altered from the historical range of variability for fire interval. A moderate change in potential fire intensity and severity has resulted (Kertis et al. 2007 and Hann et al. 2001). Additionally, susceptibility to high severity of fire within the Ball Park Thin Project Area should be tempered with the current continuous horizontal and vertical fuel profile and the main highway travel route. These factors and fire suppression create more of a potential for unnatural, severe fire as well as hazards to public and fire fighters.

**Fuel Profile**

Fuel models describe the fuel profile in the Ball Park Thin Project Area. Fuel models are a quantitative way to describe surface fuel loading (amount of fuel in tons/acre), arrangement, structure, and calculate predicted fire behavior. The primary fuel that carries the fire is the general classification in fuel models, i.e. grass, brush, timber litter, or timber slash. Fuel loading and depth correlate to the fire intensity and rate of spread. Horizontal fuels refer to ground or surface fuels, while vertical fuels refer to standing trees and ladder fuels such as limbs on the bole of trees, crown base height (CBH), regeneration, and brush.

Fuel loading and fuel models are described below. Both are used to calculate and predict expected fire behavior. Fuel loading is measured using size of fuel that relates to time frames based on how the fuel responds to moisture (how long it takes to dry and become consumable) and are then quantified using tons/acre.

Measurements for fuel loading are:

- 0” – .24” diameter or 1 hour fuels
- .25” – .99” diameter or 10 hour fuels
- 1.0” – 2.99” diameter or 100 hour fuels
- ≥3.0” diameter or 1000 hour fuels

The Ball Park Thin Project Area is represented by the following fuel models (FM):

| Ball Park Thin Project Area Fuel Models |
|---|
| • **FM 1**– Representative of grass meadows or openings. Fuel loading in the 0-3 inch diameter fuels is less than 1.5 tons/acre. Less than one-third of the area contains trees or shrubs. Fire spreads quickly in this fine fuel when it is cured or nearly cured. *Example – Bunchgrass Meadow*. |
| • **FM 5** – Representative of timber plantations and natural regeneration between two and 10 feet tall. *Ceanothus velutinus* is the common understory brush. Shrubs or grass in the understory can carry the fire. Fuel loading in the 0-3 inch diameter for live and dead fuel is less than 3.5 tons/acre. *Example – second growth units under 30 years old that have trees ≤35’ tall and a shrub component along the 2654 Road*. |

| | |
|---|---|
| • **FM 8** – Mature short-needle conifer stands with light fuel loading in the 0-3 inch diameter fuels. This profile can be found in stands that were or were not previously harvested. Fire spread is generally slow with low flame lengths. Heavy fuel concentrations (jackpots) can flare up. Fuel loading in the 0-3" diameter for live and dead fuel is less than 5 tons/acre. *Example – area along 2654 Road with few understory shrubs or regeneration..* | |
| • **FM 10 –** Representative of mixed conifer stands with heavy concentrations of large down wood, > 9" diameter. Fuel loading in the 0-3 inch diameter for live and dead fuel is less than 12 tons/acre. Ground fire behavior is higher in intensity than fuel models 8 because of the heavier fuel loading and the ladder fuels. Torching of trees (fire in the crowns of trees) occurs more frequently. *Example – areas along the 2654 about 4 miles up the road on the east side of the road.* | |
| **Post harvest units are categorized as FM11 and 12** | |
| • **FM 11** – Light slash load resulting from light to moderate partial cuts or harvests which yard tops of trees attached to the last log. Fuel loading in the 0-3" diameter for live and dead fuel is <12 tons/acre. The continuity of the slash can increase fire behavior. | |
| • **FM 12** – Moderate slash loads resulting from moderate or heavy partial cuts. Fuel loading in the 0-3" diameter for live and dead fuel is < 35.6 tons/acre. Fire behavior can be rapidly spreading, especially with red needles still on the branch wood. | |

**Table 36. Existing Condition - Fuel Model within Ball ParkThin Project Area ***

| | FM 1 | FM 5 | FM 8 | FM 10** |
|---|---|---|---|---|
| Acres within Ball Park Thin Project Area | 476 Ac. | 3,561 Ac. | 4,530 Ac. | 5,941 Ac. |

**:Data derived from 2000 FSVeg.*

The term hazardous fuel is used in current publications, such as the National Fire Plan, and describes the current and potential hazardous fuels in the Ball Park Thin Project Area:

| Current and Potential Hazardous Fuels |
|---|
| • fine fuels (1, 10, and portions of 100 hour) generated following timber harvest and in forested areas that have been excluded from disturbance processes |
| • vegetation structure with fine fuels on the ground, shrubs and small trees in the understory, lichen on larger trees, and tight canopy closure all contributing to rapid horizontal and vertical movement of fire; |

**Fire Behavior**

The Ball Park Thin Project Area has a fire frequency of 1.7 fires every two years. This shows that fire continues to occur naturally in this area. Fire behavior is a result of the fuels, topography, and weather conditions. Fire behavior was modeled using BehavePlus3 with fuels and topography inputs that correspond to the Ball Park Thin Project Area and summer fire weather data representing the hot, dry fire weather ($97^{th}$ percentile) similar to 2003 and 2006 is used to represent conditions where fires can escape initial attack, threaten resource, and have high severity/mortality. Areas with light fuel loading, such as FM 8, exhibit lower intensity fires with lower severity (low mortality of dominant vegetation). Fuel Model 10 exhibits high fire intensity and high severity including crown fire with mortality. Fuel Model 5 is also high fire severity and exhibits fast rates of spread. FM10 and 5 are difficult to contain because:

- flame lengths exceed the safety of hand tooled firefighters (flame lengths over 4 feet in height require mechanized equipment, air resources, or indirect attack);
- rates of spread over 6 chains/hour (1 chain = 66 feet) and this exceeds the ability of a 20 person crew.

Larger fuels, > 9" diameter, are not often considered the carrier of fire. Large 1000 hour fuel will create longer lasting intensity, higher flame lengths and enable crown and high severity fires to progress. Standard fire suppression operations would require mechanized suppression resources when flame lengths reach heights over four feet. Firefighters are not able to safely suppress fires directly if the flame lengths exceed four feet.

## Environmental Consequences—Fire Fuels

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

In the Ball Park Thin Project Area the No Action Alternative would not support returning fire as a natural disturbance process to the ecosystem due to fire suppression responsibilities and life, property, and resource priorities. Through time, fuel loading would continue to increase and vegetation would continue through successional pathways. Stands would continue to grow increasing fuel loading on the ground and canopy closure thus escalating the potential wildfire behavior. In the absence of prescribed fire and treatments, ladder fuels and canopy closure would be high, thus providing propellants for severe, high intensity wildfires. FRCC would not be reduced or maintained at a FRCC1, again reducing the natural forest resiliency and changes to fire. No Action would not create the DFC, return fire as an ecosystem process, reduce firefighting risks, or be cost effective due to suppression of all wildland fires.

### Alternatives B and C—Direct and Indirect Effects

Harvests increase fuel loading in a unit which increases the wildfire behavior potential. Hazardous fuels increase after harvest and can exist for up to 5 years because of the red needle slash and loftiness of the fuels. This slash has high ignition and spread potential. The hazard would be reduced with fuels treatments 1-2 years post harvest. Across the landscape the lack of variability in the horizontal and vertical fuel profile also increases the spread potential and intensity of wildfire. The proposed fire and fuels actions in Alternative B and C would change the fire and fuels environment by:

| Actions to Change Fire and Fuels Environment |
| --- |
| • Returning the natural disturbance process of fire with prescribed fire UB treatments;<br>• Reducing hazardous fuels to S&G and create variations in the horizontal and vertical fuel profile;<br>• Creating a mosaic and distribution of seral stages present in a mixed severity fire regime taking steps towards changing FRCC3 →FRCC2 → FRCC1;<br>• Increasing fire tolerant, shade intolerant conifers and reducing shade tolerant conifers;<br>• Creating safe and cost effective protection of life, structures, and resources through reducing the risk of potential high severity fires; |

All prescribed fire underburns would create variability across the landscape and return a vital disturbance process to the ecosystem. The distribution of seral stages that determine the FRCC would not completely change the Ball Park Thin Project Area from a FRCC3 or FRCC2 to a FRCC1. However, the treatments would move towards reaching the FRCC1, displaying more variation of seral stages that occurred under historic fire events. Changes to seral class have occurred for over 100 years. Future treatments would need to take place in order to reach that goal and create mid open and late open seral stage distribution that is needed under a FRCC1.

The proposed timber harvests will create varying amounts of timber activity fuels (slash) in each unit (see Table 2 in Chapter 2). The increased fine fuel loading from timber harvest may reduce the success of initial attack suppression operations due to the faster rate of spread and the flame lengths >4 feet. Activity fuels treatments would reduce the amount of fuel created from the harvests to the S&G fuel loading of 7-11 tons/acre for 0-3" diameter fuel. Fuels treatments are proposed to be within 1-2 years after the harvest. The reduction in fuel loading would reduce the potential wildfire behavior.

Table 37 displays the changes in fire behavior within the unit of treatment for existing, post harvest, and post fuels treatment conditions. Fire behavior that exceeds 4 foot flame lengths requires machinery or aerial support to reduce the risks to tooled firefighters.

