ENVIRONMENTAL ASSESSMENT FOR

RICHARDS PEAK TIMBER SALE

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FINDING
PROPOSED RICHARD'S PEAK TIMBER SALE
DNRC - PLAINS UNIT

February 6, 2003

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Richard's Peak Timber Sale on 840 acres of state owned lands in Sections 4 and 16, T24N, R27W.

After a thorough review of the EA, project file, public correspondence, Department policies, standards, guidelines, and the State Forest Land Management Plan (SFLMP), I have made the following decisions concerning this project.

1. ALTERNATIVE SELECTED

Two alternatives are presented and were fully analyzed in the EA:

- The No-Action Alternative: includes existing activities such as dispersed recreation, intermittent road maintenance, weed control, and fire suppression. Timber harvest and road construction would not occur at this time.

- The Action Alternative: entails harvesting approximately 2.5 million board feet (MMBF) of timber from 408 acres, constructing 2.2 miles of road and maintaining 12 miles. Seedtree/shelterwood cuts would occur on 172 acres, commercial thinning on 139 acres, and seedtree removal on 97 acres. Prescribed burning would be used for site preparation on 176 acres; approximately 100 acres would be hand planted with western larch and rust -resistant western white pine after logging.

I have selected the Action Alternative for implementation with the understanding that resource mitigation measures identified in the Environmental Assessment will be applied to meet the intended protection.

The Action Alternative has been selected for the following reasons:

- The Action Alternative meets the Purpose of Action and the specific project objectives listed on pages 1 and 2 of the EA.

- The No - Action Alternative foregoes a reasonable opportunity for generating revenue for the trusts, while the analyses of identified issues did not reveal information to persuade the Department to choose the No-Action Alternative prior to this decision.

- The proposed timber sale project contributes to harvest levels mandated by State Statute (*Montana Codes Annotated 77-5-222*).

- DNRC is required to administer these lands to produce the largest measure of reasonable and legitimate long-term return for beneficiaries *(Montana Codes Annotated 77-1-202*). DNRC meets this obligation by managing intensively for healthy and biologically diverse forests.

- The Action Alternative includes adjustments, mitigations, and activities to address concerns expressed by the public and others, including, but not limited to:

    a. Silvicultural treatments will remove trees infected with bark beetles and dwarf mistletoe; retain western larch and western white pine in the overstory; reduce overcrowded stand densities; and promote establishment of western larch and western white pine in the understory, effectively maintaining or improving the growth and vigor of the forest stands.

    b. Skyline (cable) yarding will be utilized to harvest steeper slopes on approximately 232 acres. Prescribed burning will be utilized on steeper slopes for disposing of logging slash and preparing sites for regeneration. Applicable Best Management Practices and the Streamside Management Zone law requirements will be applied to protect water quality and minimize impacts to soil and site productivity.

    c. No harvest will occur on 432 acres of the project area, retaining closed canopied forest stand conditions on approximately 50% of the project area. In addition, no harvest will occur within 50 feet of streams adjacent to or within harvest unit boundaries, to provide for wildlife cover and travel.

    d. An adequate number of trees or snags will be retained in the project area to provide for snag recruitment and down woody debris as important wildlife habitat components.

2. SIGNIFICANCE OF IMPACTS

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

- *VEGETATION:* Old growth stands or sensitive plant species or communities were not identified on state land in the project area. 35 acres of an over represented cover type will be converted to the under represented and more site appropriate western larch/Douglas-fir cover type. As a result of reducing stand densities and favoring seral tree species for retention or regeneration, stand conditions will be more favorable for maintaining the current and appropriate western larch/ Douglas-fir cover type on approximately 252 acres (30% of the project area). The seedtree removal cut will convert 97 acres from the 100 - 149 years old age class to the 0-39 years old age class, which is currently not represented on state land, but well represented on surrounding lands. Stand conditions on 311 acres, after harvest, will be less susceptible to bark beetle infestations and dwarf mistletoe infection. Although mortality from root disease may increase immediately adjacent to existing pockets, assuring regeneration of less susceptible species, such as western larch should decrease susceptibility and mortality in future stands.

- *NOXIOUS WEEDS:* Heavy equipment used for sale activities will be washed prior to being brought on site; disturbed areas will be seeded with a native grass seed mix concurrently with disturbance. Site-specific herbicide spraying would occur based on current and future monitoring and assessments.

- *SOILS:* New road construction would remove an additional 8 acres from the forest

resource base, but would complete the transportation system required for accessing these parcels of state land and provide for current and future management needs. The long term productivity of harvested sites will be ensured by utilizing applicable Best Management Practices (BMP's), such as cable yarding on steeper slopes, using skid trails from prior harvest operations, planning and spacing trails, and operating on dry, frozen or snow covered ground to control the extent of soil impacts to less than 15% of the area. Where available the retention of 10-15 tons of slash per acre will be left on site to provide for nutrient recycling and prescribed burning on 176 acres will provide a nutrient rich ash cover.

- *WILDLIFE*: The forest canopy closure on approximately 311 acres (37% of the project area) would be reduced below 40%, favoring wildlife species that prefer stand structures with open grown large diameter trees in the overstory, and generally well stocked understories of seedling and sapling sized trees. Lynx use of the area is not expected, although 619 acres of "mature foraging" and "other" habitat is provided. Harvest treatments would convert up to, 311 acres of this habitat component to "temporary non-suitable". This effect is considered negligible because 308 acres of lynx habitat would remain unaltered providing for travel, cover, and future denning habitat development. The project area provides grizzly bear habitat, but is at least 2 miles outside identified recovery areas. Grizzly bear use of the area has not been observed and is expected to be rare due to high road densities and frequent timber management activities on adjacent lands. DNRC activities are not expected to enhance or detract from bear use or habitat availability in the project area or surrounding lands. Harvest treatments will alter 92 acres of preferred pileated woodpecker habitat, while leaving a 62 acre patch of the highest quality woodpecker habitat unaltered. Pileated woodpecker habitat will be maintained within the 139 acres to be commercially thinned by: retaining the majority of western larch and ponderosa pine in the overstory; retaining larger diameter snags or cull trees; and leaving defective or down large diameter logs in the woods for coarse woody debris. The project area provides for big game non- winter use. Road closures or restrictions have already been implemented in the general vicinity of the project area to provide for big game security, during the recovery period for hiding and thermal cover reductions in the last 20 or 30 years. DNRC would maintain current road closures and restrictions after harvest and restrict or close newly constructed roads. Seedtree cuts would add to a short- term (15 -30 years) loss of 172 acres of hiding cover in this area, at a time when many adjacent stands have developed to the point that hiding cover is or will be provided in the next few years.

- *HYDROLOGY:* Harvest and road construction activities would increase water yield in the Meadow Creek watershed by 1.5 percent, from 10.2 to 11.7%, which is not sufficient to create unstable stream channels and is below the allowable threshold level of 15 percent. Equivalent clearcut acres (ECA) would increase by 241 from 2,650 to 2,891, which is below the allowable ECA of 3564. Several stream crossings will be installed on the unnamed tributary to Meadow Creek and will contribute sediment during construction. However, operational timing, use of sediment fences, and other mitigation measures will substantially limit the amount of sediment. These improvements will result in a long-term reduction in sediment delivery at these sites.

- *FISHERIES:* Meadow Creek is the only fish - bearing stream in the project area and no harvest is proposed within the Streamside Management Zone (SMZ) for this stream. Some SMZ harvest will be conducted in the SMZ for the unnamed tributary that drains Section 16; however, no harvest would occur in the first 50 feet immediately adjacent to this stream. Due to low water yield increases, minimal harvest within SMZ's, and application of BMP's in harvest and road construction activities, adverse impacts to fisheries are not expected.

- *ECONOMICS:* The proposed project should generate approximately $300,000 in net income for the Common School Trust, and $430,625 in total net income. Recent values provided by the Montana Bureau of Economic Research suggests that this level of harvest is estimated to support approximately 46 workers and $1,530,000 of income.

- *PRECENDENT SETTING & CUMULATIVE IMPACTS:* The project area is located on 840 acres of State-owned lands that are "principally valuable for the timber that is on them or for growing timber of for watershed protection" (*Montana Codes Annotated 77-1-402).* Since the EA does not identify future State actions that are new or unusual, the proposed timber sale project is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the impacts of the proposed timber sale are not significant. The proposed activities are common practices and none are being conducted on important fragile or unique sites.

The proposed timber sale project conforms to the management philosophies of DNRC and is in compliance with existing laws, policies, and standards applicable to this type of proposed action.

3. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)? - No

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

- The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.
- Evaluation of the potential impacts of the proposed Richard's Peak Timber Sale Project indicates that no significant impacts would occur.
- The ID Team provided adequate opportunities for public review and comment. Public concerns were incorporated into the project design and analysis of impacts.

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February 6, 2003

Chapter 1: Purpose of Project

I. PURPOSE AND NEED FOR ACTION

Introduction:

The Montana Department of Natural Resources and Conservation (DNRC), Plains Unit, proposes the Richards Peak Timber Sale. The proposed action would harvest approximately 2-3 million board feet (MMBF) of timber and construct 2.2 miles of new road. The project encompasses one full section and part of another section totaling 840 acres and is located approximately 25 air miles north of Plains, Montana in Sanders County. Timber sale activities would likely begin in the summer/fall of 2003 and conclude in the year 2006.

Table 1-1: State Lands involved in the Richards Peak Timber Sale:

Section	Township/Range	Subdivision	Acres	Trust
4	T24N, R27W	NW¼SW¼, S½S½	200	C.S.
16	T24N, R27W	All	640	C.S.

C.S.= Common Schools

Statement of Need:

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf and Blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (the Plan). The Land Board approved the Plan's implementation on June 17, 1996. The Plan outlines the management philosophy of DNRC in the management of state forested trust lands, as well as sets out specific Resource Management Standards for ten resource categories.

The Department will manage the lands involved in this project according to the philosophy and standards in the Plan, which states:

Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream. In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

Project Objectives:

In order to meet the goals of the management philosophy adopted through programmatic review in the State Forest Land Management Plan, the Department has set forth the following specific project objectives:

- ✓ Harvest 2 to 3 million board feet of sawtimber to generate revenue for the appropriate school grants.

- ✓ Improve the long term productivity of the timber stands by increasing vigor, reducing the susceptibility of stands to insect and disease infestations, and regenerate portions of the stands to promote appropriate species mixes.

- ✓ Develop a transportation system for the site, utilizing existing roads where possible to minimize new road construction.

- ✓ Move the forest toward appropriate or desired future conditions characterized by the proportion and distribution of forest types and structures historically present on the landscape.

II. PROJECT DECISIONS TO BE MADE

This environmental assessment (EA) will provide the basis for deciding what actions will be taken on the project area lands. The "decision maker" will select one of the alternatives outlined in this EA. The decision maker will consider:

- → Does the action alternative presented meet the project objectives?
- → Which alternative should be implemented?
- → Will the alternative have any significant effects on the human environment?
- → Does an Environmental Impact Statement need to be prepared?

III. RELATIONSHIP TO THE STATE FOREST LAND MANAGEMENT PLAN

In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (Plan). The Plan established the agency's philosophy for the management of forested state trust lands. The management direction provided in the Plan comprises the framework within which specific project planning and activities take place.

The Plan also defines the Resource Management Standards which guided the planning of this proposed action, the Richards Peak Timber Sale. The Plan philosophy and appropriate resource management standards have been incorporated into the design of the proposed action.

IV. PERMITS NEEDED FOR IMPLEMENTATION

A Stream Preservation Act Permit (124SPA) will be needed from the Montana Department of Fish, Wildlife, and Parks for installation of up to 10 culverts.

V. SCOPE OF THE ANALYSIS

The scope of this Environmental Analysis (EA) was determined through comments received from DNRC specialists, adjacent landowners, organizations, industries, agencies and the general public. DNRC solicited participation in the Richards Peak Timber Sale Project by advertising in newspapers and sending letters to adjacent landowners, agencies and organizations. DNRC accepted comments on the proposal for 30 days. Public comments can be found in the project files located at the Kalispell Unit Office.

DNRC specialists also conducted field reconnaissance to develop specific resource concerns and mitigations. A complete list of individuals consulted is located on page 49.

VI. RESOURCE CONCERNS

The major resource concerns were identified through the scoping process. The majority of all resource concerns were resolved by mitigation measures incorporated into the project design for the different action alternatives. The major resource concerns are briefly described below and explored in greater depth in chapters II, III, and IV. They are listed in no particular order of importance.

A. Vegetation

- Past management and lack of disturbance events within the project area are contributing to the shift from appropriate western larch/Douglas-fir cover types to alpine fir and mixed conifer cover types.

- Overstocked stand conditions are contributing to reduced growth rates and increase in insect and disease activity.

B. Soil

- Long-term soil productivity could be reduced depending on area and degree of physical effects from skidding and other logging activities, and the amount and distribution of course woody debris retained for nutrient cycling.

C. Wildlife

- Timber harvesting and road building activities could remove lynx habitat and/or prevent lynx movement through the area.

- Timber harvesting and road use could displace grizzly bears from important habitats in the project area.

- Timber harvesting could reduce hiding cover and visual screening, reducing security for grizzly bears.

- Timber harvesting could reduce the quality and quantity of pileated woodpecker nesting and feeding habitat.

- Timber harvesting, new road construction, and road use could decrease big game security, especially during hunting season.

- Timber harvesting could prevent wildlife species movements, especially big game species, through the project area and into adjacent areas.

D. Noxious Weeds

- Timber harvesting and road construction activities may spread existing noxious weed populations and promote invasion and establishment of new populations.

E. Air Quality

- Burning of slash from timber harvest and road construction has the potential to reduce air quality.

F. Water Quality

- Timber harvesting and road construction has the potential to increase water yield, which in turn may affect stream channel stability.

- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality and fish habitat.

G. Fisheries

- Timber harvesting and road construction activities may affect fish habitat by increasing sediment delivery.

CHAPTER 2 : DESCRIPTION OF PROJECT ALTERNATIVES

I. INTRODUCTION

This chapter describes development of alternatives, including a "no-action" alternative and compares the alternatives by summarizing their environmental consequences. For this project, only one action alternative was developed and was designed to meet the project objectives. In addition to describing and comparing the alternatives, this chapter describes the alternative development process and mitigation and compensation measures that are designed for the action alternative.

II. DEVELOPMENT OF ALTERNATIVES

A. Purpose of Alternatives

Action alternatives are developed to meet project objectives in alternative ways that would resolve issues. Because resolving some issues creates conflicts with others, it is often necessary to develop several action alternatives to accommodate these conflicts. For this project, all resource concerns were resolved by incorporating mitigation and compensation measures into the project design. As a result, only one action alternative was developed.

A "no-action" alternative provides the baseline for comparing the environmental consequences of other alternatives.

B. Description of the Alternatives

This section describes the action alternative and the no-action alternative, proposed harvesting, logging methods, and mitigation and compensation measures that are specific to the action alternative.

1. **No Action Alternative**
If the no action alternative were selected, there would be no timber harvesting and no new road construction. Current land management activities and uses would continue. Many of these activities would be limited depending on funding and would include: spot treatment for noxious weeds, road maintenance, dispersed recreation (mostly hunting), and fire suppression.

2. **Action Alternative**
If the action alternative were selected, 408 acres of timber would be harvested from 8 harvest units. Seedtree/shelterwood harvest systems will be prescribed on 172 acres, commercial thinning on 139 acres, and 97 acres will have the overstory seedtrees removed. Follow up treatments will include 176 acres of prescribed burning and approximately 100 acres of hand tree planting. 2.2 miles of new road will be constructed to meet logging system requirements, which include 232 acres of skyline/cable logging and 176 acres of ground based harvesting.

Table 2-1 summarizes the management activities that would occur under the two alternatives.

Project Actions	Alternatives	
	No Action	Action
Acres of State Land involved	840	840
Acres to be logged	0	408
Harvest volume (MMBF)	0	2-3
Acres of prescribed burning	0	176
Acres of tree planting	0	100
Miles of New Road Construction	0	2.2
Miles of Road Maintenance	0	12

III. MITIGATIONS TO BE IMPLEMENTED

The following mitigation measures were developed to reduce the potential impacts to the identified resource concerns. The resource concerns were identified through the scoping process and from DNRC resource specialists. These mitigation measures would be applied if the action alternative were chosen:

A. Vegetation

- Reduce the percentage of shade tolerant species in stand compositions and promote regeneration of seral tree species to initiate the development of more appropriate cover types, that are dominated by seral species.

- Reduce stand densities to increase growth and vigor and improve forest health.

- Broadcast burn seed tree/shelterwood harvest units to prepare a favorable seed bed for seral species and provide more nutrients for natural and planted seedlings.

- Plant western larch and western white pine to assure the presence in future stand composition.

B. Soil

- Restrict logging activities to periods when the soil moisture is less than 20%, frozen to a depth of four inches, or snow covered to a depth of 18 inches loose or 9 inches packed.

- Existing skid trails and roads will be utilized for skidding, wherever possible, to reduce the amount of ground disturbance.

- The logger and sale administrator will agree to a general logging plan prior to harvest operations, in order to limit ground disturbance due to skidding operations.

- Retain 10-15 tons of coarse woody debris after harvest for nutrient cycling.

- Grass seed road cuts and fills on new construction and reconstruction.

- Ground scarification for site preparation will be limited to 30% soil exposure.

- A burn plan will be prepared to limit impacts to the soil resource from prescribed burning.

C. Wildlife

- Retain 50 foot no harvest wildlife corridor along streams.

- Retain a minimum of 2 trees per acre larger than 21" or the next largest class for snag management.

- Maintain current road closures and close newly constructed roads at the end of the project to provide for big game and grizzly bear security.

- Retain closed canopy forest stands as travel corridors in uncut areas.

D. Noxious Weeds

- All equipment used in roadwork and harvesting operations will be cleaned of plant parts, dirt, and weed seed prior to entry to prevent possibility of seed dispersal by equipment.

- All newly disturbed areas of soil associated with roadwork will be promptly grass seeded with a site adapted seed mix to deter establishment of noxious weeds.

- Monitor project area and contract herbicide spraying as needed to control spot outbreaks of noxious weeds.

E. Air Quality

- Slash burning will be conducted only when weather and air quality conditions are favorable and as allowed under the cooperative Montana Airshed Group rules and regulations.

F. Water Quality

- 50 foot no harvest zone and a 100 foot no mechanized equipment zone next to streams to reduce potential sediment delivery.

- Removing slash created during harvesting from the SMZ in Units that are to be broadcast burned to reduce risk of ash depositing in streams and reducing water quality.

- Areas disturbed during road construction will be grass seeded within 7 days of final shaping to reduce erosion and transport of sediment to streams.