**Table 37. Existing fire behavior**

| | Rate of spread (chains/hour) | Flame length (feet) | Crown fire with % mortality* | Spotting potential (miles) |
|---|---|---|---|---|
| FM5 | 117 ch/hr | 13 feet | Active w/ 99% mort | Yes at 0.6 miles |
| FM10 | 38 ch/hr | 11 feet | Active w/ 37% mort | Yes at 1.5 miles |
| FM12 | 37 ch/hr | 13 feet | Active w/ 97% mort | Yes at 0.6 miles |
| Post Fuels Treatment | 5 ch/hr | 2 feet | Active w/ 12% mort | Yes at 0.6 miles |

**:Crown fire activity is displayed as Active, which means that fire is present in both the surface fuels and canopy fuels.*
***:Post fuels treatment examines the fire behavior as FM8 because units would have lower fuel loading, higher CBH, and varying canopy density.*

| Forest Plan Standards & Guidelines to be met in fuel treatment units: |
|---|
| • reducing fuel loading of 7-11 tons/acre for 0-3" diameter fuel; |
| • maintaining duff coverage of 85% or more; |
| • weight of equipment and machinery would be with in range; |
| • downed woody debri minimum of 240 linear feet of representative DBH; |
| • IDT decision to keep mortality at 10% or less. |

The proposed treatment of Unit 2001 and 2002 would be a natural fuels underburn. This unit is along 1500-705 Road. A natural fuels underburn is completed without harvests being implemented. The UB would provide a reduction in fuel loading on the ground, reduce ladder fuels and vertical continuity, and create variations in the canopy closure through tree mortality. Mortality in these stands would be around 20% or less. The units would change from FM10 to a FM8 post UB. The fire behavior post burn aims to reduce the severity of wildfire behavior by reducing the spread potential of ground fire to crown fire, as well as reducing the severity of wildfire. Underburning is a preferred method of treatment not only to reduce hazardous fuels but to return fire to the ecosystem.

Underburns would take place during the spring or spring-like conditions where the soil and duff moisture are damp and fuel moisture in the large woody debris is high. These conditions slow or stop consumption which helps to retain sustainable levels of duff, soil coverage, and large woody debris often used by wildlife. Additionally, mortality of residual overstory trees can be controlled because of high live fuel moistures.

Underburns or broadcast burns may require handlines constructed around the perimeter. These are created prior to the burn and aid in containing the prescribed fire within the unit boundaries. Handlines are created by scraping fuel back to an 18" mineral soil line and scattering fuels that lie within 10 feet of the proposed line. If units are located on a steep slope waterbars are created within the fireline to reduce erosion.

On Units 270, 330, 240, 210 UB-buffers will be used if the unit is treated with an UB. This is to mitigate the need for handline along the unit boundary. Fire would not be able to move quickly or with much intensity in UB-buffers, the shaded and unharvested stand outside of the unit. The fire should not continue to move through the shaded area, thus a natural fire break or natural fire line is used instead of constructing handline. The UB-buffers are small and they fill in the distance from the harvest unit to the road. If fire does move up into the canopy in the shaded area, firefighters will aim to reduce the intensity in the unharvested stand.

Hand, grapple, and landing piles are covered with plastic following construction. This creates a drier pocket of fuel in the middle of the pile and enables them to be burned in the late fall or early winter when there is very low risk of the piles spreading into other fuels. Removing the plastic before burning is suggested in order to aid in reducing emissions from the plastic.

#### Alternatives B and C—Cumulative Effects

Cumulative effects are based on management activities that have or would occur in the Ball Park Thin Project Area. The area analyzed displays the direct and indirect effects of fire on the treated units which translate to the variation of fuel profiles over the sub-watershed landscape. Proposed fuel treatments, in concert with harvest activities, would help to diversify the fuel profile across the landscape. Future wildfire suppression actions will continue, however the proposed treatments aid in returning the natural disturbance to the landscape. Other future fire/fuels activities may be meadow burns. Bunchgrass Meadow was reviewed for prescribed fire due to the encroaching conifers and the potential loss of the open meadow in the future. Fire could be a proposal for meadow restoration in the next five years. This action would not create any negative effects as S&G would be maintained.  No other foreseeable actions are planned within Ball Park Thin Project Area that would contribute incrementally to the cumulative effects from past or currently proposed activities. No adverse effects on the fuel profile or on fire behavior would result from the proposed fuel treatments.

#### Alternatives B and C—Conclusion

Alternatives B and C fuels treatments would be conducted following S&G. FRCC 3 and 2 would move closer to FRCC 1. And all prescribed fire UB treatments would reintroduce the disturbance process of fire to the ecosystem.

## Air Quality

### Scale of Analysis

The area defined for direct, indirect, and cumulative effects analysis is the treatment units in the Ball Park Thin Project area, as well as, the larger landscape where smoke emissions can travel.
These are the location of the Design Areas and the Class I Airsheds.

## Affected Environment—Air Quality

The State of Oregon has been delegated authority for attainment standards set by the 1990 Clean Air Act and the 1977 Clean Air Act and its amendments. To regulate these standards, the state developed the Oregon Smoke Management Plan and the State Implementation Plan. These are guidelines and regulations for prescribed fire smoke emissions in Oregon. The Willamette National Forest has adopted this plan for emission control in Oregon (LRMP, 1990).

Designated Areas and Class I Airsheds are priority areas regulated in order to protect air quality. The Willamette Valley (at the eastern side, Leaburg), Oakridge, and Sisters are the closest Designated Areas to Ball Park Thin Project Area. Mt. Washington, Menagerie, and Three Sisters Wilderness are the closest Class I Airsheds to the Ball Park Thin Project Area (5, 9, and 10 miles respectively). Class I Airsheds are recommended to be protected from visibility impairment July 1 through September 15.

## Environmental Consequences—Air Quality

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

If no management actions take place in the Ball Park Thin Project Area no air quality impacts would occur in a scheduled timeframe. However, the risk of wildfire would still exist. In the event of a wildfire, air quality impacts are considerably higher than prescribed fire. Smoke emissions are not short term and can often last for many weeks or months, as witnessed during the Puzzle Fire in 2006 and GW Fires in 2007. Smoke emissions from wildfire are more likely to heavily impact communities and contribute to harmful, concentrated levels of PM 2.5 and PM 10 micrometers. Particulate Matter (PM) is hazardous to our health because the particles are small enough to penetrate through our throat and nose and enter our lungs (http://www.epa.gov/particles/). These are usually from industries, automobiles and fire smoke. Table 37 displays that emissions are considerably higher than prescribed fire emissions, posing risk to community residents, forest users, and firefighters. Acreage used for the above wildfire calculation was 1,114 acres, the number of harvest and treated acres (excluding the underburn buffers) in Alternative B.

### Alternatives B and C—Direct and Indirect Effects

Prescribed fire of activity fuels in the Ball Park Thin Project Area would comply with Oregon Smoke Management Plan regulations. Smoke emissions would be mitigated based on the timing of the burns, seasonality, forecasted transport wind direction, and weather. Regulations from the Oregon Smoke Management enforce specific days which are suitable to burn in relation to other land owners burning or weather forecasts. Prescribed fire would most likely be avoided between July 1 and September 15 in order to protect visibility standards for Class I Airsheds.

Recreationists and some local residents near Ball Park Thin Project Area may be temporarily impacted by smoke from the prescribed fire underburns or pile burning. In the Oregon Smoke Management Plan, non-harmful concentrations of drift smoke are considered nuisance smoke (Oregon SMP 1995). Mitigation measures, such as signing along the road or near the treatment area, would be taken in order to reduce the amount of nuisance smoke and notifications to the public would be made prior to burning.

Smoke emissions were predicted using the estimates from the debris prediction tables and FOFEM (First Order Fire Effects Model version 5.0). This model calculates particulate matter emitted based on the amount of fuel consumed. Fuel inputs were from the predicted post harvest data and based on a percentage of fuels that would most likely be consumed given the prescribed fire window. That is, weather and fuels dryness would be measured to achieve the objective of reducing the fuel profile across the unit. From past experience, fuels treatments often consume an average of 80% of the fine fuels (0-1 inch diameter), 60% of the 1-3 inch fuels and only about 20% of the 3-9 inch. LWD >9 inches is most often too wet to be consumed. FOFEM however consumes 100% of 1, 10, and 100 hour fuels in spring-like conditions. Table 38 summarizes particulate matter predicted for fuels treatment activities.

**Table 38. Summary of particulate matter emissions for Ball Park Thin Project Area for all treatments**

| | Alternative A – Wildfire | Alternative B and C |
|---|---|---|
| PM 2.5 total | 3122 tons/acre | 704 tons |
| PM 10 total | 3683 tons/acre | 934 tons |

It is important to note these emissions levels do not occur at one time. Additionally the model is assuming the ground fuels on the entire unit will be burned, but it is not likely due to GP and HP will not collect all the fuels and may not be through the entire units. Usually prescribed fires take place one unit at a time, and most likely one per day. For example, Unit 60 of 52 acres is predicted to have 17.1 tons/acre of 0-3” diameter fuel post-harvest. During the underburn, emissions are estimated at 11.4 tons/unit of PM2.5 and 13.1 tons/unit of PM10

**Alternatives B and C—Cumulative Effects**

No adverse effects on the air quality would result from the proposed fuel treatments. The area defined for cumulative effects is the Ball Park Thin Project Area, as well as the larger landscape where smoke emissions can travel. These are the locations of the Designated Areas and Class I Airsheds. Neither would be affected from the treatments. Smoke emissions would be short duration and mitigation measures would reduce the quantity of emissions during prescribed burns. Past management activities do not cumulatively add to air quality impacts from the proposed treatments. No other foreseeable management activities that would affect air quality are scheduled to occur in the Ball Park Thin Project Area.

**Alternatives B and C—Concusion of effects**

Smoke emissions from burns would be reduced and partly mitigated by conducting UB in spring-like conditions (as stated in the fuels treatment section). Pile burning will be done in the winter where fires will be highly unlikely to spread past the pile perimeter. All treatments should meet the S&G and Air Quality Regulations.

# Invasive Plants

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for invasive plants includes the project activity units, associated and adjacent roads, and the Deer Creek Subwatershed ($6^{th}$ field) of the Upper McKenzie Watershed ($5^{th}$ field) on the McKenzie River Ranger District.

## Affected Environment—Invasive Plants

The Willamette National Forest categorizes invasive plants into three groups, and control strategies will differ depending on species' classification.

| Invasive Plant Groups | |
|---|---|
| **1** | **Potential invaders** are those species located in adjacent National Forest or other lands that have a high probability of being detected on the Forest in the foreseeable future (next 15 years) because potential habitat exists here. |
| **2** | **New invaders** are those weed species just entering the National Forest and whose populations are possible to eradicate. |
| **3** | **Established infestations** include weed species that are so widespread on the Forest they are not likely to eradicate. Some species, such as blackberry, can have both new invader populations that are less than 10 plants and are outliers as well as established infestations such as those that are found bordering streams at lower elevations. |

Four species of new invasive plants are documented in the Ball Park Thin project area. Some species have greater potential to out-compete native plants and are more difficult to control than others, however, all of them are capable of adverse ecological impacts. The four new invasive species known to occur in the Ball Park Thin project area are listed below in Table 39:

**Table 39. Invasive Plants in the Ball Park Thin Project Area**

| Invasive Species | Proposed Units | *Recommended treatments |
|---|---|---|
| False brome (*Brachypodium sylvaticum*) | 360 | Mechanical Chemical |
| Spotted knapweed (*Centaurea maculosa*) | 30, 130, 140 | Manual/Mechanical/Chemical |
| Dalmatian toadflax (*Linaria dalmatica*) | 40 | Manual/Mechanical/Chemical |
| Deptford pink (*Dianthus armeria.*) | 360 | Mechanical Chemical |

* = in addition to Ch. 2 mitigation measures, design criteria, and BMPs
Manual=hand pulling/digging before seed production
Mechanical=mowing/cutting just after flowering has ended, but before seed matures
Chemical=use of one or more herbicides approved for application in the Willamette National Forest Integrated Weed Management EA (March 2007)

With the exception of false brome, the other new invader plants documented in the project area are considered shade-intolerant and generally confined to roadsides and open areas. One of many ecological advantages of invasive or non-native plants is the lack of native competition to keep populations balanced. More so, prolific propagation and the ability to disperse large amounts of seed is probably the greatest advantage invasive plants have in native ecosystems.

Proposed actions may introduce or spread invasive and non-native plants. In most cases, the risk of worsening the Forest invasive and non-native plant problem can be minimized through proper inventory and project design. Opportunity for invasive plants to establish and out-compete native vegetation may be caused by implementation equipment and/or disturbance from activities in both action alternatives.

Because the vast majority of the Forest's invasive plant infestations occur along road shoulders, road maintenance represents a particular risk for inadvertently spreading weeds. Road maintenance activities across the Forest risk the spread of new invader species from one watershed to another. Activities such as grading, brushing, mowing, culvert upgrades, and ditch cleaning can contribute to the spread of invasive plants along road corridors by transporting seeds from infested sites to un-infested areas.

## Environmental Consequences—Invasive Plants

### Alternative A (No Action)—Direct and Indirect,

Selecting Alternative A would allow the same level of invasive plant control as currently programmed. New and potential invader plant populations documented in the Ball Park Thin project area would remain highest priority in receiving treatment and monitoring.

The No-Action alternative would not provide further opportunities to contain or control invasive plant populations. It would also not reduce the current rate of spread of these species within the project area.

### Alternatives B and C—Direct and Indirect Effects

Alternatives B and C both would have similar direct impacts on invasive plants because both propose similar acres of harvest, fuel treatments, road maintenance, and road decommissioning. Additionally, both action alternatives propose the same acreage in terms of harvest systems. The ground disturbance caused from implementation may provide suitable conditions for invasive plants to establish or out-compete native vegetation. However, if one considers the potential ground disturbance resulting from harvest activities and an additional difference of 10% in canopy retention between the action alternatives, Alternative B poses the least risk of impacts to invasive plants.

Most of the invasive plant populations in the Ball Park Thin project area are established along roads and are mainly spread by vehicular traffic. False brome and Deptford pink occur on roads adjacent to units proposed for harvest, ground-based yarding, and under-burning fuels treatments. These populations should be treated prior to implementing any action alternative, subsequently treated and monitored for at least three years.

With mitigation measures identified in Chapter 2, selecting either of the alternatives would result in moderate risk of further spreading or introducing invasive plants. With mitigation measures, the proposed actions would have a low risk of spreading invasive plants onto adjacent properties by hauling across ownership boundaries.

### All Alternatives– Cumulative Effects

The scale of analysis for cumulative effects is the Ball Park Thin project area This analysis addresses known distribution of invasive plants and likely travel routes for the proposed projects.

Management activities in the last 50 years include road construction, road maintenance, and timber harvest. Included in these activities are the Eugene Water and Electric Board (EWEB) power line corridor, as well as the vegetation management activities associated with it.

Even without past or present management actions, invasive plants would still be present from natural and biological vectors. Invasive plants are present on the properties of adjacent landowners and along the Highway

126 corridor. However, past harvest and road maintenance activities within the Ball Park Thin project area have provided additional opportunities for establishment and spread of invasive plants. Some management actions, such as harvest and yarding, result in short-term disturbance conducive for invasive plant establishment. The effects of these actions are greatest at the on-set of implementation and often decrease over time and with stand succession.

Other management activities like road construction or maintenance often result in longer-term effects to invasive plant infestations. This is because roads serve dual functions by acting as suitable ground for the establishment of invasive plants and by providing the plants access to a host of potential vectors.

Because of the design criteria and mitigation measures, the actions proposed in Alternatives B or C, along with past and reasonably foreseeable activities in the analysis area, are not expected to cumulatively add to a significant increase in invasive plants. The potential opportunities afforded by this project would provide additional resources to treat the new invader species in the Ball Park Thin project area. It would also assist in reaching the goal of control and eventual eradication of *new* invader plants. This would result in an overall net improvement of invasive plants in the Ball Park Thin project area.

# Roads and Access

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Roads and Access includes the project activity units and the McKenzie Deer Creek 6th Field sub-watershed, which is also the Ball Park Thin Project area.

## Affected Environment—Roads and Access

The project area includes approximately 77.9 miles of Forest roads. There are no State or Federal Highways, County roads, or private roads within the project area boundary on the McKenzie River Ranger District. The Forest road system consists of 6.1 miles of arterial road, 20.7 of collector road and 51.1 miles of local roads. There is 0.42 miles of unclassified road.

Past management activities in and near the Ball Park Thin Project area have provided the current network of Forest Roads, mainly from timber sales. The current system of roads provides sustainable access to the area for administration, protection, public recreation, and forest product utilization, consistent with the Willamette Forest Plan. This section incorporates by reference the Willamette National Forest Road Analysis Report (USDA Forest Service. 2003), which provides detailed information regarding the Forest roads, describing maintenance levels, maintenance costs, and management direction.

### Existing Condition of the Road System

Road 1500 is the only road classified as an arterial within the planning area. Road 1500 is a single lane aggregate surfaced road within the planning area, although it is paved with asphalt surfacing on both the north and south ends. Road 1500 provides seasonal access between US Highway 20 on the north, and State Highway 126 to the south. Roads 2654 and 2655 provide the primary access to the central and eastern parts of the planning area..

There are 41.63 miles of Key Forest Roads identified in the Roads Analysis Report for this project area. These roads are the 15, 1500-700, 1500-705, 1500-720, 1506, 1509, 2654, 2655, 2655-503, and 2655-507. The

Roads Analysis Report identified a need for these roads for long-term management of the Forest, access to recreation opportunities, and private lands. They are the priority roads that are open to the public and maintained for vehicular traffic. These key roads provide the long-term transportation network necessary to meet forest management objectives. These Key Roads and numerous secondary roads are primarily surfaced with crushed rock.

There are currently 11.4 miles of forest road in the project area that are closed. The roads are closed by means of gates, berms or other physical barriers implemented through road management, or naturally by brush growth or blown down timber. 5.55 miles of road in the project area have been decommissioned.

The current road system allows the Forest Service administrative access to conduct a wide variety of forest management and fire protection activities in the area. Access is also provided for inspection and maintenance of the Eugene Water and Electric Board powerline facilities. The Forest roads provide access to the McKenzie River National Recreation Trail. Numerous dispersed campsites are accessible by roads in the project area. In addition, current roads provide the means to transport timber products from the National Forest. These roads also allow public use of firewood and special forest products.

The road system receives annual maintenance in accordance with established road management objectives. However, over the last decade, a limitation on road maintenance funds on the Forest has resulted in a backlog of maintenance work to reduce brush, clean out drainages, and repair road surfaces on many of the Key and secondary roads in the project area. There are drainage improvements which need to be implemented prior to commercial haul, in order to protect water quality. Many of the culverts on the roads are in poor condition and in need of replacement.

## Environmental Consequences—Roads and Access

### Alternative A (No Action)—Direct,Indirect, and Cumulative Effects

Alternative A would not change the use pattern of roads, or correct existing road erosion problems. Without timber harvest related road maintenance, the existing budgetary trend makes it unlikely that funding would be available to support adequate road maintenance, which could eventually result in unsafe traveling conditions for public and administrative traffic, as well increasing the possibility of resource damage. There is currently a backlog of road maintenance and some local roads are becoming impassible due to fallen trees or the growth of brush. Culverts that are not maintained because of impassible roads could plug and cause washouts. Current invasive plants rate of the spread could continue on roads not maintained.