IV. COMPARISON OF ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

The following table (2-2) compares the alternatives by summarizing their environmental consequences. The table lists the major resource concerns and compares the related effects for each alternative. The scientific basis for the environmental effects summarized here are discussed in detail in Chapters 3 & 4.

Resource	Issue	No Action Alternative	Action Alternative
VEGETATION	Cover Type Distribution	156 Acres of current lodgepole pine, mixed conifer and Alpine fir cover types that are more appropriately western larch/Douglas-fir.	35 acres of current cover types converted to appropriate western larch/Douglas-fir. 121 acres not converted.
	Age Class Distribution	No change in current age class distribution.	97 acres converted from the 100-150 year age class to 0-39 year age class.
	Tree/Timber stand growth and vigor	Static to declining on 815 acres.	Static or increasing on 408 acres
	Insect & Disease	Bark Beetles: Continued endemic activity with potential for epidemic activity.	Bark Beetles: 283 acres with endemic levels treated.
		Dwarf Mistletoe: Moderate infection over 85 acres.	Dwarf Mistletoe: 85 acres treated with removal of mistletoe infected trees.

		Root disease: Continued increases in size of root rot pockets and mortality.	Possible increase in mortality. Silvicultural treatments favoring species less susceptible to root disease.
	Noxious Weed encroachment	Continued spread along roads and trails.	Increase in risk of spot infestations with increases in bare mineral soil exposure from logging and road building operations.
SOILS	Soil Productivity	11.5 acres impacted by existing roads.	New road construction would reduce soil productivity on an additional 8 acres to the 11.5 acres already impacted by existing roads. Timber harvesting activities would reduce productivity on 49.6 acres. Short-term increase in productivity on 176 acres after broadcast burning.
	Coarse Woody Debris	Increase in coarse woody debris in areas infected by root disease and bark beetles. Recruitment depends upon level of mortality and firewood cutting.	An increase of 10-15 tons of coarse woody debris after harvesting.
WILDLIFE	Coarse Filter	Forest conditions continue to change toward shade tolerant cover types with high canopy cover. These changes favor species that use closed forest habitats with sparse understory, heavy coarse woody debris, snags, and/or shade tolerant tree species.	Silviculture treatments would favor retention of shade intolerant species and propose regeneration treatments on 172 acres. The conditions created would favor species that use open forested conditions with dense understory and shade intolerant tree species, favoring species that use these types of habitats.
	Canada Lynx	Lynx use of the area is not expected, however, lynx habitat exists in the project area. Lynx habitat would not be affected. Over time, increases in coarse woody debris would increase denning habitat quality but would reduce foraging habitat.	Lynx use of the area is not expected, however, lynx habitat exists in the project area. Effects are expected to be negligible.

	Grizzly Bears	No change in grizzly bear habitat or expected grizzly bear use of the area. Project lies outside recovery area.	Timber sale activities are not expected to alter grizzly bear use of area, however, some localized habitat shifts could occur for bears to take advantage of forage or cover resources.
	Pileated Woodpecker	The surrounding landscape is managed primarily for timber production, so pileated woodpecker habitat on these lands is probably scarce. This alternative would not further reduce pileated woodpecker habitat in the area.	Approximately 62 acres of potential nesting habitat in Section 16 would not be harvested. Timber harvesting would occur in 92 acres of potential nesting habitat. Snags, coarse woody debris, numerous leave trees, and snag recruits would be retained for feeding and nesting substrate, but quality nesting habitat may decline due to removal of the midlevel forest canopy layer and reduction of overstory canopy cover.
	Big Game	In the short-term, no substantial changes in big game habitat is expected. Hiding cover would remain unchanged or increase through time. Motorized access would remain the same.	Short-term reduction in hiding cover (15-30 years). Hiding cover is expected to return to harvest sites as conifer regeneration and shrub regrowth occurs. Unrestricted motorized access would increase during project but return to the current situation after the project is completed.
HYDROLOGY	Sediment Delivery	No timber harvest or road construction to deliver sediment to streams affecting water quality.	Short-term increases in sediment from timber sale activities may occur but are not likely to result in adverse cumulative effects to water quality.
	Water Yield	No increase in existing water yield in the Meadow Creek Watershed.	Timber harvest and road construction activities would result in a 1.5% increase in annual water yield. Cumulative water yield increase of 11.7% below the threshold for concern (15%).

FISHERIES	Woody debris recruitment	No effect to woody debris recruitment.	No SMZ harvest is proposed along fish bearing streams. Therefore, no effect to woody debris recruitment
	Sediment delivery	No timber harvest or road activities to provide sediment source. Current fisheries habitat and populations would change in response to natural events.	Low water yield increase and low potential for sediment introduction associated with timber sale and road construction activities.
AIR QUALITY	Smoke production from slash and broadcast burning	No slash or broadcast burning would be burned. Current levels of smoke production would continue.	Short term increases in smoke from burning of slash and broadcast burning of harvest units.

CHAPTER 3: EXISTING ENVIRONMENT

I. INTRODUCTION

This chapter describes the existing environment within the project area where the proposed action would occur. This chapter provides the baseline for comparison of the environmental effects discussed in Chapter 4.

The Richards Peak Timber Sale Project area lies approximately 25 air miles from Plains, Montana, in Sanders County. The Sections involved include Section 4 & 16, T24N, R27W. Total State owned acreage within the project area is 840 acres.

Plum Creek Timber Company, Thompson River Lumber Company and Forest Service lands surround both State Parcels. Timber management is the main focus for the lands surrounding the State parcels. Both parcels are accessed using existing Plum Creek Timber Company roads. Easements gaining access to the project area were completed with Plum Creek under the Richards Peak Reciprocal Access Project.

The Project area lies in the Thompson River drainage with elevations ranging from 3,600 feet to 5,770 feet at the Richards Peak lookout. The area lies on a predominately North aspect with slopes from 0 to 80%.

II. VEGETATION

The State Forest Land Management Plan (SFLMP) directs DNRC to promote biodiversity by taking a 'coarse filter' approach thereby favoring an appropriate mix of stand structures and compositions on State land. Components use to determine an appropriate mix of structures at the landscape unit level include cover type proportion, age class distributions, stand structural characteristics, and the spatial relationships of stands- i.e. size and location on the landscape.

A. Cover Type Distribution

1. Plains Unit

Estimates of current and appropriate cover types were determined at the landscape level for the entire Plains Unit. The Plains Unit Stand Level Inventory (S.L.I.) was used in conjunction with John Losensky's 1997 report *Historical Vegetation of Montana* to compare what this landscape may have looked like historically in regards to amount and distribution of cover types.

Table 3-1: Current and Appropriate Cover Types for the Plains Unit

Cover Type	Current Cover Type (Acres)	Appropriate Cover Type (Acres)
PP	27,901.8	27,948.8
DF	2,089.8	2,261.2
WL/DF	9,137.4	17,686.2
LP	3,578.7	2,763.5
WWP	306.8	366.1
MC	8,583.9	1,479.6
ALP	692.8	179.6
HW	110.9	110.9
NONSTKD	393.8	393.8
TOTAL	**52,795.9**	**52,795.9**

PP: Ponderosa pine, DF: Douglas-fir, WL/DF: Western larch/Douglas-fir, LP: Lodgepole pine,WWP: Western white pine, MC: Mixed conifer, ALP: Alpine fir, HW: Hardwoods, NONSTKD: Non-stocked.

The general trend for cover types on the Plains Unit is that open stands dominated by ponderosa pine and western larch are now more densely stocked with shade tolerant species, such as Douglas-fir. The main reasons for this trend are fire suppression and past management activities on State Land.

2. **Richards Peak Project Area**

Table 3-2: Current and Appropriate Cover Types for the Richards Peak Project Area

Cover Type	Current Type (Acres)	Appropriate Type (Acres)	Current Type (-) Appropriate Type (Acres)
PP	10.1	10.1	0.0
DF	145.4	145.4	0.0
WL/DF	415.1	571.2	-(156.1)
LP	150.4	96.3	54.1
WWP	5.5	5.5	0.0
MC	31.3	0.0	31.3
ALP	70.7	0.0	70.7
OTHER	11.5	11.5	0.0
TOTAL	840	840	

The general trend for cover types in the Richards Peak Project Area mirrors the trend on the Plains Unit as a whole. Reduced acres of appropriate western larch/Douglas-fir and an increase in shade tolerant cover types of mixed conifer and alpine fir. Reasons for this trend also mirror the Plains Unit as a whole. Past management activities removed the seral western larch from the overstory and lack of fire disturbance has increased the amount of shade tolerant species in both the overstory and understory.

B. Age Class Distribution

1. Plains Unit

Table 3-3: Plains Unit Age Class Distribution by Current Type

Current Type	Stand Age Class				
	0-39	40-99	100-149	150+	TOTAL
	Acres				
ALP	0	206.6	326.0	160.2	**692.8**
DF	0	829.9	775.1	484.8	**2,089.8**
HW	0	0	110.9	0	**110.9**
LP	601.0	2,253.2	687.2	37.3	**3,578.7**
MC	124.1	2,601.6	4,337.6	1,520.6	**8,583.9**
NONSTKD	393.8	0	0	0	**393.8**
PP	509.3	9,122.3	11,517.8	6,752.4	**27,901.8**
WL/DF	548.5	2,652.0	3,927.6	2,009.3	**9,039.4**
WWP	103.3	44.5	95.6	63.4	**306.8**
TOTAL	**2,280.0**	**17,710.1**	**21,777.8**	**11,028.0**	**52,795.9**

2. Richards Peak Project Area

Table 3-4: Richards Peak Age Class Distribution by Current Type

Current Type	Stand Age Class				
	0-39	40-99	100-149	150+	TOTAL
	Acres				
ALP	0	70	0	0	**70**
DF	0	87	26	33	**146**
LP	0	151	0	0	**151**
MC	0	0	0	31	**31**
PP	0	0	10	0	**10**
WL/DF	0	64	281	71	**416**
WWP	0	0	0	5	**5**
TOTAL	**0**	**372**	**317**	**140**	**829***

*Currently 11 acres of roads in project area for total of 840 acres.

C. Old Growth

Old growth will be managed to meet biodiversity and fiduciary objectives in the SFLMP, pursuant to State Law.

As per the State Land Board's decision in February 2001, the DNRC adopted the definition for old growth based on minimum number and size of large trees per acre and age of those trees as

noted in Old-Growth Forest Types of the Northern Region, by P. Green, J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann (1992, USFS Northern Region, Internal Report).

There are no stands within the project area that meet DNRC's definition of old growth.

D. Timber Productivity

Measured inventory plots were taken in the project area to determine quantitative data about the existing stands. Stand level inventory data was used in conjunction with measured inventory plots in Section 4 for summarizing areas outside of harvest unit boundaries. The data is summarized in Table 3-5.

Table 3-5: Merchantable Timber Characteristics for the Richards Peak Project Area

Merchantable Timber Characteristics									
Section	**Species comp**	**Gross Vol/AC**	**TPA**	**BA/AC**	**Avg. D.B.H.**	**Avg. HT**	**Avg. Age**	**Growth Rate/ Trend**	**Habitat Type**
04	DF-59%, WL-28%, LP-6%, ES-4%, PP-3%	5.4	60	50	12"	80	120	8/D	ABLA/LIBO PICEA/LIBO
16	DF- 72%, WL-10%, LP-10%, AF-3%, GF-3%, WWP-1%, PP-1%	12.0	156	119	11"	72	110	9/D	PSME/SYAL, ABGR/LIBO, ABGR/XETE, ABLA/MEFE, ABLA/XETE

SPECIES COMP= species composition: DF= Douglas-fir, PP= Ponderosa pine, WWP= Western white pine WL= Western larch, LP= Lodgepole pine, AF= Alpine fir, GF= Grand fir ES= Engelmann Spruce.

GROSS VOL/AC= gross volume per acre measured in thousand board feet (MBF); **TPA=** trees per acre; **BA/AC=** basal area per acre measured in square feet; **AVG DBH=** average diameter at breast height; **AVG HT=** average height in feet; **AVG AGE=** average age in years; **GROWTH RATE/TREND=** radial growth for last ten years measured in 20ths of an inch and letters indicate growth trend with D= Decreasing. **Habitat Types**=** PSME/SYAL= Douglas-fir/snowberry, ABGR/LIBO= Grand fir/ twinflower, ABGR/XETE= Grand Fir/beargrass, ABLA/MEFE= Alpine fir/menziesia, ABLA/XETE= Alpine fir/beargrass PICEA/LIBO= Engelmann spruce/twinflower.

E. Insect and Disease Activity

Inventory data and field reconnaissance were used to identify and quantify insect and disease activity in the project area.

1. Bark Beetles

Mountain pine beetle (Dendroctonus ponderosae) and the Douglas-fir beetle (Dendroctonus pseudotsugae) are the two most common bark beetles found in the project area. The mountain pine beetle was most active in the 1980's and resulted in widespread mortality in the lodgepole pine. Mountain pine beetle populations are currently at endemic levels in the project area with small pockets and individual tree mortality occurring. There is increasing evidence that mountain pine beetle populations are on the sharp increase. More and more pockets of mortality by bark beetle are appearing on the landscape. The Douglas-fir bark beetle population has been increasing in the project area for the last couple of years. This is due to a widespread increase in populations in the mid 1990's across the entire northwest, where beetles have found large areas of suitable habitat. Populations are still at endemic levels, with most mortality occurring in small pockets and individual trees. The trees killed are mostly over-mature Douglas-fir. It appears the number of Douglas-fir beetle killed mortality has decreased as populations start a cyclical decline across the northwest.

2. Dwarf Mistletoe

Western larch dwarf mistletoe (Arceuthobium laricis) is the most common dwarf mistletoe in the project area. The mistletoe is mainly affecting the larch overstory in Section 16.

3. Root Diseases

Armillaria root rot (Armillaria mellea) and brown cubical butt rot (Phaeolus schweinitzii) are the root diseases found in the project area. Small Armillaria pockets can be found along the existing road in Section 16 (proposed harvest unit 3). The brown cubical butt rot is mainly affecting older Douglas-fir trees that are scattered throughout Section 16.

F. Sensitive, Threatened, and Endangered Plants

A review of the records from the Montana Natural Heritage Program indicated no plant species of special concern were identified within the project area.

G. Noxious Weeds

Noxious weed species identified through reconnaissance of the project area include spotted knapweed and orange hawkweed. The majority of the noxious weed populations were found along both State and private road systems throughout the project area.

III. SOILS

Analysis for evaluating soils will include DNRC managed land in the project area. Refer to the Soil Map in Appendix D for soil type locations within the project area.

A. General Description

The project area is varied in geology from the alluvial deposits and glacial till in Section 4 to the moderate to steep mountain sideslopes and ridge tops of Section 16 that were formed by the mixing of residual rock material with colluvial gravels and cobbles from the non-calcareous argillites and quartzites of the Ravalli group and Pritchard formation and the calcareous Wallace limestones and Missoula group formations.

Table 3- 5: Soil Types of the Richards Peak Project Area

SOIL TYPE	SOIL DESCRIPTION
10UD- Fluventic Ustochrepts	Soils are well-drained, coarse textured gravelly sandy loams and cobbly loams. These soils dry out early in the summer and tend to be droughty. Small depressions and overflow channels may have silty soils, which support moister vegetation.
32UB- Andic Cryochrepts	Soils are moderately deep and well drained. Typical surface soils are 8-12 inches thick and reddish brown in color. Texture is gravelly silt loam. Subsurface soils are 15-20 inches thick. Texture is extremely gravelly loam.
30UC- Andic Dystrochrepts/ 30UD- Andic Ustochrepts	Soils are deep and well drained. Duff layers of litter and organic matter of at least 1 inch occurs on the surface. Typical surface soils are 5-15 inches of brown color. Texture is very gravelly loam to sandy loam. Subsurface soils are 10-20 inches thick. Texture is very gravelly sandy loam. Volcanic ash influence is intermittent, infiltration is rapid and soil moisture retention is moderate.
30MC- Typic Ustochrepts	Soils are deep and well drained. Typical surface soils are 8-10 inches thick and light brown in color. Texture is gravelly loam to clay loam. Subsurface soils are 10-15 inches thick. Texture is very gravelly clay loams to silty clay loams. Intermittent volcanic ash surface soils are mixed with colluvium on northerly microsites.
72UD- Andic Eutroboralfs	Soils are deep and well drained. Typical surface soils are 8-10 inches thick and light brown in color. Texture is volcanic ash influenced gravelly silt loam. Subsurface soils are 15-20 inches thick. Texture is very gravelly silty clay loam. Infiltration and moisture holding capacities are moderate.

B. Existing Condition

Timber harvest was done in the 1940's and 50's in the Richards Peak area, using mostly ground based harvest methods. Existing skid trails and old landings are still visible on the landscape. Ground based harvest can affect soil productivity through displacement and compaction of productive surface layers of soil, principally on heavily used skid trails. It is estimated that less than 10% of the ground is affected by existing skid trails.

C. Management Implications

The following table lists the management implications for the soil types referred to in Table 3-5 above:

Table 3-6 Soil Management Implications

SOIL TYPE	TIMBER	ROADS	WATERSHED
10UD- Fluventic Ustochrepts	Timber productivity is moderate to high.	Road construction may require special design, location and construction.	Soil erosion hazard is moderate. Sediment delivery efficiency is moderate on flat slopes and high near streams.
32UB- Andic Cryochrepts	Timber productivity is low to moderate.	Material quality is good for road construction. Subsoils contain high percentage of gravels with low amounts of fine soil.	Soil erosion hazard is low. Sediment delivery efficiency is low.
30UC- Andic Dystrochrepts/ 30UD-Andic Ustochrepts	Timber productivity is moderate to high.	Material quality is good for road construction.	Soil erosion hazard is moderate. Sediment delivery efficiency is moderate.
30 MC- Typic Ustochrepts	Timber productivity is moderate.	Material quality is fair for road construction. Native material roads are rough due to stones and large cobbles.	Soil erosion hazard is moderate. Sediment delivery efficiency is moderate.
72UD- Andic Eutroboralfs	Timber productivity is high.	Material quality is fair for road construction. Native surface roads can rut easily when wet.	Soil erosion hazard is moderate. Sediment delivery efficiency is moderate.

IV. WILDLIFE

A. Introduction

In the following sections, the existing environment is discussed. This description occurs on 2 scales. The first scale relates to the project area and/or the unit(s) proposed for harvest. The second scale (cumulative effects) describes how the project relates to the surrounding landscape. This analysis area differs by species and is defined under the existing condition for each species. If habitat does not exist in the project area or the project is not expected to affect a species, the analysis for that species was dropped from further analysis.

B. Methods

To assess the existing condition of the project area and the surrounding landscape, a variety of techniques were used. Field visits, scientific literature, stand level inventory (SLI) data, aerial

photography, Montana Natural Heritage Program data, and consultations with other professionals provided information for the following discussion and effects analysis.