### Alternatives B and C—Direct and Indirect Effects

Road maintenance as identified in Chapter 2 would occur under all action alternatives, and would protect the road infrastructure, improve safety of the road, improve drainage, and reduce the spread of invasive plants. Action alternatives may cause a temporary increase in sedimentation while the work is being done, but in the long term, would decrease the volume and velocity of water that carries sediments into creeks. Newly graded or surfaced roads, improved drainage structures, and upgraded culverts could increase sediment production until road surfaces stabilize.

Maintenance activities could cause some short-term delays or detours for road users while roadwork is being performed. Road maintenance would protect the existing road infrastructure, improve safety of the road, decrease sedimentation, and reduce the spread of Invasive Plants. Brushing roads increases sight distance to increase visibility for safe driving. Blading, ditch maintenance, culvert replacement, surface rocking, and installing dips or waterbars corrects or improves water drainage. Removing ditch slough, or accumulated soil, to predetermined disposal locations would reduce the likelihood of spreading Invasive Plants. Designated water sources for filling water tankers for compaction and dust abatement operations are not expected to affect stream flows.

After the road decommissioning, the open road density within the project area would not be changed. The roads to be decommissioned are presently closed to traffic. The proposed road decommissioning would reduce existing road erosion problems, and reduce road maintenance costs. Roads treated by the project would be left in a condition to drain properly and protect water quality.

There would be fewer roads for public and administrative vehicle access for recreation, reforestation, fire and noxious weed control. It would cost more to suppress fires or treat weeds if vehicle access is prevented (walking in to the affected areas would be required). However, the cost of maintaining a road that has been effectively decommissioned and has self-maintaining water drainages is less costly than keeping it open.

#### Alternatives B and C—Cumulative Effects

The effect of past management actions have created a 77.9 mile Forest Service road system within the Ball Park Thin Project area that requires consistent road maintenance levels to provide adequate resource protection. Alternatives B and C would provide this necessary road maintenance on the haul routes. The incremental cumulative effect of all action alternatives would be to reduce the miles of road available for access within the project area by approximately 0.53 miles. Public access would be unchanged. There are no additional foreseeable future Forest Service management actions that would add to or subtract mileage from the current roaded condition of the project area.

# Recreation

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Recreation resources includes the project activity units and the Deer Creek 6$^{th}$ field watershed, which is also the Ball Park Project area.

## Affected Environment—Recreation

The project area offers no developed recreation activities and limited opportunities for dispersed recreation. A portion of the McKenzie Wild and Scenic River corridor is within the project area, however the river itself is outside of the project area. Adjacent to the project area is the West Cascades National Scenic Byway, which includes a portion of State Highway 126.

The forested slopes along the McKenzie River form an important scenic backdrop to the National Scenic Byway. The McKenzie River and its adjacent lands are a favorite location for fishing, hunting, hiking, biking, photography, picnicking, and boating. The McKenzie River National Recreation Trail is located adjacent to and southwest of the project area.

Developed recreation sites located nearby but outside of the project area include: Trail Bridge Campground, Ollalie Campground and Boat Launch, and Frissel Boat Launch. The project area receives light to moderate dispersed recreation use. Recreational activities include berry picking, viewing scenery, dispersed camping, picnicking, fishing, and hunting. Hunting is particularly heavy for deer and elk in the fall. There are no recreation residences or special use permits within the project area.

**Recreation Opportunity Spectrum (ROS)**

The Forest Service uses a land classification system to inventory and describe a range of recreation opportunities called the Recreational Opportunity Spectrum (ROS) from the Willamette Forest Plan FEIS, page III-93. This system seeks to identify recreation settings of varying characteristics that range from remote, undeveloped areas to easily accessed highly developed sites. Settings are described in the following five ROS Classes: Primitive, Semiprimitive Non-motorized, Semiprimitive Motorized, Roaded Natural, and Roaded Modified. Primitive falls on the most unmodified natural environment end of the spectrum and Roaded Modified falls on the most substantially modified end of the spectrum. Table 40 displays the ROS for those Management Areas within the project area.

**Table 40. Recreation Opportunity Spectrum for the Project Area**

| Willamette Forest Plan Management Areas | ROS Class | Unit(s) |
|---|---|---|
| 4 – Research Natural Area,<br>5a – Special Interest Area,<br>6d – McKenzie River W&S,<br>9c – Marten Habitat,<br>9d – Wildlife Habitat – Special Area | ROS – Roaded Natural | None. |
| 14a – General Forest | ROS – Roaded Modified | All activity units are located within this ROS Class. |

**Recreational Driving**

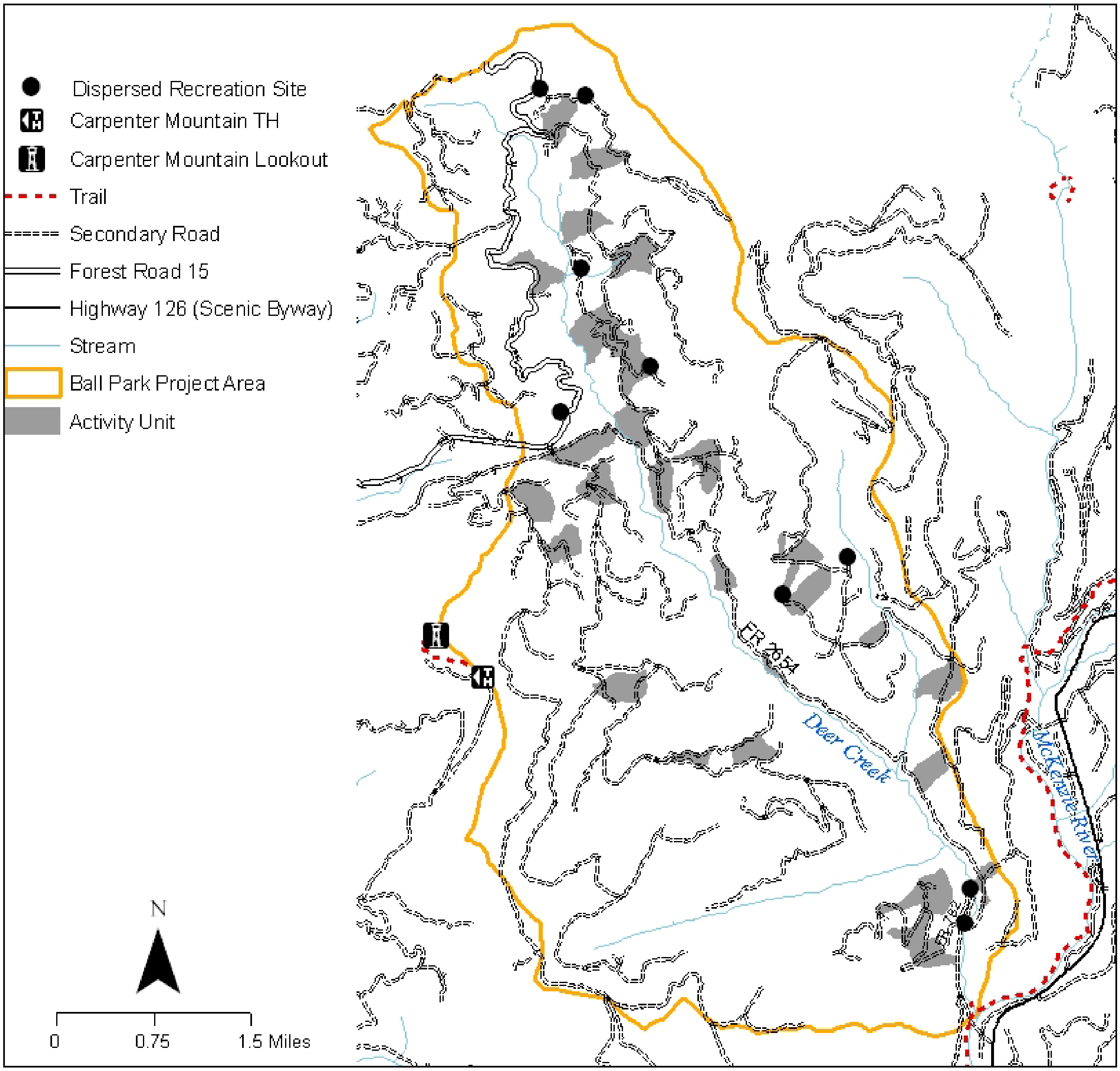
The most noticeable driving for pleasure (sightseeing) occurs along the West Cascades National Scenic Byway, a segment of which lies just outside the project area. It receives heavy traffic from motorcycles, RVs, logging trucks, passenger cars and pickups, as well as bicycles. Fewer vehicles travel the Forest roads within the project area with use decreasing in the winter months due to the snow levels. When the roads are accessible, use fluctuates from very light on most dead end roads to moderate use on secondary and collector roads. Within the project area, secondary and collector roads receive increased use during the hunting season.

**Dispersed Camping**

There are nine known dispersed sites within the project area. These sites are usually associated with favorite hunting areas and get-away-spots, and are often located near water or at the end of a dead end road. Figure 27 illustrates these dispersed sites in relation to activity units and the existing road system.

The lower stretch of Deer Creek, in particular, receives a moderate amount of use with dispersed sites along Forest Roads 782 and 2654. Steep slopes along Deer Creek make this stream generally inaccessible, except for this one mile stretch before the confluence with the McKenzie River. Just outside the project area near the confluence and along the McKenzie River National Recreation Trail, is Deer Creek Hot Springs. Also known as Bigelow Hot Springs, this one pool spring is situated in the bank of the McKenzie River offering visitors a primitive soaking experience. Optimum use time is during summer and fall seasons when the river level is lower.

**Figure 25. Recreation features within and adjacent to project area.**



Wolf Meadow is another popular dispersed area, located near the western edge of the project boundary. There was a Forest Service campground at this location that was decommissioned several years back. Camping still occurs in this now primitive, dispersed camping area.

**Developed Sites**

There are no developed recreation sites within the project area. There are dispersed sites that are utilized for day use and overnight use that are illustrated in Figure 27, above. Developed recreation sites located nearby but outside of the project area include: Trail Bridge Campground, Ollalie Campground and Boat Launch, and Frissel Boat Launch.

**Trails**

Approximately 1000 feet of the McKenzie River National Recreation Trail dips into the south end of the project area. As well, approximately 1000 feet of the Carpenter Mountain Trail that leads to the fire lookout traverses the ridge of the project area and circles inside the west end of the project boundary near the top of Carpenter Mountain. These are the only active system trails within the project area.

## Environmental Consequences—Recreation

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Recreation use of the National Forest in the project area would remain unchanged with the no action alternative. The recreating public would continue to use the project area for recreational purposes, and would continue current use of dispersed sites, trails, and roads. Alternative A does not manage forested stands within recreation areas and there are no ongoing or reasonably foreseeable projects in the area. Therefore, Alternative A would have no direct, indirect, or cumulative effects on recreation within the project area.

### Alternatives B and C—Direct and Indirect Effects

Short terms effects of proposed timber harvesting, log truck hauling, and fuel treatments would include the following: localized road closures, and disruption to hunting, hiking, camping, and driving in some areas. The logging activity, hauling, and fuel treatments could cause noise and dust or smoke disturbance. The duration of these effects would only last for the duration of implementing the stand treatment. It is unlikely that all recreation use in the area would be affected at the same time.

### Alternatives B and C—Cumulative Effects

Past activities in the Ball Park project area included timber harvest and road construction, creating a network of roads. These activities have opened vehicle access to Forest lands where dispersed recreation activities may occur. The incremental effects of all action alternatives would be to reduce approximately 0.53 miles of road, as discussed in Chapter 3, Roads and Access. Dispersed recreation activities nearby will be accessible after reduced access is implemented. There is no foreseeable future management action planned, which would add cumulative effects to the recreation uses condition in the project area.

# Scenic Quality

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Scenic Quality includes the project activity units within Forest Plan Management Allocation 14a in the Deer Creek 6$^{th}$ field watershed, which is also the Ball Park project area.

## Affected Environment—Scenic Quality

The landscape within and adjacent to the project area is generally characterized as being a Douglas-fir dominant forest. From the road and river corridors, views are made up of an even-aged or uniform appearing overstory of Douglas-fir trees, hemlock and hardwood understory tree species, and common shrubs such as rhododendron, vine maple, and Oregon grape. Past and present natural and human caused disturbances/modifications (including: fire, disease, timber harvest, fire suppression, and road development) are visible within and adjacent to the project area.

There are openings in the project area from past timber management activity (within last 60 years). Some older existing openings are visible in the scenic viewshed but these stands are considered vegetatively recovered, as defined by Willamette Forest Plan standards and guidelines. Some management created openings above the river are visible from State Highway 126.

### Visual Quality Objectives (VQO)

The Forest Plan establishes Visual Quality Objective (VQO) categories to describe degrees of acceptable alteration of the natural landscape when considering timber stand management (Forest Plan FEIS, page III-112). Objectives range from allowing ecological change only to allowing for human activity to dominate the characteristic landscape. The five VQO categories are: Preservation, Retention, Partial Retention, Modification, and Maximum Modification. Following is a description of each category:

| Visual Quality Objectives |
|---|
| **Preservation:** Provides for ecological change only. |
| **Retention:** In general, human activities are not evident to the casual forest visitor. |
| **Partial Retention:** In general, human activities may be evident but must remain subordinate to the characteristic landscape. |
| **Modification:** Human activities may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture, and appear as natural occurrence when viewed in foreground or middleground. |
| **Maximum Modification:** Human activity may dominate the characteristic landscape but should not appear as a natural occurrence when viewed as background. |

**Table 41. Visual Quality Objective categories for the management areas that contain activity units.**

| Willamette Forest Plan Management Areas | VQO category | Unit |
|---|---|---|
| 14a - General Forest | VQO – Maximum Modification | All activity units are located within this MA |

**Upper McKenzie River Wild and Scenic River and West Cascades National Scenic Byway**

The McKenzie River Wild and Scenic Corridor and the West Cascades National Scenic Byway are both visually sensitive areas that require consideration during land management planning. The McKenzie River was designated in 1992 based on a set of outstandingly remarkable values, including scenery. In 2000, the West Cascades Oregon Scenic Byway was federally designated as a National Scenic Byway by the Federal Highway Administration and extends approximately 220 miles from Estacada to Westfir, Oregon. The West Cascades National Scenic Byway traverses the western edge of the Cascade Mountains and a segment of the route includes Highway 126 from its junction with Highway 20 south to Forest Road 19.

Approximately 85 acres of the river corridor falls within the project area and has a VQO of retention and partial retention. Approximately 3,300 acres of the scenic byway viewshed overlaps the southern portion of the project area and a small piece along the western edge. VQO for this area is primarily maximum modification, with a small portion retention/partial retention where it overlaps the river corridor.

## Environmental Consequences—Scenic Quality

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Scenic quality along the West Cascades National Scenic Byway and Upper McKenzie River Wild and Scenic River Corridor would remain unchanged. The No Action Alternative would not harvest timber stands in any visual management areas in the Ball Park planning area, and there are no ongoing or reasonably foreseeable projects in the area. All visually sensitive Management Areas remain consistent with Forest Plan standards and guidelines, and VQOs are met. Alternative A would have no direct, indirect, or cumulative effects on scenic quality in the project area

### Alternatives B and C—Direct and Indirect Effects

Short term effects to visual quality for the Ball Park project area would be limited to exposed stumps from harvested trees, less dense forested stands (increasing depth of view), slash or underburned areas, and possibly dust from transporting forest products from the forest on unpaved forest roads. Long term effects would include fewer exposed stumps due to vegetation recovery (3-6 years and after), and larger diameters and larger crowns of residual trees due to increased growing space. Intermediate harvest treatments, including fuels treatment, are expected to accelerate stand development toward a more natural range of conditions and scenic diversity in the project area. Units within the scenic byway viewshed (360, 370, and 390) will meet VQO standards and guidelines. The prescriptions for these units will result in a more open forest canopy and scenic byway motorists may glimpse small openings. However, more visually interesting structure, depth of view, and mix of vegetative species are likely long term effects of proposed vegetation entry.

#### Alternatives B and C—Cumulative Effects

Considering that Alternatives B and C would include thinning of a small portion (less than 1%) of the scenic byway viewshed, there would be no adverse effect on the scenic quality. Short term acceptable effects from the thinning are recognized.

The proposed action and Alternative C would not contribute additional adverse effects to visually sensitive areas located along Highway 126. These modifications would still maintain modest scenic quality as required in the Forest Plan, and may result in visually interesting stand structure, depth of views, and mix of trees and understory species. Therefore, no long-term adverse incremental cumulative effects to scenic quality are anticipated considering the direct and indirect effects from the proposed action and the action alternatives. Also, no reasonably foreseeable future management actions are planned for the project area which would result in additional cumulative effects to the scenic quality.

## Roadless and Unroaded Areas

### Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Roadless and Unroaded areas includes the project activity units and Forest Service lands in the Deer Creek 6$^{th}$ field watershed, which is also the Ball Park project area.

### Affected Environment—Roadless and Unroaded Areas

The Ball Park project area does not contain any Inventoried Roadless Areas (IRA). The project area does contain about 1,500 acres of unroaded areas, 200 acres, of which is part of a contiguous unroaded area 1,000 acres or more in size as analyzed in the Willamette Pilot Roads Analysis, 2003 (USDA Forest Service, 2003). These unroaded areas do not exist in large blocks due to extensive road building in this area over the past 50 years. No project activities are proposed within the unroaded areas. Existing roads provide access to a majority of proposed harvest units. None of the harvest units have portions that are greater than 1/2 mile from an existing road or a previously harvested stand.

### Environmental Consequences—Roadless and Unroaded Areas

#### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Alternative A would not implement any management actions within the project area. Alternative A does not manage forested stands within IRA's or unroaded areas. There are no ongoing or reasonably foreseeable projects in the area. Therefore, Alternative A would have no direct, indirect, or cumulative effects on unroaded areas or on any roadless values that currently exist within the project area.

#### Alternatives B and C—Direct and Indirect Effects

There is no proposed harvest or road building in IRA's or unroaded areas. Therefore, Alternatives B and C would have no direct or indirect effects on IRA's or unroaded areas or on any of the following roadless values that currently exist within those areas:

- Soil, water, and air quality
- Diversity of plant and animal communities
- Habitat for TES species and biological strongholds
- Traditional Cultural Properties and Sacred Sites

**Primitive, Semi-Primitive Non-Motorized Classes of Recreation**

With clear evidence of past forest management, the landscape in the Ball Park project area is characterized as a patchwork of natural stands and second growth conifer plantations. As stated elsewhere in this chapter, the proposed partial cutting in Alternatives B and C, would all remain within Forest Plan standards and guidelines for ROS and VQO, and would not adversely affect the existing scenic quality of the landscape.

**Landscape Character and Scenic Integrity**

There are limited opportunities for recreation activities that depend on remoteness and wilderness-like experiences in this area, as discussed elsewhere in this chapter (see Recreation and Scenery). Roads are either visible or vehicles can be heard on roads from any location in the project area. Except for short term noise and traffic occurring during project implementation, the proposed action and other action alternatives would not diminish any sense of remoteness or solitude that currently exist within any unroaded areas in the project area.