C. Coarse Filter Assessment

DNRC recognizes that it is an impossible and unnecessary task to assess an existing environment or the effects of proposed actions on all wildlife species. We assume that if landscape patterns and processes similar to those that species adapted to are maintained, then the full complement of species will be maintained across the landscape (DNRC 1996). This "coarse filter" approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across a landscape.

The parcels ranges from 3,600 to 5600 elevation on varying slopes. Over time, due to fire suppression, tree densities increased and shade tolerant species, such as Douglas-fir, grand fir, and subalpine fir, become more prevalent than they were historically. This situation probably benefited wildlife species that rely on shade tolerant tree species and/or closed canopy habitats, while negatively affecting species that rely on shade intolerant tree species and/or open habitats.

The vegetation analysis demonstrates that fire suppression and forest management favoring removal of seral species led to current conditions that differ from historical conditions reported by Losensky (1997). Mixed-conifer (often shade-tolerant species) types increased at the expense of fire associated lodgepole pine and fire-resistant ponderosa pine, western larch and Douglas-fir. The stands proposed for treatment follow this trend, except those units in section 4. In the project area and on the Plains Unit, wildlife species that use forests dominated by Douglas-fir and grand fir probably benefited from this succession at the expense of species that require ponderosa pine, western larch, and unforested habitats. The shade tolerant tree species generally provide better snow intercept than do the shade intolerants, thus favoring species that have trouble with deep snow. Conversely, shade intolerants are often well adapted to fire, having thick bark that allows the presence of heart-rot without weakening the entire tree, thus providing excellent raw materials for snag users and cavity-dependent species.

D. Fine Filter Assessment

Site-specific analyses were also conducted for individual species recognized to be sensitive or of special concern are evaluated (a "fine filter analysis"). They include wildlife species federally listed as "Threatened" or "Endangered", species listed as "Sensitive" by DNRC, and species managed as "big game" by Montana Fish, Wildlife, and Parks.

E. Threatened And Endangered Species

Three species indigenous to northwestern Montana are classified as "Threatened" or "Endangered" under the Endangered Species Act of 1973. The bald eagle, Canada lynx, and grizzly bear are listed as "Threatened", while the wolf is listed as "Endangered".

1. **Bald Eagle**

The bald eagle is classified as "Threatened" and is protected under the Endangered Species Act. Strategies to protect the bald eagle are outlined in the Pacific States Bald

Eagle Recovery Plan (U.S. Fish and Wildlife Service 1986) and the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 1994). Management direction involves identifying and protecting nesting, feeding, perching, roosting, and wintering/migration areas (U.S. Fish and Wildlife Service 1986, Montana Bald Eagle Working Group 1994). No eagle nests or suitable nesting habitat are located in or near the project area, nor are eagles expected to use the project area in the winter. Therefore, this species will not be discussed further in this document.

2. **Canada Lynx**

Lynx are listed as "Threatened" under the Endangered Species List. Currently, no recovery plan exists. Several reports have been written to summarize the research on lynx and develop a conservation strategy (Ruediger et al. 2000, Ruggiero et al. 2000).

Lynx are associated with subalpine fir forests generally between 4,000 to 7,000' in elevation in western Montana (Ruediger et al. 2000). Lynx habitat in western mountains consists primarily of coniferous forest with plentiful snowshoe hares, mature forest for denning and cover for kittens, and densely forested cover for travel and security. Additionally, the mature forests provide habitat for red squirrels, an alternative prey source.

To assess lynx habitat, DNRC SLI data were used to map habitat types used by lynx. These areas were considered lynx habitat. Other parameters (stand age, canopy cover, amount of coarse woody debris) were used in modeling the availability of specific lynx habitat in the area (i.e. denning, forage, other, temporarily not available). Young forage consisted of regenerating stands less than 39 years old in a well-stocked condition (more than 1,500 trees per acre). Mature forage included all stands in lynx habitat greater than 40 years old with more than 40 percent canopy closure. Denning habitat consisted of mature stands (older than 100 years) with more than 40 percent canopy closure and a high abundance of coarse woody debris present. Temporary nonhabitat included all stands with regeneration less than 15 years old, stands that received precommercial thinning within 10 years, and stands with less than 40 percent canopy closure. Other available habitat included any habitat of a suitable habitat type with more than 40 percent cover that could be used by lynx for travel or any other purpose.

Based on the above analysis, lynx habitat comprised approximately 720 acres (85%) of habitat on State lands within the project area. Of these acres, 267 acres of mature forage, 101 acres temporary non-suitable, and 352 acres of other suitable habitat. The existing temporary non-suitable is nearing young foraging habitat, however, western larch dominates the regeneration, therefore winter cover for snowshoe hares would be limited making it unlikely that this area provides young foraging habitat for lynx.

Cumulative effects were analyzed for lands immediately adjacent to the 2 parcels in the project area. This area is compromised of 1,237 acres of DNRC, 6,554 acres of Plum Creek Timber Company, 640 acres of Thompson River Lumber Company, and 640 acres of National Forest System lands. The lands surrounding the project area received moderate to heavy management starting in the late 1980's and continuing to the present.

Some of the regeneration harvests conducted in the late 1980's are starting to develop lynx foraging habitat components.

3. **Grizzly Bear**

Grizzly bears are listed as "Threatened" under the Endangered Species Act. The Grizzly Bear Recovery Plan defines 6 recovery areas (US Fish and Wildlife Service 1993). This project is not located in any of the identified recovery areas. The nearest subunit of the Cabinet/Yaak Ecosystem (Mount Headley Bear Management Unit) is over 2 miles away. Grizzly bear use of the project area is unlikely due to the high road density and high amount of timber harvesting activities. These activities increase disturbance and human presence, thereby decreasing grizzly bear security and discouraging use.

Although no observations are documented on these parcels, habitat for this species exists on both parcels. These parcels probably provide summer and autumn habitat and food sources for bears. During this period of the year, bears focus on green vegetation mainly in riparian areas and ripening berries, especially huckleberries. Huckleberries are common in Section 16, but not in Section 4. Use of these parcels during other seasons of the year is possible, but not probable based on the current vegetation communities and elevation.

4. **Wolf**

The gray wolf is listed as "Endangered" under the Endangered Species Act. The Northern Rocky Mountain Wolf Recovery Plan defines 3 recovery zones (U.S. Fish and Wildlife Service 1987). The proposed project is in the Northwest Montana Recovery Zone.

The wolf is a wide-ranging species. Adequate habitat for wolves contains adequate vulnerable prey and minimal human disturbance. Primary prey species in northwest Montana are white-tailed deer, elk, moose, and mule deer. Distribution of wolves is strongly associated with white-tailed deer winter range.

Wolves in northwest Montana typically den in late April. Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites. Wolves are most vulnerable to human disturbance at den and rendezvous sites. Most of the project area is high in elevation and steep, therefore no wolf dens or rendezvous sites are expected in the project area. Wolves may pass through the area sporadically. The project is not expected to prevent use of or travel through the area. In the event an active den or rendezvous site is discovered within 1 mile of the project area, DNRC will contact USFWS to determine adequate mitigation measures to avoid adverse impacts to these areas. Since wolves do not currently use the project area; this project is not expected to affect important wolf habitat (denning or rendezvous sites), and forested travel corridors would be retained through the project area, this species will not be discussed further in this document.

F. Sensitive Species

When conducting forest management activities, the SFLMP directs DNRC to give special consideration to the several "sensitive" species. These species are sensitive to human activities,

have special habitat requirements that may be altered by timber management, or may become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database did not return any sensitive species sightings in or within 1 mile of the project area. The following sensitive species were considered for analysis. Each sensitive species either was included in the following analysis or was dropped from further analysis based on the lack of potential of habitat in the area and/or if the habitat could be affected by any of the alternatives (Table 3-7).

Table 3-7: Listed sensitive species for the Northwest Land Office showing the status of these species in relation to this project.

Species	Determination - Basis
Black-backed woodpecker	No recently (<5 years) burned areas in the project area. No further analysis conducted
Boreal owl	No further analysis conducted– The project area occurs above 5,000, but no suitable habitat is present in the project area.
Coeur d'Alene Salamander	No further analysis conducted – no moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted – no suitable grassland communities occur in the project area.
Common loon	No further analysis conducted - no large lakes occur in the project area
Ferruginous hawk	No further analysis conducted – no suitable grassland communities occur in the project area.
Fisher	**Included** – Potential fisher habitat occurs in the project area.
Flammulated owl	No further analysis conducted – no dry ponderosa pine habitats occur in the project area.
Harlequin duck	No further analysis conducted - no potential habitat exists in the project area.
Mountain plover	No further analysis conducted – no suitable grassland communities occur in the project area.
Northern bog lemming	No further analysis conducted – no sphagnum or other fen/moss mats occur in the area.
Pileated woodpecker	**Included** – ponderosa pine, western larch/Douglas fir and mixed conifer habitats occur in the area.
Townsend's big-eared bat	No further analysis conducted – no caves or mine tunnels occur in the project area.

1. **Fisher**

Fishers are listed by DNRC as a sensitive species due to their use of mature forested habitats. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopy. Fishers appear to be highly selective of resting and denning sites. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 150' of water. Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept. Resting and denning habitats were modeled using preferred cover types (Heinemeyer and Jones 1994), age class, and canopy closure.

Strategies that promote or maintain habitat elements important for fishers typically involve protection of valuable resting habitat near riparian areas and maintaining travel corridors with dense overhead canopy. The project area ranges from 3,600' to 5,600' in elevation with a perennial stream and tributaries running from the north to the south of Section 16 and a small part of Meadow Creek abuts the northern portion of the Section 4 parcel. These riparian bottoms and some uplands likely provide forage and travel corridors for fishers. However, these habitats are isolated from other potential habitats by fragmented forested habitats due to past and present timber harvests. Therefore, it is unlikely that fishers would use either parcel in the project area. Since fisher habitat is unlikely to be used or to add to fisher conservation, this species was dropped from further consideration and analysis in this document.

2. **Pileated Woodpecker**

The pileated woodpecker plays an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Due to their important role as a keystone species and their preference for forested habitats in latter stages of successional development, DNRC considers the pileated woodpecker as a sensitive species.

Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps and snags. Aney and McClelland (1985) described nesting habitat for pileated woodpeckers as "stands of 50-100 contiguous acres, generally below 5,000' in elevation with basal areas of 100-125 ft2/ac and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests with old growth characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979). Using SLI data, the above information was modeled to estimate pileated woodpecker habitat. The project area contains 203 acres of scattered patches of potential nesting habitat. Snags occur sporadically throughout the area, but are in lower densities near the open roads.

Cumulative effects were analyzed for lands immediately adjacent to the 2 parcels in the project area. This area is compromised of 1,237 acres of DNRC, 6,554 acres of Plum Creek Timber Company, 640 acres of Thompson River Lumber Company, and 640 acres of National Forest System lands. The lands surrounding the project area received moderate to heavy management starting in the late 1980's and continuing to the present. In many of these areas snags were not managed for in the past. Consequently, snag densities in the surrounding landscape are low. The open habitat and small number of large snags in the surrounding landscape indicates that pileated woodpecker nesting habitat is rare in the area.

G. Big Game Species

The project area provides non-winter habitat for white-tailed deer, mule deer, elk, and moose. During this period of the year, big game species are raising offspring, recovering from the winter food stress, and putting on fat reserves for the next winter period. Also, hunting for these species occurs during the autumn. Road densities and hiding cover are important habitat components during the non-winter period.

Cumulative effects were analyzed for lands immediately adjacent to the 2 parcels in the project area. This area is comprised of 1,237 acres of DNRC, 6,554 acres of Plum Creek Timber Company, 640 acres of Thompson River Lumber Company, and 640 acres of National Forest System lands. The lands surrounding the project area received moderate to heavy management starting in the late 1980's and continuing to the present. In many of these areas, regeneration of tree species could be developing into hiding cover. Most roads are restricted. The restriction devises regulate several miles of existing roads.

H. Special And Unique Habitats

No special or unique habitats were found in any harvest units or in the project area.

V. HYDROLOGY

A. Analysis Area

1. Upland Sources of Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project.

2. Instream Sources of Sediment

The analysis area for water yield are the Meadow Creek watershed, Young Creek and Thompson River watersheds.

3. Cumulative Effects

The analysis for cumulative impacts, including upland and instream sediment, will be the Meadow Creek, Young Creek and Thompson River watershed.

B. **Analysis Methods**

In order to address the issues with water quality as described in Chapter 1, instream sediment and upland sources of sediment will be discussed.

1. **Upland Sources of Sediment**

A sediment source inventory was completed in 2000 for sources on State managed land within the channel and outside of the channel. Roads and stream crossings were evaluated to determine existing sources of introduced sediment.

2. **Instream Sources of Sediment**

The methods applied to the project area to evaluate potential instream sediment production include the Rosgen Stream Classification (Rosgen, 1996) and the R-1 Channel Stability Rating (Pfankuch, 1975). The tools were deemed the most appropriate to provide information on stream channel form, function and resistance to change. This information indicates the relative stability of a stream. The measure of risk for additional instream sources of sediment will be annual water yield. This stability of a stream channel is an important indicator of where a threshold of concern for annual water yield should be set. Thresholds were established based on evaluating the acceptable risk level, resource value, and watershed sensitivity.

The water-yield increase for the watershed in the project area was estimated using the Equivalent Clearcut Acres (ECA) method as outlined in Forest Hydrology, Part II (1976).

In order to evaluate the watershed risk of water yield increase effectively, a threshold of concern for each watershed was established. Thresholds were established based on evaluating the acceptable risk level, resources value, and watershed sensitivity. Watershed sensitivity was evaluated using qualitative assessments as well as using procedures outlined in Forest Hydrology Part II (1976). As water yields increase as a result of canopy reduction, the amount of water flowing in a stream gradually increases. The more stable streams are more likely to handle larger increases in water yield before they begin to erode, while less stable streams will have a greater potential to experience erosion at more moderate water yield increases.

3. **Cumulative Effects**

Water yield will be disclosed as a cumulative effect in the Existing Conditions portion of the hydrology analysis because the existing condition is a result of all past harvesting and associated activities.

An analysis of the potential for adverse cumulative watershed effects to occur due to increased sediment delivery and increased water yield resulting from the proposed action was completed for the project area. The analysis included: 1) An estimate of potential water yield increases using the ECA method described under existing conditions; 2) An evaluation of existing channel conditions; 3) An inventory of existing roads, and 4) An evaluation of proposed road and harvest unit location and mitigation.

C. Water Uses and Regulatory Framework

1. Water Quality Standards

This portion of the Clark Fork River basin, including the Thompson River watershed is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply.

State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMP's) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

2. Water Quality Limited Waterbodies

Meadow Creek is not listed as a water quality limited water body in the 1996 303(d) list. The 303(d) list is compiled by the Montana Department of Environmental Quality as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired.

3. Streamside Management Zone Law (SMZ)

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. An SMZ width of 50 feet is required when the slope is less than 35%.

4. Water Rights and Beneficial Uses

Water rights for surface water exist on Meadow Creek for stock watering. Other water rights exist on the Thompson River, however there is low risk of impacts to the Thompson River or downstream beneficial uses.

D. Existing Condition

The proposed Richards Peak Timber Sale is located approximately 21 air miles northeast of Thompson Falls, Montana. The majority of the section is within the immediate Meadow Creek drainage with the remaining portion drained by the Thompson River. Meadow Creek is a tributary to the Thompson River.

Elevations in the Meadow Creek watershed range from 3160 feet at the confluence with the Thompson River to 5760 feet at the watershed divide. Precipitation varies less than 20 inches per year at the lowest point, to 30 inches at the higher elevations.

The Meadow Creek watershed is a 9,504-acre tributary to the Thompson River. Management of the drainage is mixed between Plum Creek Timber Company (6,170 acres), U.S. Forest Service (987 acres), State of Montana (1,172 acres) and the remaining acreage owned by other private industrial entities.

1. **Instream Sources of Sediment**

Meadow Creek at the confluence with the Thompson River generally flows less than two months each year. Duration of flows is closely related to snowmelt. This area was inventoried during 2000 for sediment sources, channel stability and morphologic characteristics of the stream channel. The portion of Meadow Creek in Section 4, adjacent to the State managed parcel is considered to be a Rosgen type C4 channel. Sediment supply is moderate to high in this type of channel as evident by the well formed point bars. In-channel sediment sources are limited to outcurves and constrictions. The current condition of this channel is relatively stable.

The tributary to Meadow Creek that drains the majority of Section 16 is a class I stream due to the perennial nature of the channel. During the 2000 inventory, no fish species were noted. Stability of the lower portion of the channel is considered to be 'fair' given that the Rosgen channel type is a B4a. A 'B' type channel is relatively stable that is not associated with a high sediment supply (Rosgen, 1996). This is supported by channel inventory data, which concluded that sediment sources from within the channel are limited in size and number (Butts, 2000). Upstream of the confluence of the two first-order channels in the northwest corner of Section 16, stability is considered to be good due to a combination of the channel morphology and the vegetation present in the riparian area. All of these streams are class I or II streams as described in the SMZ law (ARM 36.11.312).

2. **Upland Sources of Sediment**

During the sediment source inventory, no sediment sources to streams were identified on the proposed haul road within State ownership. The road on other ownerships has been upgraded with surface drainage to meet BMP's.

3. **Cumulative Effects**

Water yield in Meadow Creek was estimated using the Equivalent Clearcut Acre (ECA) method as described in Haupt et al (1996). Allowable ECA in the watershed is 3564. Harvest levels beyond the allowable ECA represent potential risk beyond those levels identified by DNRC as acceptable. The predicted cumulative ECA is approximately 2650 acres for analysis year 2003. This equates to an annual water yield increase of 10.2% over pre-disturbance levels. The threshold of concern for this watershed was set at 15% after considering the acceptable risk level, channel condition, beneficial uses present and potential for adverse impacts.

VI. FISHERIES

A. Analysis Area

1. Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling and streams in the Meadow Creek watershed. This includes in-channel and upland sources of sediment that could result from this project.

2. Cumulative Effects

The analysis area for sediment delivery is limited to the harvest units, roads used for hauling, and streams in the Meadow Creek watershed. This includes in-channel and upland sources of sediment that could result from this project.

B. Analysis Methods

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline disclosing the expected changes due to the alternatives proposed.

1. Sediment Delivery

The analysis methods for sediment delivery will mimic those used in the Hydrology Analysis.