**Alternatives B and C—Cumulative Effects**

Since the 1950s, timber sales have modified approximately 7,254 acres within the project area with primarily regeneration harvest (see Table 16). Timber sales have also contributed to the development of a 100-mile network of roads in the area. As a result, there are now roughly 1,500 acres of unroaded areas within the project area.

There is no proposed harvest or road building in IRA’s or unroaded areas. No other management actions are planned for the project area that would result in additional affects to unroaded areas.

# Social/Economics

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Social/Economic issues includes the project activity units is the Ball Park Thin Project area and the surrounding communities that would be affected by the proposed project.

## Affected Environment—Social/Economics

The Ball Park Thin Project area is situated along Oregon State Highway 126, between the communities of Nimrod to the west, and McKenzie Bridge to the east. The communities of Blue River and Rainbow, Oregon are also located within or adjacent to the project area. Highway 126, a major travel route for commercial and recreation traffic passing through these communities, follows along the McKenzie River.

The economy of the local communities from the Springfield urban-growth boundary to McKenzie Bridge depends on a mixture of tourism, recreation, timber industry, and Forest Service jobs for stability. Local businesses that rely on tourism and recreation include: Hoodoo Ski Bowl, many inns, lodges, restaurants, stores, gas stations, along with the outfitters and guides. Timber industry jobs include a variety of woods and mill jobs.

Forest Service jobs in the Willamette and Deschutes National Forest vicinity are located at McKenzie Bridge, Sisters, Detroit, and Sweet Home Ranger Stations. Tourism and recreational activities connected with National Forest lands have been on the increase in recent years for the upper McKenzie River area. Employment connected with tourism and recreation-related services have also increased.

The current level of timber harvesting on the Willamette National Forest has dropped substantially from the levels of the mid-1980s. This decrease has contributed to a decline in the number of local jobs associated with the wood products industry in the area.

## Environmental Consequences—Social/Economics

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

The no-action alternative would not harvest any timber, and therefore, would not support direct, indirect, and induced employment. It would not result in increased income to the regional or local economy. Current levels of employment in the wood products sector would not be affected by this project.

### Alternatives B and C—Direct, Indirect, and Cumulative Effects

All action alternatives are economically viable, considering current selling values, timber volume per acre, yarding systems required, the proposed temporary road construction and system road maintenance needed, and the identified post-timber harvest projects identified in this analysis. The economic analysis run to make this determination is available in the Ball Park Thin Project analysis file at the McKenzie River Ranger District office.

In general, the primary effect on timber harvest-related employment would occur from commercial timber harvest associated with the action alternatives over the next three to seven years. As the alternative volume tables in Chapter 2 indicate, both action alternatives would provide some opportunity for timber harvest-related employment, and higher revenues. Alternative C, would provide slightly higher revenues than Alternative B. Table 42 discloses costs and revenues and the estimated present net value of each of the action alternatives, based on an average base period price of $22.76/CCF (100 Cubic Feet).

Though the combined economic benefit from implementation of any of the action alternatives is expected to be positive, each of the alternatives from the Bridge Thin Project would have a localized beneficial effect for the socio-economic environment of western and central Oregon.

**Table 42. Estimated Present Net Value of Alternatives.**

| | Alternative A<br>No Action | Alternative B<br>Proposed Action | Alternative C |
|---|---|---|---|
| ***Volume (MBF / CCF)*** | 0 | 12,347 / 24,238 | 13,133 / 25,759 |
| ***Discounted Costs*** | $0 | $5,320,534. | $5,861,458 |
| ***Discounted Revenues**** | $0 | $5,449,820 | $6,045,690 |
| ***Present Net Value (PNV)*** | $0 | $129,286 | $184,232 |
| ***PNV per Acre*** | $0 | $121 | $173 |
| ***Benefit/Cost Ratio*** | 0 | 1.0243 | 1.0314 |

* Discounted Revenues based on July 2008, selling values.

# Heritage Resources

## Scale of Analysis

The geographic scale used to assess direct, indirect and cumulative effects for Heritage Resources includes the project activity units in the Ball Park Thin Project area.

## Affected Environment—Heritage Resources

Archaeological materials recorded within the Ball Park Thin project area represent Native American lithic scatters and lithic isolated finds. The archeological sites within the project area are considered potentially eligible to the National Register of Historic Places (NRHP) and would be protected from project activities. The proposed Ball Park Thin Timber Sale has the potential to affect one of the known cultural sites within or near the project area. To protect these potentially eligible sites the project was redesigned by dropping portions of timber sale stands.

**Prehistoric Use**

Ethnographic research has indicated that pre-contact and early historic aboriginal groups, probably the Molala, Kalapuya, and their ancestors used the general area for the main purpose of seasonal hunting, fishing, and plant gathering. In 1855 the surviving Molala and Kalapuya people signed the Dayton Treaty, which gave up all rights to land in the western Cascades and led to their removal to the Grand Ronde Reservation. By the end of the nineteenth century, the Kalapuya were reduced to less than 20% of their original numbers and only 31 Molalas remained.

Ethnographic evidence suggests that several highly mobile groups indigenous to the western Cascade Mountains lived during the winter along low elevation streams, accessing the uplands during the summer and fall to hunt game and gather berries and other important plant resources. The Molala are linguistically related to Willamette Valley groups, but are thought to be a montane-based band that were living in the western Oregon Cascades during the historic period. The Molala generally are known to be split into two subgroups: the Northern Molala located in the vicinity of Mount Hood's drainage systems and the Southern Molala located west of the Klamath Lake area. Little is known of a third group, referred to as the Upper Santiam/Santiam band of Molala know to have occupied Linn and Lane counties in areas between the Northern and Southern groups. The Molala are also often culturally grouped with the Kalapuya who were based in the Willamette Valley but probably made seasonal forays to the Cascades for large game and berries. Many of the Molala and Kalapuya were removed to the Grand Ronde Reservation in western Oregon after the signing of the Dayton and Molalla Treaties of 1855) Other Molala shifted to the Siletz Reservation along the Oregon coast, the Klamath reservation the to the south and east into Central Oregon where they were absorbed into the Confederated Tribes of Warm Springs Reservation of Oregon.

Pre-contact resources include chipped obsidian lithic scatters and obsidian lithic isolates, representing tool use, modification, or manufacture related to hunting and gathering. Ongoing stone tool analysis, both by agency archaeologist and contractors, suggests that this portion of the Cascades was occupied primarily by people indigenous to the Cascades. Those people were probably ancestral to the Molala people that were involved in early but unratified treaties of the 1850s.

**Historic Land Use**

Historic accounts document the presence of horse-mounted Warm Springs Indian traveling into and through the area in the late 1800s and early 1900s (Williams 1988); these seasonal travels were motivated by the need for forage for horses, huckleberry gathering, inter-tribal contacts and visiting, hunting, fishing, trading with white settlers, and travel to seasonal cash employment, such as picking hops in the Willamette Valley (Bergland 1992).

The earliest recorded permanent Euro American settler in the vicinity was John Templeton Craig, who homesteaded at Craig's Pasture (now McKenzie Bridge) in the 1860s. The prospect of a toll road over the McKenzie Pass began to draw settlers into the area after 900 cattle and nine wagons made it over the pass on a rough track (the Scott Wagon Road) in the fall of 1862.

The Town of Blue River was founded in 1886. Subsistence hunting, farming, and stock raising were the primary lifestyles of the early settlers. A greater influx of people into the area was encouraged by the passage of the Forest Homestead Act in 1906, which allowed homesteaders to claim land set aside as national forest. The first sawmill in the region was opened on the lower McKenzie in 1851 however systematic logging of huge forest did not occur until the 1890s. Hwy 126 was constructed by the CCC in the 1930s the Belknap CCC camp formerly occupied the site of the McKenzie River RD. The first sawmill in the region was opened on the lower McKenzie in 1851 however systematic logging of huge forest did not occur until the 1890s. Hwy 126 was constructed by the CCC in the 1930s the Belknap CCC camp formerly occupied the site of the McKenzie River RD.

Historic use Administrative use appears in the form of trails and early logging activity. The Santiam NF Maps (1913, 1931) and the Cascade National Forest 1925 map depict several historic or prehistoric trails crossing through the project area. These include the Castle Rock Trails and trails to Deathball Rock and Thors Hammer. Several historic structures clustering around the Blue River, McKenzie Bridge, and Rainbow areas are visible on Forest Service maps dating back to the 1920s. A historic ranger Station at McKenzie Bridge, along with the Paradise and Blue River Guard stations, is also noted on Forest Service maps between 1913 and 1931. The Belknap CCC camp was located at the present site of the McKenzie River Ranger Station (Gauthier et al. 2007).

## Environmental Consequences—Heritage Resources

### Alternative A (No Action)—Direct, Indirect, and Cumulative Effects

Implementation of the no action alternative would not directly or indirectly affect cultural resources since there would be no change to the integrity of heritage resource sites.

### Alternatives B and C—Direct and Indirect Effects

Implementing both of these alternatives would result in ground disturbance on 915 acres of timber harvest of previously managed stands (i.e. plantations), less than 3.0 miles of temporary spur road construction, 0.53 miles of road decommissioning, 43.9 miles of road maintenance and 49 acres of natural fuels underburn. Since appropriate and approved surveys and cultural site protection measures are already in place for this project (see Mitigation Measures Chapter 2), then potential direct effects would be in the form on inadvertent damage to the integrity of cultural resources which were not discovered during initial survey. Any sites uncovered during implementation of the project would require the application of Design Measures described in Chapter 2.

**Alternatives B and C—Cumulative Effects**

It is not anticipated that there would be cumulative effects to the potentially eligible cultural resources in the Ball Park Timber Sale Project Area from any of the proposed actions as long as the Heritage mitigation and Design Criteria are implemented prior to timber harvest and associated activities.

# Compliance with Other Laws, Regulations and Executive Orders

This section describes how the action alternatives comply with applicable State and Federal laws, regulations and policies.

## State Laws:

**Oregon State Scenic Waterway –** Segments of the McKenzie River are also designated Oregon State Scenic Waterway, which is administered by the Oregon State Parks and Recreation Department. The State Scenic Waterway segments have a dual classification, with the west side of the McKenzie River classified as Scenic River Area and the east side of the river classified as Recreation River Area. Scenic Waterway Act and Commission rules require the evaluation of proposed development within ¼ mile from each side of the river. No timber harvest or any other actions are proposed within the State Scenic Waterway-Scenic River Area.

## Federal Laws and Executive Orders:

**The Preservation of Antiquities Act, June 1906 and the National Historic Preservation Act, as amended, October 1966 –** Before project implementation, State Historic Preservation Office consultation is completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated June 2004. Field surveys where ground-disturbing activities would occur in the Ball Park Thin Project area have been completed. All known archaeological sites in the project area are protected by avoidance.

Should previously unknown sites be found during ground disturbing activities, contract provisions would provide protection and the McKenzie River District Archaeologist would be immediately notified.

These various measures resulted in a determination of No Historic Properties Affected. Because cultural resources would not be affected by proposed activities under any action alternative.

**The Endangered Species Act (ESA), December 1973 –** The ESA establishes a policy that all federal agencies would seek to conserve endangered and threatened species of fish, wildlife and plants. Biological Evaluations for plants and wildlife have been prepared, which describes possible effects of the proposed action on sensitive, and other species of concern that may be present in the project area. The ESA effects determination and rationale for bull trout and spring Chinook salmon is described as Not Likely to Adversely Affect and has been found consistent with the *Biological Assessment for Fiscal Year 2007-2009 Low-Risk Thinning Timber Sales on the Mt. Hood and Willamette National Forest, and portions of the Eugene and Salem Bureau of Land Management Districts* (Appendix B).

**Clean Air Act Amendments, 1977** – The alternatives are designed to meet the National Ambient Air quality standards through avoidance of practices that degrade air quality below health and visibility standards. This project is consistent with by the 1990 Clean Air Act and the 1977 Clean Air Act and its amendments (see Fire and Fuels).

**The Clean Water Act, 1987** – This act establishes a non-degradation policy for all federally proposed projects. Compliance with the Clean Water Act would be accomplished through planning, application and monitoring of Best Management Practices (BMPs).

Within the Ball Park Thin Project Area reaches of Deer Creek and its tributaries, Budworm and County Creeks, have been identified by the Oregon Department of Environmental Quality as 303(d); having impaired water quality for temperatures in excess of water quality standards. Based on the analysis presented in this EA, TMDL requirements for the McKenzie Basin would be met in each alternative (See Water Quality/Riparian Resources).

**Federal Mine Safety and Health Act of 1977, Public Law 91-173, as amended by Public Law 95-164.** Development of Rock Quarries would conform to the requirements of the act, which sets forth mandatory safety and health standards for each surface metal or nonmetal mine. The purpose for the standards is to protect life by preventing accidents and promoting health and safety.

**Magnuson-Stevens Fishery Conservation and Management Act, 1976 (MSA) –** The Ball Park Thin Project area is located in the Deer Creek Sub-watershed, which is included in the waters designated as Essential Fish Habitat for spring Chinook salmon by the Pacific Fishery Management Council (PFMC). The proposed action is not likely to adversely affect aquatic systems, recreational fisheries, or designated Essential Fish Habitat.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires the identification of habitat “essential” to conserve and enhance the federal fishery resources that are fished commercially. The Pacific Fishery Management Council (PFMC) designated Essential Fish Habitat (EFH) for Chinook, coho, and Puget Sound pink salmon in their Amendment 14 to the Pacific Coast Salmon Plan, issued September 27, 2000. The interim final rule implementing the EFH provision of the MSA (62 FR 66531) requires federal agencies to consult with the NOAA Fisheries Service for any action that may adversely affect EFH. Ball Park Thin Project is located in the Deer Creek sub-watershed, which includes waters designated as EFH for spring Chinook salmon by the PFMC.

Potential downstream effects from timber harvest, road reconstruction, and fire treatments on EFH habitat for spring Chinook salmon is expected to be negligible due to treatment scale, low severity and proximity of activity to stream channels. Sources of sedimentation are expected to increase in the short-term at the site-specific level from the ground disturbing activity. These increases would result primarily from road reconstruction, culvert replacement, haul and temporary road construction. No stream crossing reconstruction would occur within bull trout or spring Chinook habitat. Habitat of importance to spring Chinook could be subjected to short-term increases in turbidity if reconstruction activity were to occur in the immediate vicinity. However, the distance of reconstruction activity from habitat in the project area would substantially reduce the risk. Project effects are expected to be of short duration during seasons of implementation. Suspended sediments are not expected to adversely impact habitat important to spring Chinook due to low project scale and intensity, flow routes, distance of activity from listed species habitat. The use of best management practices is expected to further mitigate potential adverse aquatic effects.

As described above, project cumulative effects of past, current (Ball Park Thin action alternatives) and foreseeable actions is expected to maintain EFH habitat within and downstream of the project area. The proposed action would not adversely affect aquatic systems, recreational fisheries, or designated Essential Fish Habitat. The effects that are likely to occur are based on sound aquatic conservation and restoration principles for the benefit of recreational fisheries, as directed by Executive Order #12962. Since the project would not adversely affect EFH, no further consultation under the Magnuson-Stevens Fishery Conservation and Management Act is required. The No Action alternative would not adversely affect EFH habitat.

**Wild and Scenic Rivers Act, 1968 –** Alternatives in this proposal are designed to maintain the Outstandingly Remarkable Values of the McKenzie River Wild and Scenic River. No portion of the proposed thinning project is located within this Congressionally Reserved designation. Proposed project haul activities through the road system in the Wild and Scenic corridor are consistent with the McKenzie River Wild and Scenic River Plan (USDA Forest Service, 1993).

**Inventoried Roadless Areas and Wilderness –** There are no actions proposed within Inventoried Roadless Areas (IRAs) or Wildernesses in the Ball Park Thin Project, and no actions would affect these designations.

**Executive Orders 11988 and 11990: Floodplains and Wetlands –** Executive Order 11988 requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Proposed harvest treatments would not occur within 100-year floodplains.

**Executive Order 11990 –**requires government agencies to take actions that minimize the destruction, loss, or degradation of wetlands. Streamside Riparian Reserves, seeps, springs, and other wet habitats exist in the Ball Park Thin Project Area. These areas would be either avoided, or managed according to Riparian Reserve Management Guidelines in Chapter 2 to comply with amended Willamette Forest Plan Standards and Guidelines. Riparian Reserves would also be protected with Mitigation Measures also detailed in Chapter 2. As a result, proposed harvest treatments would be consistent with Executive Orders 11988 and 11990.

**Executive Order 12898: Environmental Justice –** Executive Order 12898 requires that federal agencies adopt strategies to address environmental justice concerns within the context of agency operations. With implementation of either action alternatives, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area. Nearby communities would mainly be affected by economic impacts connected with contractors implementing harvest, road reconstruction, tree thinning, planting, and other fuels treatment activities. Racial and cultural minority groups could also be prevalent in the work forces that implement activities. Contracts contain clauses that address worker safety.

**Executive Order 12962: Recreational Fishing –** The June 7, 1995, Executive Order requires government agencies to strengthen efforts to improve fisheries conservation and provide for more and better recreational fishing opportunities, and to develop a new policy to promote compatibility between the protection of endangered species and recreational fisheries, and to develop a comprehensive Recreational Fishery Resources Conservation Plan.

**Executive Order 13186: Neotropical Migratory Birds –** There are 85 bird species recognized as neotropical migrants on the Willamette National Forest. Thirty-five of these species found on the Willamette have been identified as species of concern (Sharp 1992). A Memorandum of Understanding was signed between the USFS and USFWS to complement the January 2001, Executive Order.

The Ball Park Thin Project Area contains populations of migratory landbirds typical of the western Cascades. See Migratory Land birds above for further discussion of effects to neotropical migratory birds.

**The National Environmental Policy Act (NEPA), 1969 –** NEPA establishes the format and content requirements of environmental analysis and documentation. Preparation of the Ball Park Thin Project EA was done in full compliance with these requirements.

**The National Forest Management Act (NFMA), 1976 –**All proposed timber harvest units are planned to occur on suitable land. If regeneration harvest is implemented the sites would be capable of restocking within 5 years of harvest by either natural or artificial means. All units were considered for potential uneven-aged management. Proposed commercial thinning would increase the rate of growth of remaining trees. Some locations would favor species or age classes most valuable to wildlife. The resultant reduced stress on residual trees would make treated stands less susceptible to pest-caused damage. Mitigation measures have been identified to protect site productivity, soils, and water quality.

The burning of activity fuels would reduce long-lasting hazards from wildfire and reduce the risk of pest outbreaks over the project area as a whole. Air quality would be maintained at a level that would meet or exceed applicable Federal, State, and local standards. All proposed activities would provide sufficient habitat to maintain viable populations of fish and wildlife. Critical habitat for threatened or endangered species would be protected through avoidance. The action alternatives would accelerate development of forest habitats that are currently deficient within the analysis area to enhance the diversity of plant and animal communities in the long-term. See discussions under the applicable resource sections above, for further support that proposed activities that would comply with the seven requirements associated with vegetative manipulation (36 CFR 219.27(b)), riparian areas (36 CFR 219.27(e)), and soil and water (36 CFR 219.27(f)).