C. Existing Condition

Information regarding existing fish populations in Meadow Creek is limited at best. According to the Montana Rivers Information System, Meadow Creek contains resident populations of westslope cutthroat trout and rainbow trout, although these species are estimated to be rare. Eastern brook trout are estimated to be common throughout Meadow Creek. Data from Plum Creek Timber Company shows only eastern brook trout during shocking and snorkeling surveys in 1994. During the watershed inventory process, no fish were observed in the unnamed tributary to Meadow Creek that drains Section 16.

Sediment Delivery

As described in the Hydrology section, sediment sources from instream and upland locations were inventoried during 2000. Instream sediment sources are limited to outcurves and constrictions of the channel as can be expected from the channel type present (see Hydrology Analysis). No out of channel sources of sediment were identified on proposed haul routes on State land.

VII. AIR QUALITY

This area is currently managed under the Montana Airshed Group and lies within Airshed 2. The Airshed Group monitors weather conditions and manages open burning restrictions in the airshed to prevent or limit burning operations during poor dispersion and ventilation conditions. Overall air quality in this area is good; with temporary periods of lower quality air during the spring and fall open burning seasons.

CHAPTER 4: ENVIRONMENTAL EFFECTS

I. INTRODUCTION

This chapter is the scientific and analytical basis for evaluating the environmental consequences of implementing the action or no action alternatives described and compared in chapter 2. Effects for the alternatives will be discussed under resource sections and presented in the same order as in chapter 3.

II. VEGETATION EFFECTS

A. Cover Type Distribution

1. Direct and Indirect Effects

Plains Unit: On the Plains Unit, the shift in current cover types when compared to "desired future" or appropriate cover types shows a decrease in western larch/ Douglas-fir cover types and an increase in mixed conifer cover types. The reasons for this trend revolve around past management and fire suppression.

No Action Alternative: There would be no change to the current cover type amount and distribution on the Plains Unit under this alternative. The shift of the western larch/Douglas-fir cover types to 'other' cover types (mostly mixed conifer) would continue to occur without natural disturbances or stand replacement type harvest treatments to open the canopy and allow for seral tree species regeneration.

Action Alternative: Although 408 acres of timber will be silviculturally treated, the implementation of the action alternative will only slightly change the overall cover type amount and distribution on the Plains Unit. The implementation of the action alternative would help slow the current shift of cover types by favoring the retention of overstory seral species (western larch) which is under represented and by removing shade tolerant species (Alpine fir and grand fir) which are over represented. Regeneration of the seral species will be promoted in the openings created by the timber harvest to help maintain or promote the development of WL/DF cover types on appropriate sites.

Richards Peak Project Area: On the Richards Peak Project Area, the cover type shift is similar to what has been happening on the Plains Unit as a whole. Current western larch/Douglas-fir cover types are underrepresented and Alpine fir, lodgepole pine and mixed conifer exceed what was historically present. This trend is the result of past management and lack of wildfire disturbance in the western larch/Douglas-fir cover types.

No Action Alternative: There would be no change to the current cover type amount and distribution on the Richards Peak Project Area under the no action alternative. The current shift in western larch/Douglas-fir cover types to Alpine fir and mixed conifer

would continue to occur without natural disturbances or stand replacement type harvest treatments to open the canopies and allow for seral tree species regeneration. Shade tolerant species such as alpine fir and grand fir would continue to increase in the appropriate western larch/Douglas-fir cover types keeping with the overall Plains Unit trend. This increase of shade tolerant species increases the risk of the stands to insect and disease attack and stand replacement wildfires.

Action Alternative: Under the action alternative, there would be minimal change to the current cover type amount and distribution on the Richards Peak Project Area. Of the 156 acres of appropriate western larch/Douglas-fir cover types that are currently classified as alpine fir, lodgepole pine and mixed conifer, approximately 35 acres will be treated and converted to western larch/Douglas-fir. The remaining 121 acres are in areas where high logging costs and lack of merchantable trees for harvest exist. The action alternative would help slow the increasing percentage of shade tolerant species in the western larch/Douglas-fir cover types and promote the development of large diameter, seral tree species in the overstory and seral tree regeneration in the understory.

2. **Cumulative Effects**

Plains Unit

No Action and Action Alternative: There would be minimal change to the Plains Unit cover type amount and distribution with implementation of either alternative. The unit would still have over 7,000 acres more current mixed conifer cover types than appropriate and 8,000 acres less appropriate western larch/Douglas-fir cover types than current. Implementation of the action alternative would help slow the invasion of shade tolerant species into the western larch/Douglas-fir cover types and promote regeneration of seral tree species which is becoming underrepresented on the Plains Unit.

Richards Peak Project Area

No Action Alternative: There would be no change to the current cover type amount and distribution on the Richards Peak Project Area under the no action alternative. The current shift in western larch/Douglas-fir cover types to Alpine fir and mixed conifer would continue to occur without natural disturbances or stand replacement type harvest treatments to open the canopies and allow for seral tree species regeneration. Shade tolerant species such as alpine fir and grand fir would continue to increase in the appropriate western larch/Douglas-fir cover types keeping with the overall Plains Unit trend. This increase of shade tolerant species increases the risk of the stands to insect and disease attack and stand replacement wildfires.

Action Alternative: Under the action alternative, there would be minimal change to the current cover type amount and distribution on the Richards Peak Project Area. Of the 156 acres of appropriate western larch/Douglas-fir cover types that are currently classified as alpine fir, lodgepole pine and mixed conifer, approximately 35 acres will be treated and converted to western larch/Douglas-fir. The remaining 121 acres are in areas where high logging costs and lack of merchantable trees for harvest exist. The action

alternative would help slow the increasing percentage of shade tolerant species in the western larch/Douglas-fir cover types and promote the development of large diameter, seral tree species in the overstory and seral tree regeneration in the understory.

B. Age Class Distribution

1. Direct and Indirect Effects

Richards Peak Project Area

No Action Alternative: No timber harvesting or related activities would occur. The current age class distribution on the project area would remain the same over the short term with stands becoming older with time. This trend would continue without natural disturbances or stand treatments that would convert stands to younger age classes.

Action Alternative: Under the action alternative, overstory removal of seedtrees in Section 4 would convert 97 acres of WL/DF cover type in the 100-149 year age class to the 0-39 year age class. Although the remaining 311 acres would have no change in age class this entry, silvicultural treatments on 172 acres focus on regeneration harvesting and will promote a conversion to younger age classes next entry.

2. Cumulative Effects

Richards Peak Project Area

No Action Alternative: No Change in age class distribution would occur. Stands would continue to age and result in older age classes within the project area without natural disturbances or stand treatments that would convert stands to younger age classes.

Action Alternative: Under the action alternative, timber harvesting would convert 97 acres of WL/DF in the 100-149 year age class to 0-39. In addition to the 97 acres, 172 acres would be harvested using a seedtree/shelterwood cut to promote the development and establishment of younger age classes. The conversion to younger age classes would result in increased timber productivity for the treated stands.

C. Timber Productivity

Many stands within the Richards Peak Project area are producing at the lower end of their potential due to overstocked stand conditions. Overstocked stand conditions are increasing the risk to these stands from insect and disease damage and mortality.

1. Direct and Indirect Effects

No Action Alternative: No trees would be harvested with this alternative. In areas outside of the root disease centers, which are mainly in a small portion of Section 16, stand density is expected to increase over time. Timber productivity would decline with increased stand stocking, resulting in increased competition between trees for nutrients

and water. In areas adjacent to or within root disease pockets, timber productivity may increase for those species not susceptible to root disease (western larch, ponderosa pine) and those susceptible species not currently infected. The increased productivity would most likely be short lived as the root disease centers continue to enlarge and infect new trees. Natural regeneration of seral species would be unlikely without disturbances to prepare the proper seedbed for seral tree regeneration.

Action Alternative: Trees would be harvested from 408 acres of the project area from 8 different harvest units using seedtree harvest on 172 acres, overstory removal on 97 acres, and commercial thinning on 139 acres. Silvicultural objectives are aimed at thinning the overstory to reduce overcrowding, improve forest health, promote resistance of the overstory to root disease and bark beetles and promote regeneration of seral tree species such as western larch. In addition, prescribed broadcast burning would provide increased timber productivity and improve establishment and growth of regeneration on the 176 acres to be burned. The reduced stocking and promotion of trees less susceptible to insect and diseases would result in improved tree vigor and growth production by reducing the competition for moisture, nutrients and growing space. Timber productivity on the remaining 432 acres within the project area but outside of any harvest units may decrease in the short term with this alternative. Many of these acres are where high logging costs and lack of merchantable trees for harvest exist.

2. **Cumulative Effects**

No Action Alternative: Timber productivity in the Richards Peak Project Area would continue to decline over time without disturbance to open the canopy and reduce stand stocking.

Action Alternative: Timber productivity in the Richards Peak Project Area would generally improve over the 408 acres that would be harvested under this alternative. Silvicultural prescriptions would reduce stocking levels to provide more light and nutrients to remaining trees, retain the healthiest trees in the stand and retain species that are less susceptible to insects and disease. The reduced stocking will ensure increased growth and vigor and improve long-term timber productivity in these areas. Prescribed burning would increase timber productivity on the 176 acres to be burned. In most areas that would not receive treatment at this time, timber productivity would continue to decline.

D. Insect and Disease Effects

1. **Direct and Indirect Effects**

No Action Alternative:

1. **Bark Beetles**: Bark beetles would continue to be present at endemic levels for the short term. With continued drought and presence of overstocked lodgepole pine stands, mountain pine beetle numbers may dramatically increase in the project area in the near future. Douglas-fir beetle populations will hold steady and may decline with overall

declines in populations across the northwest. Continued drought and overstocked stand conditions may lead to an increase in numbers over the long term.

2. **Dwarf Mistletoe**: Dwarf mistletoe would continue to be present and increase numbers of infected trees without disturbances to eliminate all or some currently infected trees. The infection would continue to be spread from infected overstory to adjacent overstory and understory trees. Reduced growth rates and tree vigor would persist as infection is spread from the overstory to younger regeneration below, resulting in long term merchantable timber quantity and quality reductions. Long-term infection would cause a gradual shift in species composition from seral species such as western larch to more shade tolerant species such as alpine fir and grand fir.

3. **Root Diseases**: Root diseases would continue to be present causing mortality in the overstory and understory. Root disease centers would continue to increase in size over time. These pockets may regenerate with less susceptible species such as western larch, but more than likely will regenerate with susceptible species such as Douglas-fir and grand fir which have higher reproductive success. The perpetuation of the root disease susceptible species would result in loss of timber productivity around these sites until less susceptible species become established.

Action Alternative:

1. **Bark Beetles**: Lodgepole pine trees, within proposed harvest units, would be salvaged. Salvaging lodgepole recently infected with beetles can interrupt the beetles breeding cycle and result in reduced tree mortality. Under the action alternative, basal area reductions resulting from timber harvest would increase vigor and growth in remaining trees that are susceptible to mountain pine beetle attack. Increases in growth and vigor improve the tree's ability to "pitch out" attacking beetles and survive.

2. **Dwarf Mistletoe**: Western larch infected with dwarf mistletoe would be harvested under the action alternative. Reduction in infected overstory trees will remove sources of mistletoe infection and reduce future losses in growth and yield. Promotion of healthy western larch overstory and supplemental planting of areas severely infected with mistletoe with western larch would provide long-term growth and yield.

3. **Root Diseases**: Douglas-fir would be salvaged around root disease pockets, although rates of disease spread and tree mortality will not be reduced. Silvicultural prescriptions will favor retention of species less susceptible to root disease, improving future stands resistance.

2. **Cumulative Effects**

No Action Alternative: Insect and disease populations under the no action alternative would remain static to increase over time. Bark beetles would continue to increase in the short term and depending upon drought and stocking conditions, continue to increase for a period of time until their life cycle is disrupted. Dwarf mistletoe infection in the larch

would continue and result in long term shift from seral species to more shade tolerant species. Root diseases would continue to exist and acreage affected would continue to increase until more of the stand is dominated by species that are less susceptible.

Action Alternative: With implementation of the action alternative, insect and disease levels would remain static to decrease over time. Silvicultural prescriptions reducing stocking levels would increase growth and vigor in the remaining trees increasing their resistance to bark beetle attacks. Bark beetles would continue to increase over the short term in those areas highly susceptible but not harvested. Long term attacks and mortality would depend upon future weather conditions and growth and vigor of stands not harvested. Dwarf mistletoe would be reduced in the overstory and future infection of younger stands would also be reduced. Root disease would continue to be present. Silvicultural prescriptions that favor retention of species less susceptible and planting of these species should result in long term increases in their numbers and a direct increase in timber productivity.

E. Noxious Weed Effects

1. Direct and Indirect Effects

No Action Alternative: Current weed populations would continue to increase over time without treatment. Motorized vehicle use, the main proponent in weed seed dispersal, would continue to spread weed seed along all open roads in the project area. Road maintenance activities on State and private roads would have the potential to create conditions conducive for new infestations or increases in current infestations. With the adoption of the SFLMP, a more aggressive approach to identification and treatment of noxious weed infestations would occur than in the past. This ongoing treatment of noxious weeds should help mitigate any increase in noxious weed spread and may reduce the number of acres infested in the future.

Action Alternative: The action alternative includes 2.5 miles of new road construction and reopening of approximately 1 mile of road currently closed with earthen berms. Much of the existing mile of road to be reopened is already infested with noxious weeds. Logging operations such as skidding logs, log landings, site preparation, road construction and log hauling operations increase the exposure of bare mineral soil. The increase in bare mineral soil from road construction/maintenance and logging operations would increase the area where noxious weeds can become established. The action alternative includes closure of the 1 mile of road that would be reopened to facilitate the logging operation. Mitigation measures to reduce the current weed population and restrict future infestation would include washing of heavy equipment before entering the project area and grass seeding of areas disturbed during road construction and logging operations.

2. Cumulative Effects

No Action Alternative: The spread of weed seed and increases in weed populations would continue to occur with the no action alternative. Road maintenance activities that

would disturb the soil create conditions that would be conducive to possible new infestations or spread of current populations. The current miles of open road within the project area would not change under the no action alternative and would be the likely areas to see increases in noxious weeds and invasions of new species. Reductions in noxious weed infestations would most likely occur with cooperation and joint control efforts with the private landowners within and adjacent to the project area.

Action Alternative: The spread of weed seed and increases in weed populations would continue to occur with implementation of the action alternative. Road construction and maintenance activities that would disturb the soil create conditions that would be conducive to possible new infestations or spread of current populations. Reductions in noxious weed infestations would most likely occur with cooperation and joint control efforts with the private landowners within and adjacent to the project area.

III. SOIL EFFECTS

1. Direct and Indirect Effects

No Action Alternative: No timber harvesting and associated activities would take place except for road maintenance and spot repairs. Effects from skid trails, landings, hazard reduction and site preparation would not occur under the no action alternative.

Action Alternative: Timber harvesting would occur on 408 acres of the project area. Effects from skid trails, landings, hazard reduction and site preparation would occur under the action alternative. Hazard reduction and site preparation activities would include approximately 176 acres of prescribed burning.

Table 4-1: Estimated maximum acres of soil impacts from harvest methods

Harvest Method	Harvest Area (acres)	% Area Impacted	Acres Impacted
Cable	232	10%	23.2
Ground Based	176	15%	26.4
TOTALS	**408**	**12%**	**49.6**

Due to the compaction and displacement impacts to the soil as shown in Table 4-1, reductions in soil productivity are expected on up to 49.6 acres. To control the area and degree of detrimental soil effects to less than 15% of the area, the following mitigation measures were developed to reduce the potential impacts to the soil resource:

- Lopping slash in main skid trails to reduce bare soil exposure
- Grass seed road cuts and fill slopes shortly after construction and the road prism after final blading.
- Skidding will only be allowed when soil is dry, frozen, or snow covered.
- A plan for felling, skidding and landing will be required prior to the start of

operations in each logging unit.

- Ground scarification for site preparation will be limited to 30% soil exposure in Regeneration harvest areas.
- A burn plan will be prepared by a qualified burn boss to limit impacts to the soil resource from prescribed burning.

2. **Cumulative Effects**

No Action Alternative: Since no timber harvesting and associated activities are proposed under the no action alternative, there would be no effects to future soil productivity from these activities.

Action Alternative: The timber harvesting and related activities coupled with the road construction proposed with the action alternative have the potential to cause erosion, displacement, and compaction of forest soils resulting in loss of productivity. Road construction activities associated with the action alternative would reduce the productivity on 8 acres in addition to the 11.5 acres that are already impacted from existing roads. Cumulative effects to soil productivity would be reduced from implementation of mitigations and application of Best Management Practices that include using existing skid trails, installing erosion control features, skid trail spacing, and soil moisture restrictions. Prescribed burning would provide a short-term increase in soil productivity and improve tree growth and productivity. In addition, 10 to 15 tons of coarse woody debris and fine litter would be retained per acre for long-term nutrient cycling.

IV. WILDLIFE EFFECTS

A. Coarse Filter

1. **Direct and Indirect Effects**

No Action Alternative: Under the No Action Alternative timber harvest and road construction would not occur and no additional direct effects to wildlife species using the area are expected. Forest conditions would continue to change toward shade tolerant cover types with high canopy cover. Seed tree removal would not occur, leaving widely spaced overstory trees in Unit 1, to provide nesting and perching habitat into the future stand. The sapling sized trees in the understory of this two-storied stand would continue to grow and increase in diameter, height, and density. Additionally, closed canopy mature forests would be retained on 747 acres favoring species that use these types of habitats. Over time, shade intolerant trees would die out and are not expected to be replaced in the near term, barring other disturbances.

Action Alternative: Under the Action Alternative, approximately 361 acres of closed canopy forest stands would be opened up to some extent by removing shade tolerant trees, while retaining shade intolerant trees. In Section 4, a 97 acre seedtree removal cut would further reduce the open canopied WL/DF stand. These conditions would lead to

more open habitats with a higher percentage of shade intolerant trees in the overstory. In proposed seed tree harvests, regeneration of shade intolerant trees is expected. These conditions would benefit species that use these types of habitats and habitat structure. In all harvest units, a minimum of 2 trees per acre of the larger diameter classes would be retained for snags or snag recruits to provide for cavity nesters. The seed tree removal would reduce habitat structure available presently and in the future stand, while producing an open regenerating stand. This situation would benefit species that use open or early seral stages with minimal habitat structure. Approximately 400 acres would not be harvested; thereby closed canopied habitats would be retained in those areas.

2. **Cumulative Effects**

No Action Alternative: No changes in age class or cover types would occur. Stands would continue to age and convert to more shade tolerant cover types. These conditions would favor species that use closed forested habitats with sparse understory, heavy coarse woody debris, and/or shade tolerant tree species to fulfill their life requirements. These conditions are less common on the surrounding lands, therefore this alternative would retain less common habitats, resulting in positive effects to species that use a variety of habitats or require these less common habitats for a portion of their life requirements.

Action Alternative: The cumulative effects under the action alternative would include converting a 97 acre, stand from the 100-149 years old age class to 0-39 years old age class. Additionally, 143 acres would receive seed tree treatments that would reduce the overstory to scattered shade intolerant trees for regeneration. Additionally, this alternative would convert 35 acres back to WL/DF, while leaving 121 acres in a cover type inconsistent with the desired condition of the stand. These conditions would favor species that use open forested conditions with dense understory and shade intolerant trees to fulfill life requirements. These conditions are common on the surrounding lands, therefore this alternative would reduce the amount of closed canopied habitats resulting in minor negative effects to species that require these less common habitats for a portion of their life requirements.

B. Threatened And Endangered Species

Canada Lynx

1. **Direct and Indirect Effects**

No Action Alternative: Under the No Action Alternative, lynx and their habitat would not be affected. In time, stands would age, while tree diameter and coarse woody debris would increase. These changes would increase denning habitat quality, but would reduce foraging habitat.

Action Alternative: Under the Action Alternative, lynx could be disrupted by harvest activities if they use the area. However, lynx tend to be tolerant of human activities and the likelihood of lynx using the area is low, therefore the direct effects of this project are expected to be negligible.

Timber harvest could alter lynx habitat on both parcels. Seed tree removal in Section 4 is not expected to alter the existing habitat or development of young foraging habitat. However, removal of this material could reduce denning structure in the distant future. Since this parcel is lower elevation near Meadow Creek, the probability of lynx use in this area is low, therefore the development of denning habitat is probably not of large importance. Therefore, the effects of harvests in Section 4 are expected to be negligible.

In Section 16, 90 acres of mature forage and 113 acres of other available habitat would be harvested. Approximately 15 acres of mature forage and 84 acres of other available habitat would be converted to temporarily unsuitable habitat for approximately 30-40 years. When regeneration of conifer trees occurs, the area could offer young foraging habitat. The remaining 65 acres of mature foraging and 29 acres of other available habitat would be modified and potentially converted to temporarily unsuitable habitat if canopy closure is reduced below 40%. This loss of habitat would be expected to last for 10-20 years until canopy closure exceeds 40%. If canopy were retained above this threshold, lynx could still use the area, but might experience a decline in red squirrel prey due to reduced conifer seed production. Since lynx use in the area is believed to be rare to nonexistent and retention areas could provide travel corridors for lynx through these parcels, the effects of this proposal is expected to be negligible.

2. **Cumulative Effects**

No Action Alternative: Young foraging habitat is available or is expected to develop in the near future on adjacent lands. However, denning habitat could be limited due to the amount of timber harvesting in the area. Therefore, this alternative could benefit lynx in the long-term by allowing the amount of denning habitat to increase over time with undisturbed stand development on DNRC lands. However, due to the landownership patterns and management of adjacent lands (focus on timber production, precommercial thinning, etc.), lynx are not expected to use the area, therefore these effects are expected to be negligible.

Action Alternative: Young foraging habitat is available or is expected to develop in the near future on adjacent lands. However, denning habitat could be limited due to the amount of timber harvesting in the area. This alternative would continue to allow movement through the project area, but could retard development of denning habitat, thus negatively affecting lynx habitat in the area. However, due to the landownership patterns and management of adjacent lands (focus on timber production, precommercial thinning, etc.), lynx are not expected to use the area, therefore these effects are expected to be negligible.

Grizzly Bears

1. Direct and Indirect Effects

No Action Alternative: This alternative is not expected to result in any changes in disturbance to grizzly bear habitat, or the use of this habitat by grizzly bears.

Action Alternative: Timber harvest activities would result in additional road construction, vegetation manipulation, and prescribed burning, which could affect grizzly bear habitat. Due to the snow conditions, the harvest activities would occur during the non-denning season. During the harvest activities, grizzly bears could be displaced if they were using the project area. However, any displacement is expected to result in negligible effects to grizzly bears, because the habitat in the project area does not appear crucial to bear use, the project would occur during a season (summer-early autumn) when habitat is most available and it is likely that adjacent areas with limited disturbance would be available during the project.

Road use and construction could disrupt grizzly bear use of the project area. Under this alternative, 2.2 miles of new road would be constructed through the center of Section 16. Other existing restricted (gates and berms) roads would be used during implementation of this proposal and the associated follow-up treatments (burning, planting). Following use, the restriction devise used on currently restricted roads would be reinstalled. These restrictions are expected to limit disturbance to grizzly bears after completion of the project, resulting in a short-term disturbance ($\leq$ 3 years), but a long-term negligible affect.

Timber harvest and follow-up activities could alter grizzly bear habitat. Timber harvesting and subsequent prescribed fire would remove vegetation cover, while enhancing foraging plants. Cover would be retained in unharvested stands and in unburned patches. Forage would be enhanced throughout the harvest units by increasing sunlight, nutrients, and plant response to prescribed burning. Cover would be retained around riparian areas and along creeks. In Section 4, harvests would not alter the distance to cover because the regeneration units proposed for seed tree removal are providing or near to providing adequate hiding cover. In Section 16, foraging plants, especially huckleberry, could be reduced if the prescribed fire burns too hot and damages the root crowns. Efforts in planning and ignition patterns could reduce the risk of a hot fire. Overall, the proposed project is expected to produce minimal positive effects to grizzly bear habitat.

2. Cumulative Effects

No Action Alternative: This alternative is not expected to alter grizzly bear use of the area.

Action Alternative: This alternative is not expected to alter grizzly bear use of the area, however, some localized habitat shifts could occur for bears to take advantage of forage or cover resources.

C. Sensitive Species

Pileated Woodpecker

1. Direct and Indirect Effects

No Action Alternative: Under the No Action Alternative, timber harvest would not occur and the existing shade-intolerant trees would continue to grow in diameter and die, thus providing pileated woodpecker nesting and foraging habitat. However, as these trees die out, replacement trees (shade-intolerant) would not be present in the stand barring any disturbance. Therefore under this alternative, pileated woodpecker habitat would increase through time, then decline as shade intolerant tree species are replaced by less-preferred shade tolerant species. No short-term additional effects to pileated woodpeckers would occur under this alternative. However, in the longer-term, pileated woodpecker use of the area could decline.

Action Alternative: Under the Action Alternative, approximately 62 acres of potential nesting habitat on the east side of Section 16 would not be harvested, thereby retaining the largest and highest potential habitat on the section. Timber harvesting would occur in 92 acres of potential nesting habitat. Snags, coarse woody debris, numerous leave trees, and snag recruits would be retained for feeding and nesting substrate, but quality nesting habitat may decline due to the removal of the midlevel forest canopy layer and reduction of overstory canopy cover. The resulting open canopy and prescribed burning may allow for natural regeneration and growth of replacement shade-intolerant tree species to provide nesting structure in the distant future. The retained trees would increase in growth due to reduced competition, resulting in potential recruitment of large snags earlier in the future, than if not managed. Snag numbers may decline due to the harvest operations, resulting in decreased foraging habitat. However, these losses are expected to be minimized due to the logging practices proposed. The removal of encroaching DF may reduce feeding opportunities in the near and distant future. Most snags cut to reduce safety hazards would be left on site along with cull trees and butts. These would continue to provide foraging sites for pileated woodpeckers. Snags left on site are susceptible to firewood cutting, however, road closures are expected to decrease snag loss. This alternative could result in moderate adverse effects to pileated woodpeckers in the short-term by removing or altering 45% of the existing nesting habitat, but minor positive effects in the longer-term by promoting preferred cover types and large trees.

2. **Cumulative Effects**

No Action Alternative: The surrounding landscape is managed primarily for timber production, so pileated woodpecker habitat on these lands is probably scarce. This alternative would not further reduce pileated woodpecker habitat in the area.

Action Alternative: The surrounding landscape is managed primarily for timber production, so pileated woodpecker habitat on these lands is probably scarce. This alternative would further reduce pileated woodpecker habitat in the area. However, due to the limited amount of habitat in the area, these effects are expected to be minimal.

D. Big Game

1. **Direct and Indirect Effects**

No Action Alternative: Under the No Action Alternative, big game species would not be disrupted from harvest activities and hiding cover and motorized access would remain unchanged. Therefore, no effects are expected under this alternative.

Action Alternative: Under this alternative, big game species could be displaced during the harvest activities, however, this disturbance would occur during the nonwinter period when habitat is abundant. Therefore, negligible direct effects are expected to big game species.

The proposed timber harvests would remove hiding cover for a period of 15 to 30 years and increase motorized access into the project area. Hiding cover would be retained in unharvested stands and in commercial thinned harvest units. Additionally, the main saddle in the area would remain unharvested to provide a corridor through Section 16. Motorized access into the project area would increase during the project. Gated roads would remain gated when timber associated activities are not active. Additionally, contractors would not be allowed to carry a firearm on to a restricted road. Following completion of harvesting and follow-up activities, all the roads that were restricted prior to the project would be restricted along with all new roads. During the project, road access could increase thereby reducing big game security. Following completion of the project, road access would return to the existing situation. Therefore, only short-term localized effects are expected under this alternative.

2. **Cumulative Effects**

No Action Alternative: Most of the adjacent lands are managed for timber production. Motorized access is limited due to road closures. This management regime provides forage for big game, while reducing cover. Reduction of cover and concerns over security of big game, especially during hunting season, led to an extensive road closure program on the extensive road network present in the area. This alternative would retain

existing cover, and provide for increasing amounts of hiding cover as forest stands grow and develop over time.

Action Alternative: Most of the adjacent lands are managed for timber production. Motorized access is limited due to road closures. This management regime on adjacent lands provides forage for big game, with smaller amounts of hiding and thermal cover existing mostly along streams and wetlands. Reduction of cover and concerns over security of big game, especially during hunting season, led to an extensive road closure program on the extensive road network present in the area. This alternative would result in similar effects as the adjacent ownerships, thereby decreasing the amount of hiding cover present in the area. These effects are expected to result in minor negative effects to big game species during the non-winter period.

V. HYDROLOGY EFFECTS

This section discloses the anticipated indirect, direct and cumulative effects to water resources within the affected environment from proposed actions. Past, current, and future planned activities on all ownerships within the Meadow Creek watershed have been taken into account for the cumulative effects analysis.

The primary concerns relating to aquatic resources within the affected environment are potential impacts to water quality from sources outside the channel as well as inside the channel. In order to address these issues, the following parameters are analyzed by alternative:

- Miles of new road construction and road improvements
- Increases in ECA and annual water yield.

The project proposes 386 acres of harvest in the Meadow Creek watershed, 13 acres in the Young Creek watershed, and 9 acres in the Thompson River watershed. The harvest units in Young Creek and the Thompson River are located well away (>300 feet) from any stream and therefore have a low potential for delivering sediment to streams. In addition, this low level of harvest would not measurably increase annual water yield. Due to the low potential for impacts in Young Creek and the Thompson River, no further analysis will be displayed for the watersheds.

A. Sediment Delivery from Upland Sources

1. Direct and Indirect Effects

No Action Alternative: No timber harvest or road construction activities would take place with this alternative.

Action Alternative: Approximately 386 acres of State Land would be treated in the Meadow Creek watershed. In addition, approximately 8 acres would be disturbed for road construction.

The proposed harvest in Section 4 consists of two harvest units that would generate approximately 28 ECA. No SMZ harvest is proposed along Meadow Creek. The ground-based unit 1 is located at least 200 feet from Meadow Creek and the terrain is relatively flat. Therefore, it is unlikely that soil disturbed during the harvest operation would be transported to the stream.

The second unit proposed in Section 4 is a cable unit on 60% slope. SMZ harvest is proposed along the class II SMZ in this unit, although no closer than 50 feet from the stream. Due to slope, felling operations would restrict the use of mechanized equipment. In addition, cable yarding typically results in less potential soil displacement than ground based operations. By designing this harvest unit with cable harvest and no ground based harvest methods, the risk of sediment disturbance and delivery to streams would be minimized.

The proposed harvest in Section 16 is contained in within 6 units that would generate approximately 205 ECA in the Meadow Creek watershed. Five of the units within this section propose SMZ harvest although no SMZ harvest is proposed within 50 feet of any channel. All of the proposed SMZ harvest would utilize cable yarding and hand felling. With the proposed harvest implemented using (1) no mechanized felling equipment within 100 feet of any stream channel; (2) the SMZ law; and (3) all applicable Forestry BMP's, the risk for sediment introduction into Meadow Creek from harvest practices would be minimized.

Other proposed activities that would occur near streams are associated with the road construction and prescribed burning. Approximately 2.2 miles of new road construction would be implemented as part of this proposal that would generate approximately 8 ECA. Included in the proposed road construction would be at least three stream crossings. Stream crossings would be installed using all applicable BMP's and during periods when no water would be flowing in the streams to minimize sediment deliver. A short-term increase in turbidity may result from these activities, but with mitigation no adverse impacts to beneficial uses would result. A 124 permit (Montana Stream Protection Act) would be obtained prior to work in any stream. In addition, a 318 permit (short term turbidity increase) may be required by the Montana Fish, Wildlife and Parks.

Prescribed burning in Units 4,6,7 & 8 of Section 16 and Unit 2 of Section 4 is proposed to promote regeneration. Hand line or excavator lines, if constructed, would present a sediment source, although potential for transport to the streams would be low due to the untouched vegetation between the control line and the stream. The vegetative filter would be protected by: 1) whole tree harvesting to reduce slash levels in the SMZ; 2) piling existing slash to reduce burn potential in the SMZ; or 3) installing hand or excavator fire line to reduce the risk of fire entering the SMZ.

By implementing this alternative as presented and in accordance with the SMZ law and all applicable forestry BMP's, it is unlikely that adverse long-term impacts to water quality and beneficial uses would result from the harvesting and road construction.

2. **Cumulative Effects**

No Action Alternative: No Timber harvesting or road construction activities would take place, therefore no cumulative effects to sediment delivery and water quality would occur with this alternative.

Action Alternative: Due to harvest methods that would be employed on harvest units, this alternative would not likely result in adverse impacts to water quality. By implementing BMP's on all new and existing roads and harvest units, sediment introduction into surface waterbodies is not likely to result in adverse cumulative effects to water quality. Short-term impacts may result as described in the direct and indirect effects.

B. Sediment From Instream Sources

1. **Direct and Indirect Effects**

No Action Alternative: No timber harvest or road construction is associated with this alternative. Sediment increases are not likely since no increase in water yield is expected with this alternative.

Action Alternative: Approximately 386 acres of timber harvest in the Meadow Creek watershed would be implemented under this alternative. The timber harvest and road construction combined results in an increase of 241 ECA in Meadow Creek. Timber harvest and road construction activities would result in a 1.5% increase in annual water yield for the Meadow Creek watershed. This estimated increase is within the acceptable limits to maintain a low degree of risk for instream erosion.

2. **Cumulative Effects**

No Action Alternative: No timber harvest or road construction activities are proposed under this alternative; therefore no water yield increase would result from implementation of this alternative. Water yield would continue at or near the current level and would decline as past harvest units within the watershed regenerate.

Action Alternative: The cumulative annual water yield increase from this alternative would be about 11.7% over modeled pre-disturbance levels. This includes all actions on all ownerships within the watershed that contribute to water yield increase. The threshold of concern set at 15% annual water yield increase; this alternative would be within the recommended threshold.

Because the annual water yield increases below the recommended threshold; it is unlikely that adverse impacts to beneficial uses would result from the implementation of this alternative.

VI. FISHERIES EFFECTS

1. Direct and Indirect Effects

No Action Alternative: No timber harvest or associated activities are proposed with this alternative. No effect to fisheries is expected with implementation of this alternative.

Action Alternative: Under this alternative, no harvest would occur in the SMZ of fish bearing stream, namely Meadow Creek.

Section 16 of this watershed would have some SMZ harvest conducted, although no harvest would occur within 50 feet of any stream. Timber harvest and road construction would be conducted using all the applicable BMP's to limit the potential for sediment introduction.

As described in the Hydrology analysis, prescribed burning would occur on some of the proposed units. Precautions (as listed in the Hydrology Analysis) would be taken to protect the vegetative filter by reducing the potential for fire creeping into the SMZ on the tributaries to Meadow Creek.

Instream sources of sediment would not be expected to increase measurably from annual water yield increase associated with this alternative. As described in the Hydrology Analysis, the annual water yield increase would remain below the recommended threshold that could result in increase channel erosion.

By minimizing the potential for sediment introduction into streams from upland sources and maintaining the annual water yield increase below the threshold of concern, it is unlikely that fisheries habitat would be adversely affected by the implementation of this alternative.

2. Cumulative Effects

No Action Alternative: Current fisheries habitat and populations would change in response to natural events.

Action Alternative: Current fisheries habitat and populations would not likely be adversely affected with the implementation of this alternative due to low water yield increase as described in the Hydrology analysis and low potential for sediment introduction from harvest units and roads. In order to ensure a low potential for impacts, all applicable BMP's and mitigation measures would be implemented as described in the Hydrology and Soil analysis.

VII. AIR QUALITY EFFECTS

Direct and Indirect Effects

No Action Alternative: Under the no action alternative, air quality would not change from the existing condition. No slash or site prep burning would be done. Wildfires are possible and would temporarily reduce air quality.

Action Alternative: All slash burning will be done in cooperation with the Montana Airshed Group. This will provide for burning when conditions are acceptable in terms of ventilation and dispersion. No slash burning will be done when inversions or other stable weather systems prevail. Site preparation burning under the Action Alternative would be accomplished under a written burn plan that provides for burning when conditions are acceptable in terms of ventilation, dispersion and consumption of fuels in meeting burn objectives. Wildfires would still be possible under the action alternative.

VIII. ECONOMIC ANALYSIS

The economic analysis for the Richards Peak project estimates the revenue from timber harvesting and non-administrative costs for the No Action and Action Alternative. The costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not keep track of costs for individual timber sales. These figures are only for relative comparison of the alternatives and should not be used as absolute estimates of return.

The following assumptions were made:

1. The estimated harvest volume is 2,500 MBF

2. The estimated stumpage value is $120 per MBF
   -The estimated stumpage value equals the delivered log prices minus costs and an amount for profit and risk. Costs include logging costs, haul costs, forest improvement fees, development costs, and other costs (e.g. Road maintenance). Profit and risk is the return to timber buyer that accounts for actual time and effort, some profit for entrepreneurial spirit, and something to cover the expected losses on an occasional sale that is not profitable.

3. Development Costs for:

   a. No Action Alternative:
      - Reciprocal Access/ Purchase Access: $20,300

   b. Action Alternative:
      - Reciprocal Access/ Purchase Access: $20,300

The development costs for the No Action Alternative would be funded from the current Forest Improvement (FI) account. The development costs for the Action Alternative would be funded from FI money received from the purchaser.