**Forest Plan Consistency –** Actions analyzed in the Ball Park Thin EA are consistent with a broad range of Forest Plan Standards and Guidelines that have been discussed and disclosed throughout the document. The timber stand treatments associated with the project are consistent with the goals and management direction analyzed in the Willamette National Forest Land and Resource Management Plan FEIS and Record of Decision. Road improvements are designed to be consistent with the 1994 Northwest Forest Plan amendments to the Forest Plan and the Aquatic Conservation Strategy objectives.

**Other Jurisdictions –** There are a number of other agencies responsible for management of resources within the Ball Park Thin Project Area. The Oregon Department of Fish and Wildlife is responsible for management of fish and wildlife populations, whereas the Forest Service manages the habitat for these animals. The Oregon Department of Fish and Wildlife has been contacted regarding this analysis.

Proposed harvest treatments within riparian areas have been designed to comply with "Sufficiency Analysis for Stream Temperature – Evaluation of the adequacy of the Northwest Forest Plan Riparian Reserves to achieve and maintain stream temperature water quality standards" (USDA Forest Service and USDI BLM, 2004). This document was prepared in collaboration with Oregon Department of Environmental Quality and United States Environmental Protection Agency to provide documentation of Northwest Forest Plan compliance with the Clean

Water Act with regard to state water quality standards for stream temperatures. As such, it redeems several of the Forest Service responsibilities identified in "Memorandum of Understanding between USDA Forest Service and Oregon Department of Environmental Quality To Meet State and Federal Water Quality Rules and Regulations" (USDA Forest Service and Oregon DEQ, May 2002). The Sufficiency Analysis provides current scientific guidance for management of riparian vegetation to provide effective stream shade, including appropriate methods of managing young stands for riparian objectives other than shade, such as production of large wood for future recruitment.

Oregon Department of Environmental Quality and the Oregon Department of Forestry are responsible for regulating all prescribed burning operations. The USDA Forest Service Region 6 has a Memorandum of Understanding with Oregon Department of Environmental Quality, Oregon Department of Forestry, and the USDI Bureau of Land Management regarding limits on emissions, as well as reporting procedures. All burning would comply with the State of Oregon's Smoke Management Implementation Plan and, for greater specificity, see the memorandum of understanding mentioned above.

**Energy Requirements and Conservation Potential –** Some form of energy would be necessary for projects requiring use of mechanized equipment. Commercial thinning and some partial cutting units would involve both heavy and small machines for yarding logs during the implementation period. Projects such as road reconstruction and maintenance could require heavy machinery for a small amount of time. Both possibilities would result in minor energy consumption. Alternatives that harvest trees could create supplies of firewood as a by-product, which would contribute to a supply of energy for the local community for home heating.

**Prime Farmland, Rangeland, and Forestland –** No prime farmland, rangeland, or forestland occurs within the analysis area.

**Unavoidable Adverse Effects –** Implementation of any of the alternatives, including the No Action alternative, would inevitably result in some adverse environmental effects. The severity of the effects would be minimized by adhering to the direction in the management prescriptions and Standards and Guidelines in Chapter IV of the Willamette Forest Plan, and additional Mitigation Measures and Design Measures proposed in Chapter 2 of this document. These adverse environmental effects are discussed at length under each resource section.

**Irreversible and Irretrievable Effects –** "Irreversible" commitment of resources refers to a loss of future options with nonrenewable resources. An "Irretrievable" commitment of resources refers to loss of opportunity due to a particular choice of resource uses.

No new construction of permanent roads is planned. Temporary road would be constructed, but would be obliterated following operations. Rock used to surface roads would be an irreversible commitment of mineral resources.

The soil and water protection measures identified in the Forest Plan Standards and Guidelines, Mitigation and Design Measures in Chapter 2, and Best Management Practices are designed to avoid or minimize the potential for irreversible losses from the proposed management actions.

Concerning threatened and endangered plant, wildlife, and fish species, a determination has been made that the proposed actions would not result in irreversible or irretrievable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives.

**<u>With all Action Alternatives (B and C)</u>**: Tree removal would result in an irretrievable loss of the value of removed trees for wildlife habitat, soil productivity, and other values. Log landings would produce irreversible changes in the natural appearance of the landscape. The visual effect of log landings would be somewhat reduced by mitigation measures and design measures to reduce soil compaction and erosion (scarification, seeding and waterbarring for example). Little irreversible loss of soil should occur due to extensive mitigation associated with timber harvest and prescribed fire (tractor harvest only on slopes less than 35 percent, skyline yarding with partial or full suspension to meet Forest Plan Standards and Guidelines, etc.).

**<u>With Alternative A (No Action):</u>** There would be an irretrievable loss of growth within the untreated, overstocked forest. The ability to protect forest within the analysis area from stand replacing fire could be irretrievably lost as well. There would be the potential for irreversible loss of timber value due to declining tree diameter growth related to crowded stand conditions, and loss of potential growth from insects and disease.

# Monitoring

## Invasive Plants

Post-sale invasive plant surveys would be completed by District personnel as a mitigation measure to determine if the weed treatments were effective. The monitoring survey would occur one year after treatments with results reported to the district Botanist. Bermed and decommissioned roads would be monitored for Invasive Plants for three years after the road treatment is completed. Follow up treatments would occur if necessary.

## Logging Operations

During logging, operations would be monitored for adherence to contract specifications including thinning specifications, bole damage to residual trees, retention of down wood and snags, skid trail spacing and use of designated skid trails. Contract compliance monitoring would be performed by Timber Sale Administrators.

## Reforestation

First, third and fifth year survival/stocking examinations to monitor seedling survival, natural regeneration, animal damage and need for release or replanting within planted groups would be conducted for harvested stands.

## Forest Plan Implementation Monitoring

A district timber sale review with the District Ranger, IDT Members and Resource Specialists would be conducted within one year of timber sale, underburning and prescribed natural fire completion to determine if the prescribed treatments were successfully applied. The effectiveness of the prescribed treatments would be evaluated, providing valuable information for future projects. The Forest Supervisor's Staff performs annual project monitoring at each Ranger District, and compiles the results in the yearly Forest Monitoring Report. Timber sales from this project would be likely candidates for Forest Plan Implementation monitoring. Post-harvest stand density would require sampling of units prior to monitoring. Other implementation monitoring subjects may include temporary road decommissioning, system road closures, decommissioning for watershed restoration, snag creation due to fire and other processes, large down wood abundance, and small created gap reforestation.

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# Chapter 4. Consultation and Coordination

The Forest Service consulted with Federal, State, and local agencies; with tribal organizations; and individuals known to have an interest in similar projects during the development of this EA. Refer to Public Involvement on page 14 of Chapter 1. On May 24, 2007 a scoping letter was mailed to following:

## Federal, State, and Local Agencies:

- Oregon Dept. of Fish and Wildlife
- Megan Finnessey, Coordinator, McKenzie Watershed
- Karl Morgenstern, Source Water Protection Manager, Eugene Water and Electric Board
- Kitty Piercy, Mayor, Eugene City Council
- Sid Leiken, Mayor, Springfield City Council
- Steve Newcomb, Environmental Coordinator, Eugene Water and Electric Board
- U.S.D.I Fish and Wildlife Service

## Tribal Governments:

- Allen Foreman, The Klamath Tribe
- Cheryle Kennedy, Confederated Tribes of the Grand Ronde
- Delores Pigsley, Confederated Tribes of the Siletz Indians
- Ron Suppah, Confederated Tribes of Warm Springs

## Elected Officials:

- County Commissioners, Lane County
- County Commissioners, Linn County

## Organizations and Individuals:

- Jim Baker, McKenzie Guardians
- Jim Berl, Oregon Guides and Packers
- Roger Borine, Oregon Hunters Assoc.
- Linda Christian
- Terry Damon, Rosboro Lumber Co.
- Fred Dutli
- Ken & Louise Engelman, River Reflections
- Forest Conservation Council
- Michael Godfrey
- Griffin Green, Mt. Jefferson Snowmobile Club
- Jake Groves, American Forest Resource Council
- Robert and Michele Hiddleston
- Jim and Nancy Holland
- Jan Houck, Oregon Dept. of Parks and Recreation
- Chandra LaGue, Oregon Wild
- Josh Laughlin, Cascadia Wildlands Project
- Conservation Leader, Lane Co Audubon Society
- Joan and Hector Leslie
- Steve and Kathy Keable
- Chairperson, Forest Issue, Many Rivers Group, Sierra Club
- Manager, McKenzie River Chamber of Commerce
- Jim Todd, Oregon Nordic Club, Willamette Chapter
- Conservation Chair, Obsidians
- Craig Patterson

- Greg Pitts, Oregon Council, Federation of Flyfishers
- Oregon Field Director, Rocky Mountain Elk Foundation
- Annette Simonson, Santiam Wilderness Committee
- Eugene Skrine
- Andy Stahl, FSEEE
- Doug Waddell

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**Ray Rivera**, Fisheries Biologist
**James Rudisill**, Silviculturist
**Doug Shank**, Forest Geologist
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# Appendices

## Appendix A – Aquatic Conservation Strategy Consistency

## Appendix B – Biological Assessment, Spring Chinook Salmon and Bull Trout

## Appendix C – Biological Evaluation, Botany

## Appendix D – Wildlife Biological Assessment, Biological Evaluation, Specialist Report

## Appendix E – Soils Specialist Report

## Appendix F – Fuels Specialist Report

## Appendix G – Heritage Resources Specialist Report