4. Forest Improvement (FI) cost is based on the program wide cost and cost to maintain the ongoing staffing, stand and road maintenance treatment needs for the current year and right-of-way acquisition. Money collected under FI from a purchaser provides the funding for the State to accomplish projects such as tree planting, site preparation, slash treatment, pre-commercial thinning, road maintenance, road acquisition and for some timber sale related activities. Thus, the State is able to improve the long-term productivity of timber stands on State land and maintain or acquire access for future revenue producing projects. The current FI fee for the Northwest Land Office is $52.25 per MBF.

5. Limitations of the economic analysis are:

1) Only known costs and benefits that are related to timber harvesting activities or other revenue producing activities are considered.

2) None of the potential benefits associated with leaving trees (i.e. snag recruitment, structural diversity, aesthetics, wildlife habitat, nutrient cycling, etc. are considered directly in this analysis.

Table 4-2 Costs and Benefits Estimates by Alternative

	No Action		Action Alternative		
	Total $	$/ Acre*	Total $	$/ MBF	$ / Acre*
Development Cost- Access Purchase	$20,300.00	$24.17	$20,300.00	$8.12	$24.17
Forest Improvement	$0.00	$0.00	$130,625.00	$52.25	$155.51
Estimated Total $ Revenue to the Trust from Timber (Stumpage x harvest volume)	$0.00	$0.00	$300,000.00	$120.00	$357.14
Estimated Timber Dollar Collected by the State (Stumpage + FI)	$0.00	$0.00	$430,625.00	$172.25	$512.65
Estimated Total Dollar Revenue to the Trust	$0.00	$0.00	$300,000	N/A	$357.14

***$/Acre is calculated by dividing by the Total Project Acres of 840**

Effects of the No Action Alternative: The estimated Total Dollar Revenue to the Trust would be $0. The cost to the Forest Improvement account would be $20,300 for purchasing legal easement to access the project area.

Effects of the Action Alternative: The estimated Total Dollar Revenue to the Trust would be $300,000. The cost to the Forest Improvement account would be $20,300 for purchasing legal easement to access the project area.

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GLOSSARY

Animal Unit Month (AUM): The number of animals times the number of months they graze. An "animal unit" is a cow with calf.

Biodiversity: The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. (From Keystone Center)

Closed road: A road that exists but is not open to vehicle traffic because of gates, berms, or other man-made obstructions.

Cumulative effects or impacts: The impact on the environment that results from the incremental impact on an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Cumulative effects or impacts can result from individually minor but collectively significant actions taking place over a period of time.

Endangered Species: A plant or animal species whose prospects of survival and reproduction are in immediate jeopardy. Its peril may result from one or many changes: loss of habitat or change in habitat, overexploitation, predation, competition, disease, or even unknown reasons. An endangered species must have help, or extinction may follow. It must be designated in the Federal Register by the appropriate Secretary as an "endangered species." (Schwarz et al. 1976)

Endangered Species Act (ESA): The Act that required consultation with the Fish and Wildlife Service (Interior) if practices on National Forest System lands may impact a threatened or endangered species (plant or animal). Direction is found in FSM 2670.

Forest Health: A condition for forest ecosystems that sustains their complexity while providing for human needs. In terms of ecological integrity, a healthy forest is one that maintains all of its natural functions. In relation to management objectives, forest health represents a condition which meets current and prospective future management objectives. (After O'Laughlin et al. 1993, Monnig and Byler 1992)

Habitat Type: A collection of land areas potentially capable of producing similar plant communities at climax, generally named for the predicted climax community type. (After Pfister et al. 1977)

Hydrology: A science dealing with the properties, distribution, and circulation of water, specifically the study of water on the surface of land, in the soil and underlying rocks, and in the atmosphere, with respect to evaporation and precipitation. (After Webster 1963 In: Schwarz et al. 1976)

Noxious Weed: Plants that conflict with, interfere with,or otherwise restrict land management are commonly referred to as weeds. A plant that has been clssified as a weed attains "noxious" status by an act of State legislation.

Open road: A road that is open year-round with no restrictions.

Riparian area: Green zones associated with lakes, reservoirs, estuaries, potholes, springs, bogs, fens, wet meadows, and ephemeral, intermittent, or perennial streams. The riparian/wetland zone occurs between the upland or terrestrial zone and the aquatic or deep water zone.

Salvage Cutting: The removal of dead trees or trees being damaged or killed by injurious agents other than competition, to recover value that would otherwise be lost. (Silviculture Working Group 1993)

Scarification: A deliberate, moderate disturbance of soil to remove or mix surface duff with less than 1" of surface mineral soil. Scarification provides bare mineral soils for trees that need it to regenerate. It also promotes oxidation of organic matter and speeds its breakdown into nutrients to enrich soil.

Sensitive species: A U.S. Forest Service designation for plant or animal species that are vulnerable to declines in population or habitat capability which could be accelerated by land management activities.

Shelterwood: A method of regenerating an even-aged stand in which a new age class develops beneath the partially-shaded environment provided by the residual trees.

Silviculture: The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis. (Silviculture Working Group 1993)

Site preparation: A hand or mechanized manipulation of a site designed to enhance the success of regeneration. Treatments may include chopping, discing, bedding, raking, burning, and scarifying. All treatments are designed to modify the soil, litter, and vegetation, and to create microclimate conditions conducive to the establishment and growth of desired species. (Silviculture Working Group 1993)

Skidding: A loosely-used term for the transportation of logs from stumps to a collecting point by sliding or dragging along the ground-- as opposed to the use of wheels, helicopters, balloons, cables, etc., to keep them totally off the ground (After Ford-Robertson 1971 In: Schwarz et al. 1976)

Slash: Branches, tops, and other debris from the cutting of trees.

Snag: A standing dead tree.

Stand: A contiguous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit. (Silvicultural Working Group 1993)

Stocking: An indication of growing space occupancy relative to a pre-established standard. (Silviculture Working Group 1993)

Streamside Management Zone (SMZ): The zone around a streambank, from 50' to 300' wide, where certain management activities are limited or prohibited to minimize unfavorable impacts on aquatic and riparian environments. The Streamside Management Zone Law (77-5-301 MCA) prohibits certain forest practices along stream channels.

Threatened species: Species which are likely to become "endangered species" within the foreseeable future throughout all or a significant portion of their range are designated threatened species in the Federal Register by appropriate Department Secretaries. (Schwarz et al. 1976)

Thinning: A cutting made to reduce stand density of trees primarily to improve growth, enhance forest health, or to recover potential mortality. (Silviculture Working Group)

Trust mandate: The requirement that State trust lands be managed to provide income for schools.

Watershed: The area drained by a river or river system.

Wetlands: Areas that are permanently wet, or intermittently water covered, such as swamps, marshes, bogs, muskegs, potholes, swales, glades, and overflow land of river valleys. Large, open lakes are commonly excluded, but many kinds of ponds, pools, sloughs, holes, and bayous may be included. (Veatch and Humphrys 1966 In: Schwarz et al. 1976.

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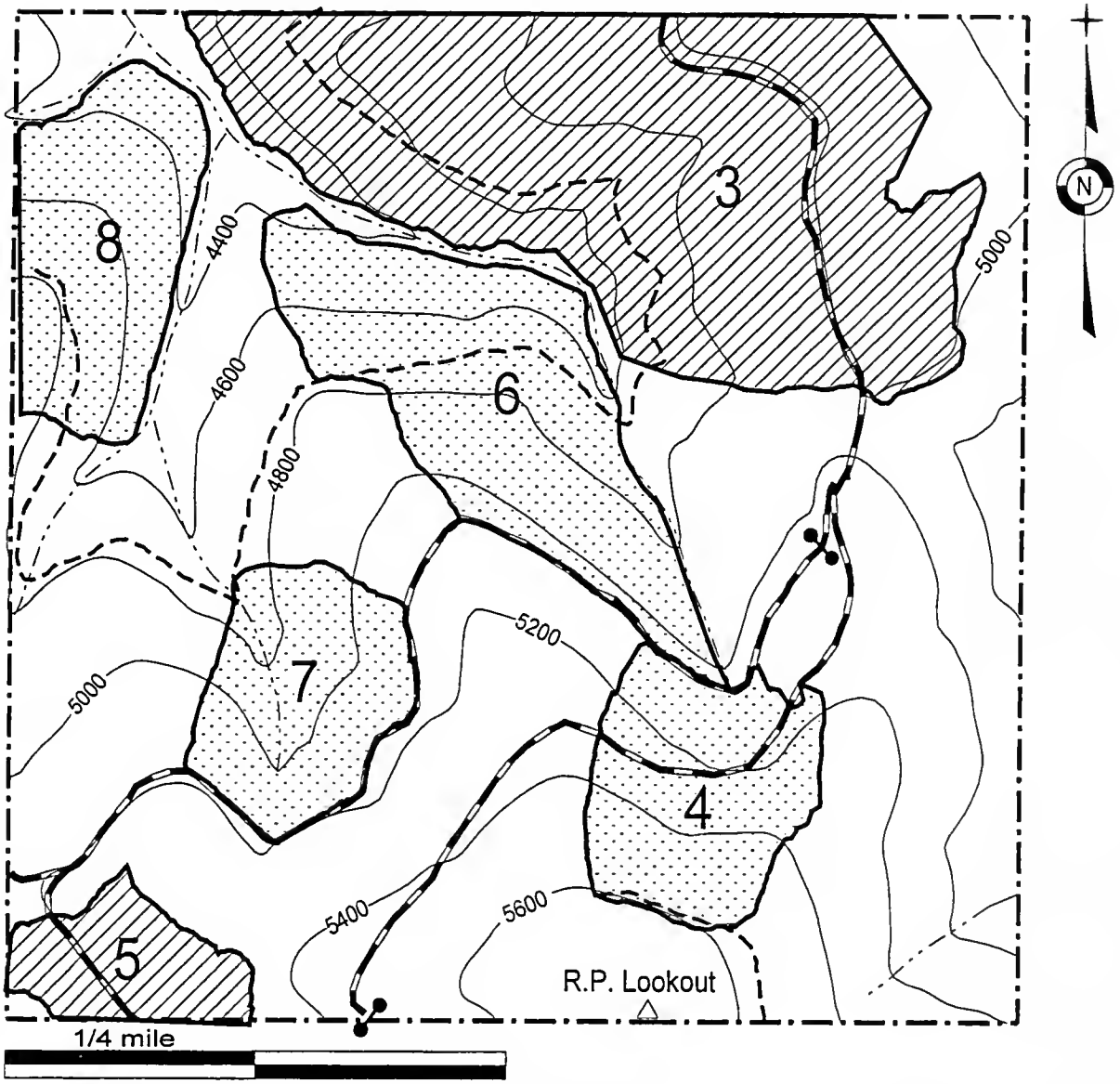
ACRONYMS

ARM	Administrative Rules of Montana
AUM	Animal Unit Month
CMP	Corrugated Metal Pipe
DBH	Tree Diameter At Breast Height
DNRC	Department of Natural Resources and Conservation
ECA	Equivalent Clearcut Acres
ESA	Endangered Species Act
MCA	Montana Codes Annotated
MBF	Thousand Board Feet
MMBF	Million Board Feet
SMZ	Streamside Management Zone
USFS	United States Forest Service
WYI	Water yield increase

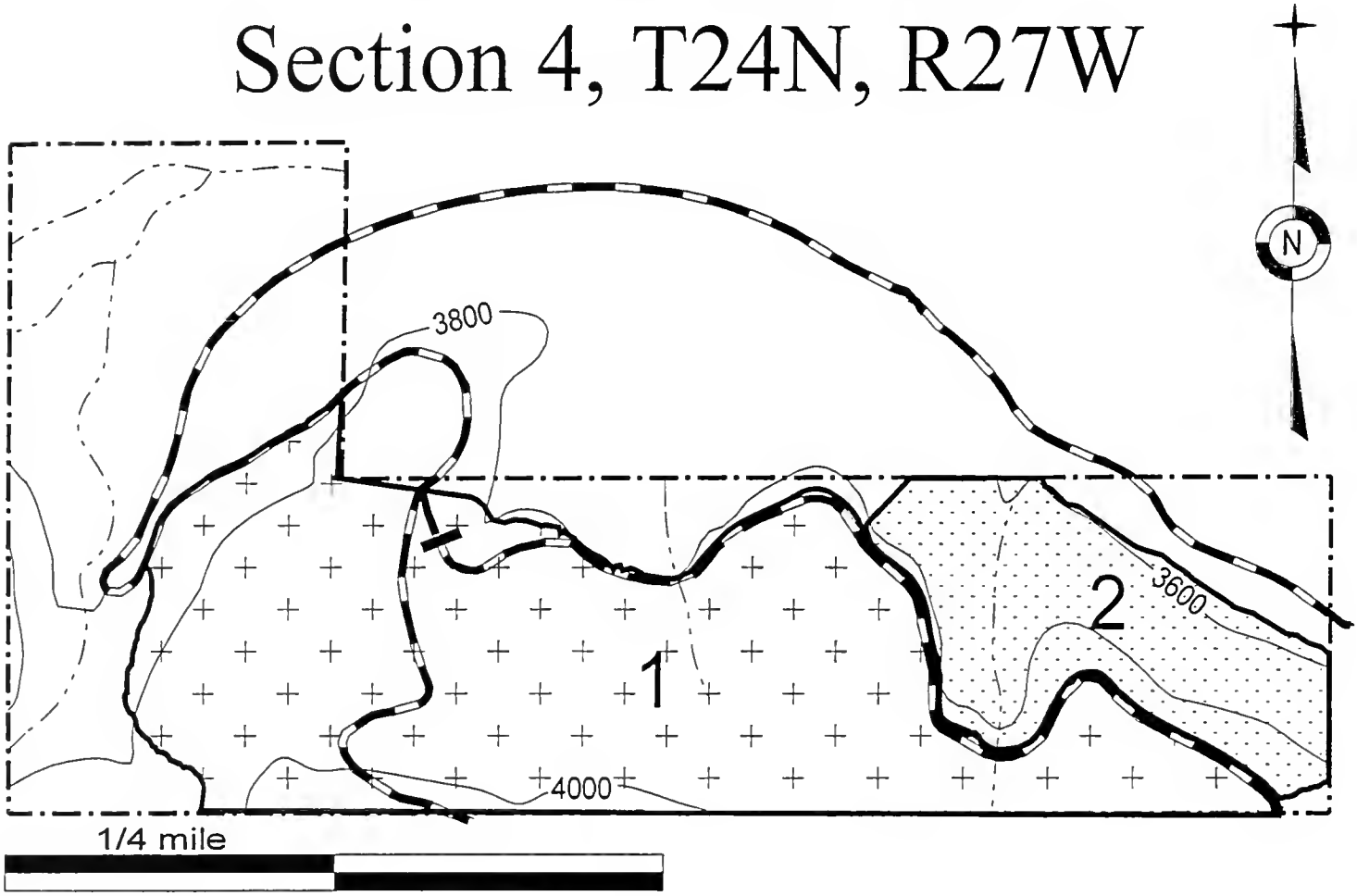
Richards Peak Timber Sale
Harvest Unit Map
Section 16, T24N, R27W



Legend

State Ownership Boundary		Harvest Units:	3
Existing Forest Road			
New Road Construction		Commercial Thin:	
Stream			
Contour Lines	4600	Seed Tree/ Shelterwood:	
Gate			

Richards Peak Timber Sale
Harvest Unit Map
Section 4, T24N, R27W



Legend

State Ownership Boundary

Existing Forest Road

Stream

Contour Lines 3600

Earthen Berm

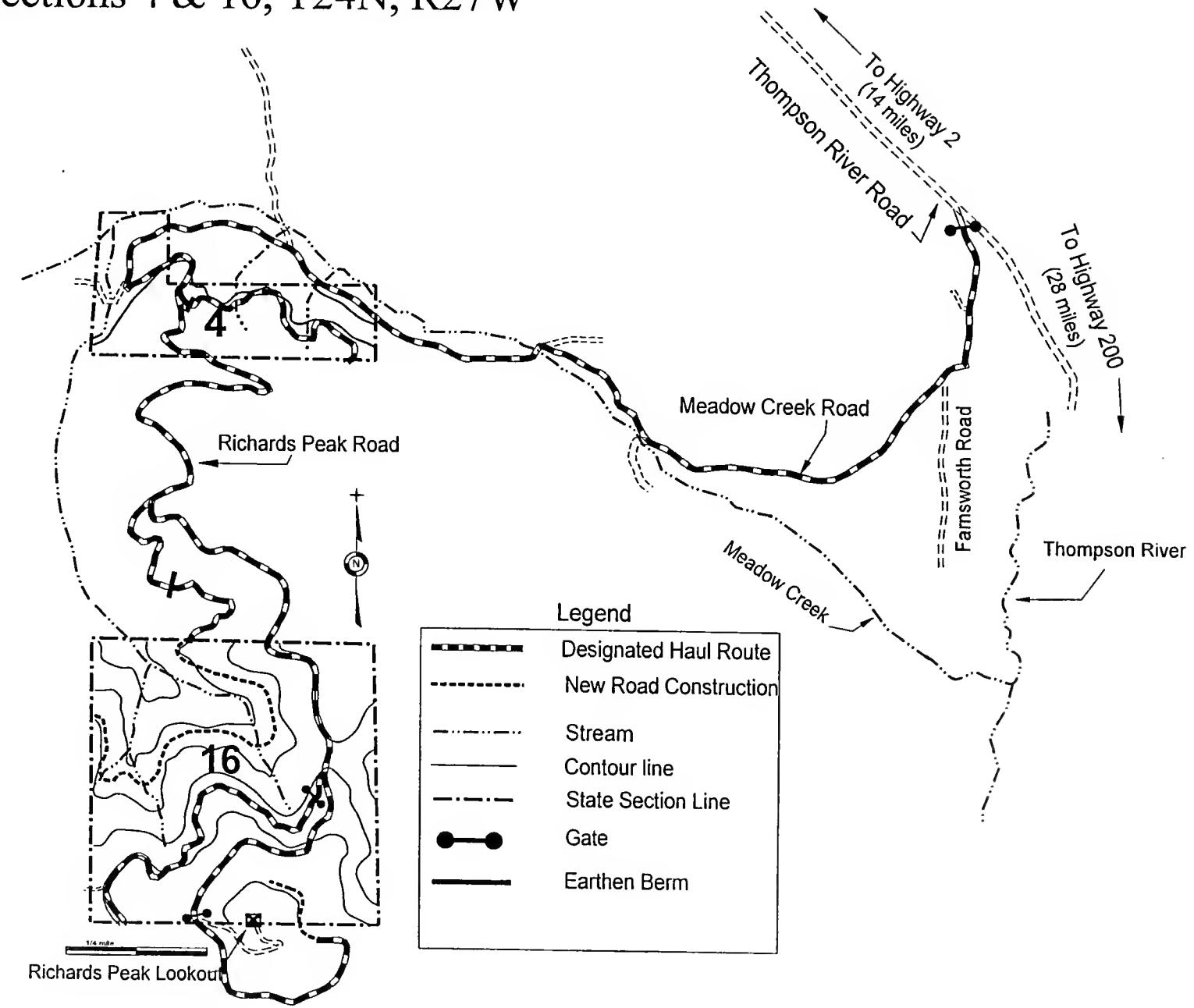
Harvest Units: 1

Seed Tree Removal:

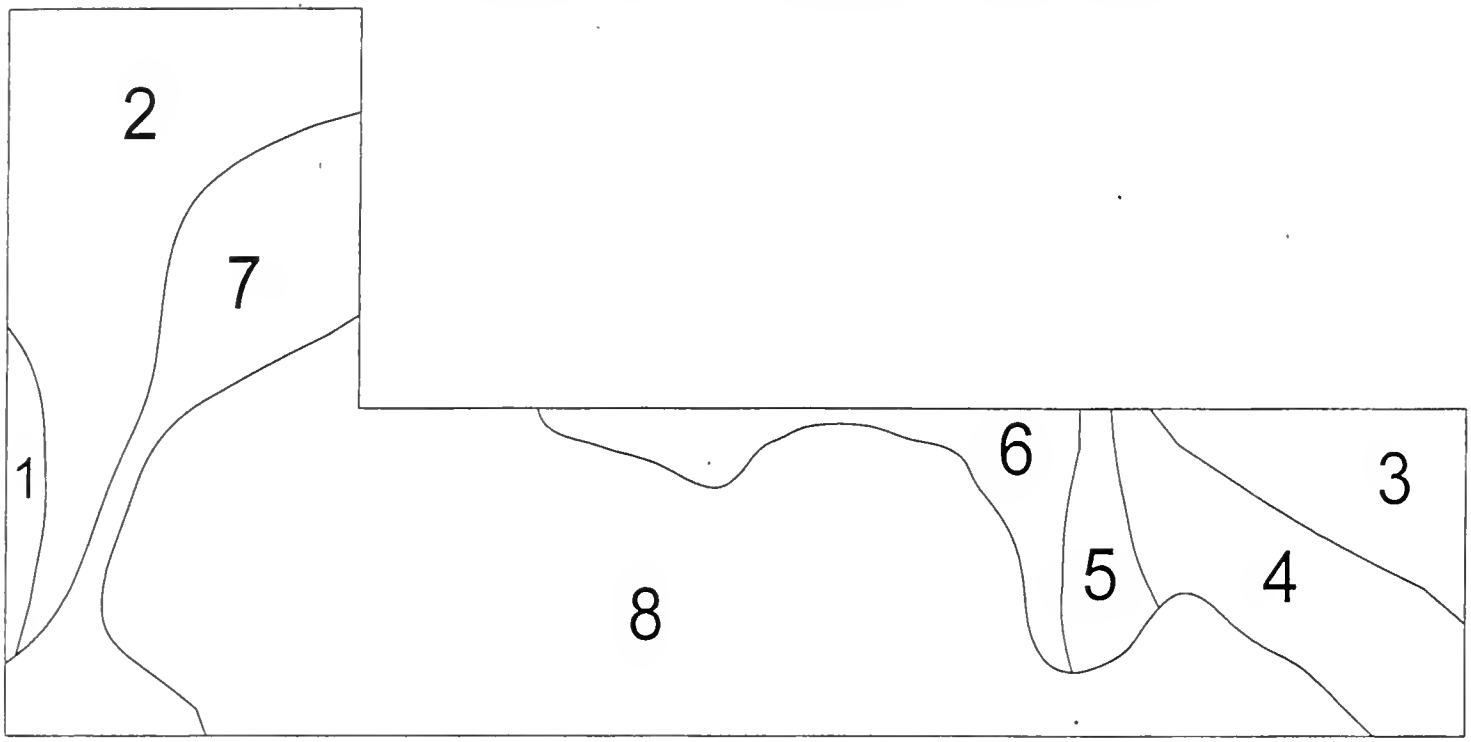
Seed Tree/ Shelterwood:

Richards Peak Timber Sale
Transportation Haul Route
Sections 4 & 16, T24N, R27W

Appendix A

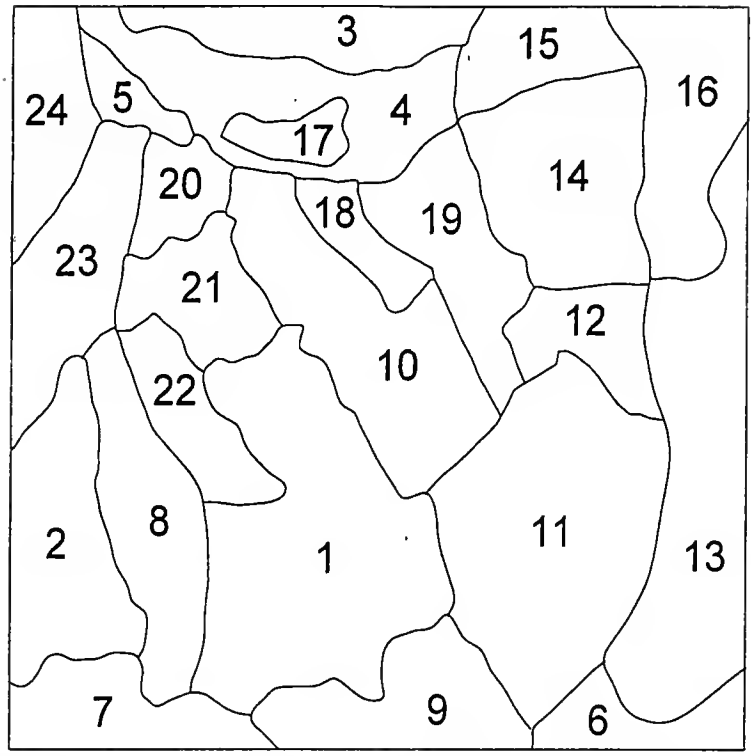


Richards Peak
SLI Stand Boundary
Sec. 4, T24N, R27W



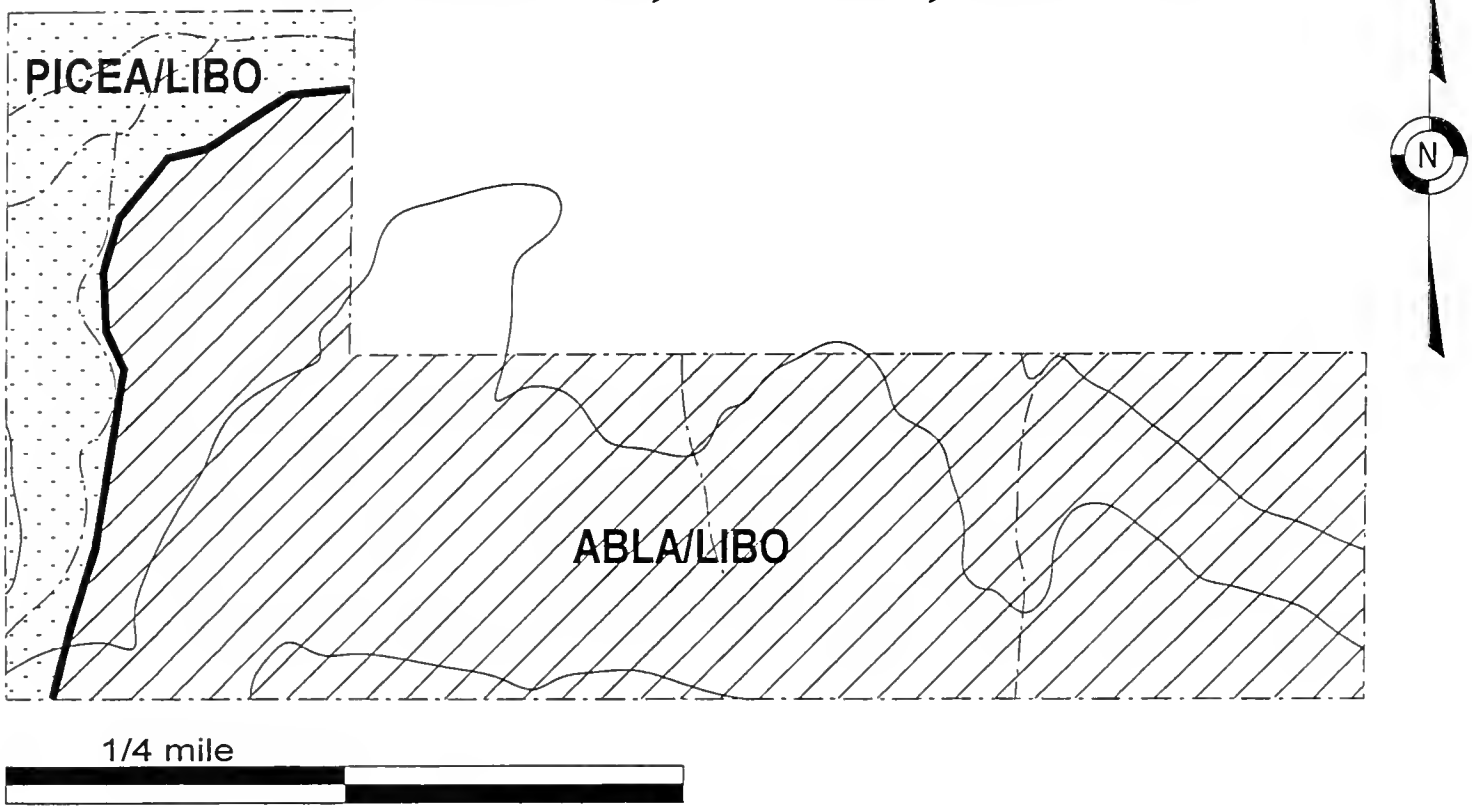
Stand #	Acres	Current Type	App. Type	Age Class
1	5	WL/DF	WL/DF	100-150
2	31	MC	WL/DF	150+
3	10	PP	PP	100-150
4	14	WL/DF	WL/DF	100-150
5	5	WL/DF	WL/DF	100-150
6	12	WL/DF	WL/DF	100-150
7	21	WL/DF	WL/DF	100-150
8	97	WL/DF	WL/DF	100-150
Road	5	n/a	n/a	n/a
TOTALS	**200**			

Richards Peak
SLI Stand Boundary
Sec. 16, T24N, R27W

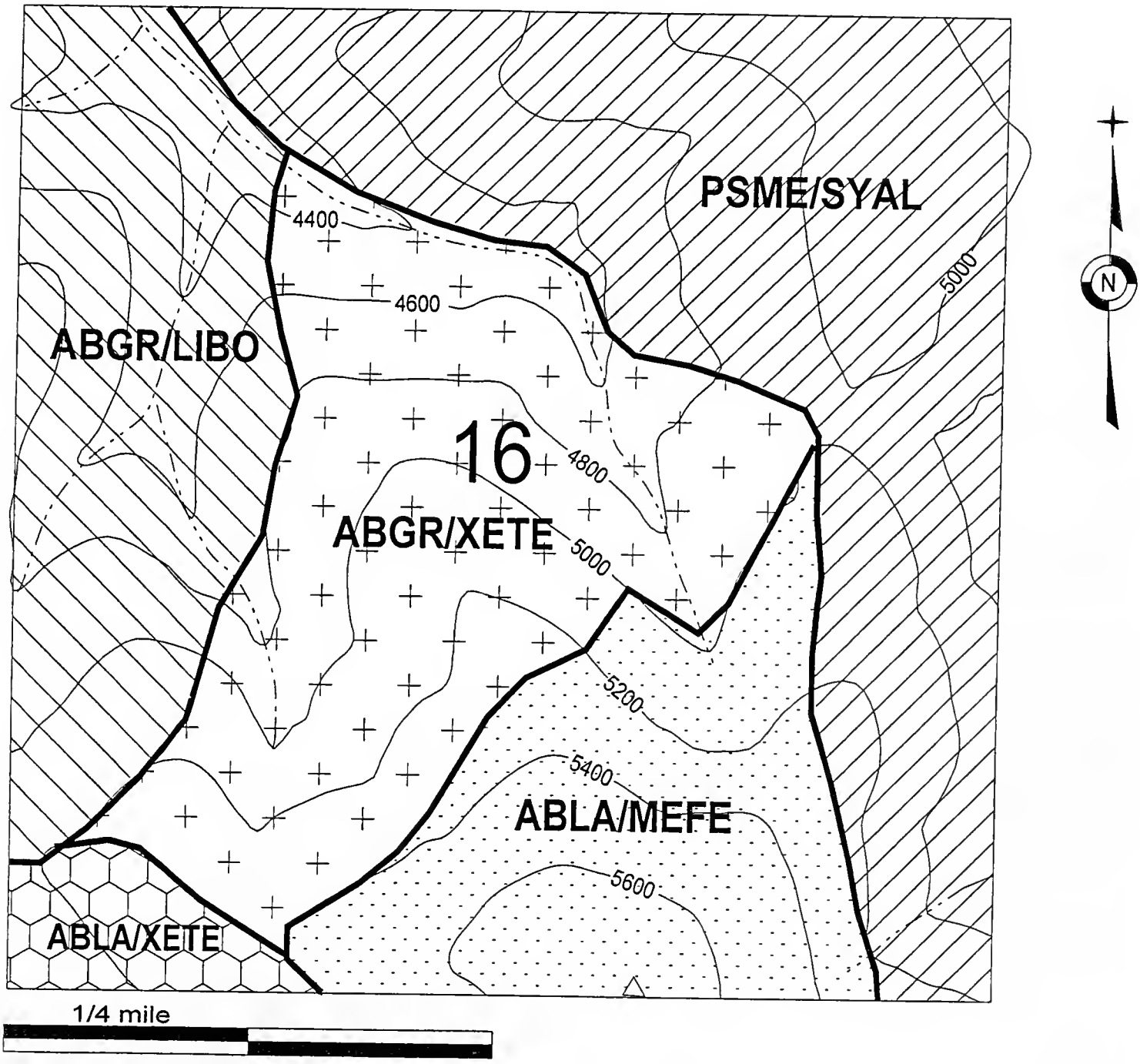


Stand #	Acres	Current Type	App. Type	Age Class
1	69	LP	LP	40-99
2	29	LP	WL/DF	40-99
3	17	WL/DF	WL/DF	100-150
4	33	DF	DF	150+
5	5	WWP	WWP	150+
6	16	ALP	WL/DF	40-99
7	25	ALP	WL/DF	40-99
8	28	LP	LP	40-99
9	29	ALP	WL/DF	40-99
10	40	WL/DF	WL/DF	100-150
11	64	WL/DF	WL/DF	40-99
12	14	WL/DF	WL/DF	100-150
13	62	WL/DF	WL/DF	150+
14	36	DF	DF	40-99
15	15	DF	DF	40-99
16	30	DF	DF	40-99
17	6	DF	DF	40-99
18	9	LP	WL/DF	40-99
19	23	WL/DF	WL/DF	100-150
20	9	WL/DF	WL/DF	150+
21	16	LP	WL/DF	40-99
22	15	WL/DF	WL/DF	100-150
23	26	DF	DF	100-150
24	18	WL/DF	WL/DF	100-150
Road	6	n/a	n/a	n/a
TOTALS	**640**			

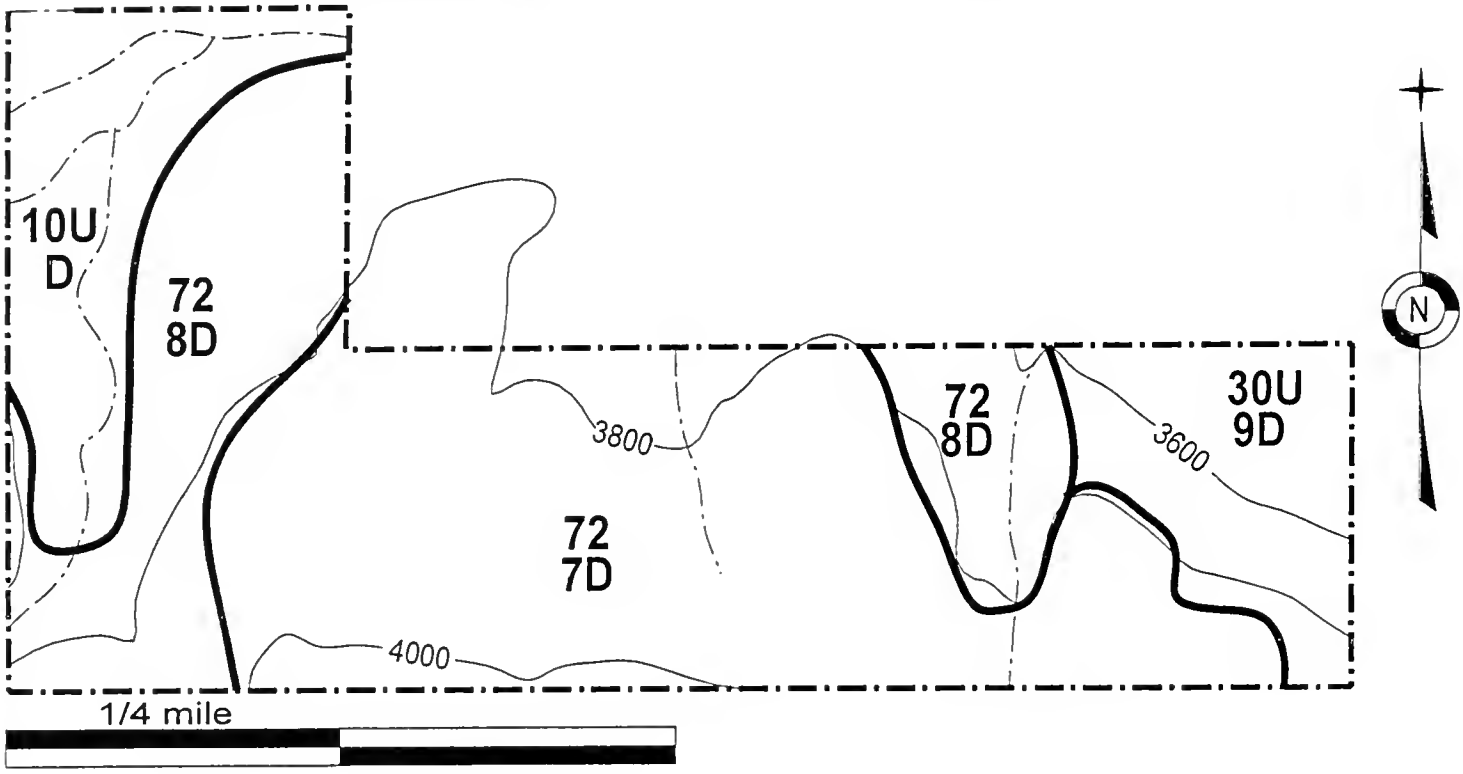
Richards Peak Timber Sale
Habitat Types
Section 4, T24N, R27W



Richards Peak Timber Sale
Habitat Types
Sec. 16, T24N, R27W



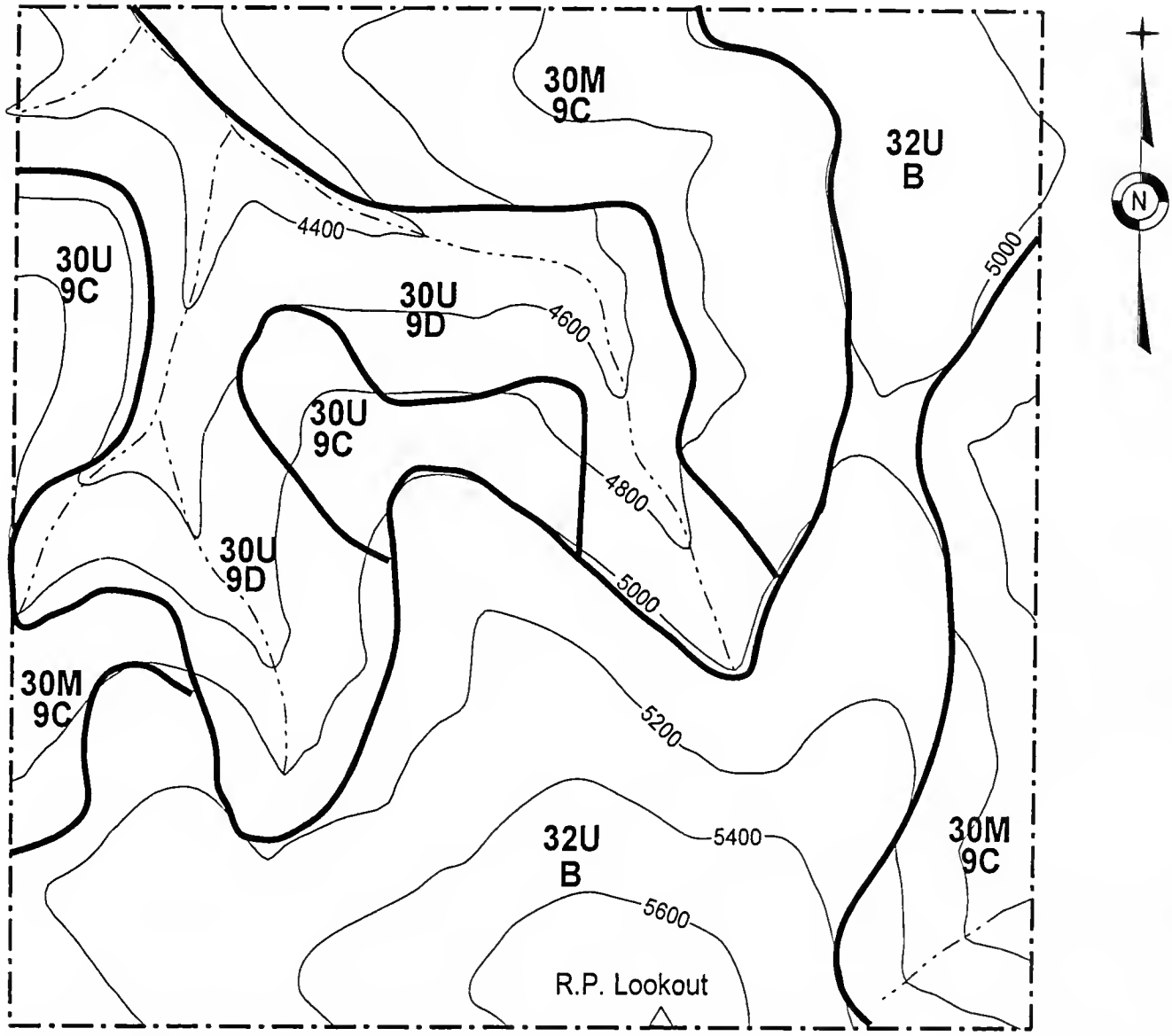
Richards Peak Timber Sale
Soil Map
Section 4, T24N, R27W



Legend

State Ownership Boundary	
Soil Series Boundary	
Contour Line	
Stream	

Richards Peak Timber Sale
Soil Map
Section 16, T24N, R27W



Legend

State Ownership Boundary	
Soil Series Boundary	
Contour Line	
Stream	

Richards Peak Timber Sale
Meadow Creek Watershed

ATTACHMENTS

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number(s): 1

Location – Section 4 TWP: 24N RGE: 27W Subd:

Elevation: 3900 Slope: 15% (0-25%) Aspect: N, NW

Habitat type: ABLA/LIBO Acres: 97

Soils: Andic Eutroboralfs. Soils are deep and well drained. Texture is volcanic ash influenced gravelly silt loams. Soil erosion and sediment delivery efficiency are moderate.

Description of existing stand: The unit is an old shelterwood harvest unit from the late 1980's. The overstory consists of approximately 10 Western larch scattered per acre with scattered Douglas-fir also present. The 130-year-old Western larch average 16 inches diameter and 90 feet in height. There are approximately 2,200 trees per acre in the understory, consisting of western larch, Douglas-fir, grand fir, and alpine fir. No major insect and disease problems noted. A few of the overstory larch are infected with dwarf mistletoe.

Treatment Objectives:

1. Remove overstory to improve tree growth and vigor in understory.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

3. Retain 1 to 2 overstory western larch per acre for snag recruitment.

Prescribed Treatment: Seed Tree Removal

Harvest method: Ground based logging unit. Overstory trees will be individually marked and those trees removed will be skidded to nearest landing along existing roads. Skid trails will use natural openings in the understory to reduce damage to residual. Overstory larch will be left in clumps adjacent to wet areas and streams that bisect the unit. Landing and skid trail locations will be approved prior to use by the Forest Officer.

Hazard Reduction: Purchaser will be required to meet hazard reduction standards as applied under the State Fire Hazard Reduction Law. Lopping and scattering, skidding tops to landings, or a combination of methods may be used. Purchaser will pile slash at landing and State crews will burn.

Site Preparation: None prescribed for this entry

Regeneration: None prescribed for this entry. Understory already stocked.

Anticipated Future Treatments: 2003-2006 log, 2004-2008 Monitor area for weeds, 2010 Precommercial thin.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 1 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

This is an overstory removal unit. Leave approximately 2 overstory western larch per acre. The leave trees do not need to be left uniformly throughout the unit, but concentrated away from the main road that goes through the unit. Adjacent to the wet areas, that traverse the unit, is a good area to leave overstory trees.

Leave tree selection guidelines:

1. Leave trees should be free of insect and disease.
2. Leave 2 western larch greater than 21" per acre .
3. Overstory larch adjacent to wet areas.
4. Leave all snags.

Cut tree selection guidelines:

1. All overstory within 500 feet of the main road.
2. Overstory infected with insects or disease.
3. Overstory not adjacent to wet areas.

Cruising Guides:

Volume estimates will be done with 18, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number(s): **2**

Location – Section 4 TWP: 24N RGE: 27W Subd:

Elevation: 3700 Slope: 60% Aspect: **NE**, N

Habitat type: ABLA/LIBO Acres: 32

Soils: Andic Ustochrepts, Andic Eutroboralfs. Soils are deep and well drained. Subsoils are very gravelly clay loams and sandy loams. Soil erosion hazard and sediment delivery efficiency are moderate.

Description of existing stand: The unit consists of uneven-aged stand of Douglas-fir (95%) with scattered western larch and lodgepole pine (5%). The overstory averages 220 trees per acre with an average age of 130 years and an average diameter of 10 inches. Stocking is uniform throughout with few breaks in the overstory canopy. Tree growth and vigor is declining in most overstory due to overstocked stand conditions. Understory is scattered and clumpy in distribution. Douglas-fir is the most common understory species with minor components of lodgepole pine and grand fir. Forest health issues are mainly bark beetles with both mountain pine beetle (lodgepole) and Douglas-fir beetle present. Their numbers are currently at endemic levels but appear to be increasing.

Treatment Objectives:

1. Retain 10-30 trees per acre to provide a seed source for natural regeneration, favoring western larch.

2. Promote regeneration of western larch in openings.

Prescribed Treatment: Seed Tree

Harvest method: Cable logging unit. Harvest method will consist of individual tree selection. Logging will use existing road along top of unit. Most of anchor trees in harvest unit above road were cut in the 1980's. Few anchor trees remaining. The Forest Officer will approve landing locations prior to use. Seed tree harvest will focus on removing the co-dominant, intermediate, and suppressed trees of poor form and vigor. The healthiest 10 to 30 overstory trees per acre will be left to provide a seed source for natural regeneration.

Hazard Reduction: Purchaser will be required to meet hazard reduction standards as applied under the State Fire Hazard Reduction Law. Whole tree yarding, lopping and scattering of tops, or a combination of methods may be used to achieve desired results. Purchaser will pile slash at landings and State crew will burn.

Site Preparation: May prescribe burn unit if slash loading after logging is capable of carrying fire.

Regeneration: Plant larger openings with western larch.

Anticipated Future Treatments: 2003-2006 log, 2007 Plant, 2004-2008 Monitor area for weeds.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 2 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current trees per acre: 220 **Target trees per acre after harvest: 10-30**

Leave tree selection guidelines:

1. The healthiest 10 to 30 trees per acre with pointed full crowns and minor defects. Spacing on the leave trees should be 40 to 50 feet apart.
2. Species preference: Western larch, Douglas-fir.
3. Leave all snags greater than 18".
4. Standing cull, free of bark beetles or dwarf mistletoe.

Cut tree selection guidelines:

1. Dominant and Co-dominant with more than minor defects: poor form, multiple tops, major crooks and sweep.
2. Intermediate and suppressed trees.
3. Lodgepole pine and Alpine fir over Douglas-fir and western larch. Note: Some western larch and Douglas-fir will need to be marked to meet the required leave tree spacing.
4. Trees infected with insect or disease.

Cruising Guides:

Volume estimates will be done with 10, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: **3**

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 4800 Slope: **35%** (0-60%) Aspect: **SW**, W

Habitat type: **PSME/SYAL**, ABGR/XETE Acres: 124

Soils: Andic Cryochrepts, Typic Ustochrepts. Soils are well drained and moderately coarse. Surface layers are formed in volcanic ash influenced loess. Subsoils are rocky, containing 55 to 95 percent rock fragments. Soil erosion hazard and sediment delivery efficiency are moderate.

Description of existing stand: The unit consists of even-aged, single storied stand of Douglas-fir (91%) with minor components of western larch (5%), lodgepole pine (2%) and ponderosa pine (2%) present. The overstory averages 172 trees per acre with an average age of 120 years and an average diameter of 11 inches. Stocking is fairly uniform throughout, with open areas on slopes that face to the south. Tree growth and vigor is declining in the overstory due to overstocked stand conditions. There are approximately 300 understory trees per acre scattered throughout the stand. The understory is mostly Douglas-fir with some grand fir in wetter sites. Clumpy distribution of understory is due to closed canopy conditions of the overstory. Insect and disease problems were noted in unit. Small pockets of root disease can be found adjacent to road the goes through the unit. The pockets are no larger than a tenth of an acre and no signs of root disease were found in any other area of the unit. Bark beetles are also present in unit. The Douglas-fir beetle has killed a few of the older overstory in the past several years but their numbers seem to be on the decline. Mountain pine beetle activity is on a sharp increase. Pockets of beetle killed overstory have become more visible in the last two years, mainly due to drought and overstocked stand conditions.

Treatment Objectives:

1. Improve the health and vigor of the unit by removing intermediate, suppressed, and the less vigorous overstory trees.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

Prescribed Treatment: Commercial Thin

Harvest method: Ground based logging unit with approximately 45 acres of cable logging required. Harvest method will consist of individual tree selection. Trees will be harvested using existing and newly constructed logging roads. The Forest Officer will approve skid trail and landing locations prior to use. The commercial thinning treatment will remove intermediate, suppressed and less vigorous trees to provide more growing space and nutrients for remaining trees.

Hazard Reduction: Purchaser will be required to meet hazard reduction standards as applied under the State Fire Hazard Reduction Law. Whole tree skidding and yarding will be required to reduce slash loading within unit. Purchaser will pile slash at landings and State crew will burn.

Site Preparation: None prescribed this entry.

Regeneration: None prescribed this entry.

Anticipated Future Treatments: 2003-2006 log, 2004-2008 Monitor area for weeds.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 3 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current basal area: 138. Target basal area after thinning: 60-80.

The commercial thinning should favor the largest, healthiest trees favoring the few (healthy) western larch and ponderosa pine over the Douglas-fir. In areas identified with root disease (along upper road), remove all live trees that are infected with root disease and those Douglas-fir along the fringe of the pocket. Removal of susceptible trees should extend approximately 50 feet from the center of the root disease pocket. Unit also has SMZ harvesting. Retain all trees within 50 feet of stream.

Leave tree selection guidelines:

1. Healthy trees free of insects and disease with pointed full crowns and minor defects.
2. Species preference: Western larch, ponderosa pine, Douglas-fir, & lodgepole pine.
3. Standing snags greater than 16 inches in diameter.
4. Standing cull.
5. All trees within 50 feet of stream.

Cut tree selection guidelines:

1. Unhealthy trees – trees infected with bark beetles or root disease.
2. Douglas-fir trees within and on the fringes of root disease pockets.
3. Intermediate and suppressed trees and those dominant and co-dominant trees that do not meet leave tree guidelines (excess of target basal area).

CRUISING GUIDES:

Volume estimates will be done with 45, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: **4**

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 5300 Slope: **40%** (15%-60%) Aspect: N

Habitat type: ABLA/MEFE Acres: 31

Soils: Andic Cryochrepts. Soils are well drained and moderately coarse. Surface layers can be silty and are derived from volcanic ash influenced loess. Subsoils contain 55-90 percent rock fragments.

Description of existing stand: The unit consists of even-aged stand of Douglas-fir (50%) and western larch (46%). Scattered grand fir, alpine fir and lodgepole pine (4%) are also present. The 100-year-old overstory averages 86 trees per acre with an average d.b.h. of 14 inches. The stocking of the overstory is somewhat clumpy with breaks in the canopy. Tree growth and vigor is constant, with some increasing growth and others declining. The understory is mostly scattered Douglas-fir and lodgepole pine that is clumpy in distribution due to brush competition and closed canopy conditions. Forest health problems are mainly from bark beetles attacking overstory lodgepole pine and scattered western larch infected with dwarf mistletoe. Bark beetle numbers are on the increase due to overstocked stand conditions and past drought.

Treatment Objectives:

1. Retain 10-30 trees per acre to provide a seed source for natural regeneration, favoring western larch.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

3. Remove shade tolerant species that have encroached upon historic western larch cover types.

4. Promote regeneration of western larch.

5. Prescribe burn unit after logging to reduce current fuel loading and prepare a seed bed for natural regeneration.

Prescribed Treatment: Seed Tree

Harvest method: Cable logging unit, with small areas that could be harvested with ground based equipment. Harvest method will consist of individual tree selection. Logging will use existing and newly constructed roads. Forest Officer will approve landing locations prior to use. Seed Tree/ Shelterwood harvest will focus on removing suppressed, intermediate, and co-dominant trees that are of poor form and vigor. Leave trees will be marked on a 40 to 50

foot spacing with the best 10-30 trees per acre left to provide a seed source for natural regeneration.
Hazard Reduction: Unit will be prescribed burned. Assessment for fuel loadings required to successfully burn unit will be accomplished after logging. Slashing of sub-merchantable grand fir alpine fir, Douglas-fir and lodgepole pine may be done to provide adequate fine fuels. Purchaser will pile slash at landings and State crew will burn.

Site Preparation: Unit will be prescribed burned. Unit will be assessed after logging to determine appropriate slash loading. Slashing of seedlings and sapling grand fir, alpine fir and Douglas-fir will occur to provide fine fuels to carry the prescribed fire.

Regeneration: Plant partial acres of unit with western larch and white pine and rely on natural regeneration in others. Exact locations will be determined after logging and prescribed burn have been completed.

Anticipated Future Treatments: 2003-2006 log, 2006 prescribe burn, 2007 plant, 2004-2008 Monitor area for weeds, spray as needed. 2008- 2013 Monitor success of natural regeneration

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 4 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Trees per acre: 86 **Target trees per acre after marking: 15-30**

Leave tree selection guidelines:
1. The healthiest 15 to 30 trees per acre with pointed full crowns and minor defects. Spacing on the leave trees should be 40 to 50 feet apart.
2. Species preference: Western larch, Douglas-fir.
3. Standing snags greater than 16".
4. Standing cull free of insect and disease.
5. All trees within 50 feet of stream.

Cut tree selection guidelines:
1. Unhealthy trees- trees infected with bark beetles or dwarf mistletoe.
2. Intermediate & suppressed trees.
3. Trees with more than minor defects- major crooks, sweep, multiple tops.
4. Alpine fir, Grand fir, lodgepole pine over western larch and Douglas-fir.

Cruising Guides:

Volume estimates will be done with 12, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: **5**

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 5300 Slope: **30%** (10%-45%) Aspect: **SW**, W

Habitat type: ABLA/XETE, PSME/SYAL Acres: 15

Soils: Andic Cryochrepts. Soils are well drained and moderately coarse. Surface layers are formed in volcanic ash influenced loess. Subsoils contain 65 to 90 percent rock fragments.

Description of existing stand: The unit consists of even-aged stand of Douglas-fir. Scattered lodgepole pine are also present. The overstory averages 175 trees per acre with an average age of 100 years and an average d.b.h. of 12 inches. Stand is densely stocked and uniform throughout. Tree growth and vigor is declining in overstory due to overstocked stand conditions. Understory is scattered and sparse due to closed canopy conditions of the overstory. The main forest health issues are bark beetles. The mountain pine beetle is currently active in the lodgepole pine overstory and scattered mortality of older Douglas-fir from the Douglas-fir beetle can also be found.

Treatment Objectives:

1. Thin overstory to reduce overcrowding and improve tree growth and vigor.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

Prescribed Treatment: Commercial Thin

Harvest method: Ground based logging unit with a small area below the bottom road that will have to be cable logged. Harvest method will consist of individual tree selection. Trees will be harvested using existing logging roads. The Forest Officer will approve skid trail and landing locations prior to use. The commercial thinning treatment will remove intermediate, suppressed and less vigorous trees to provide more growing space and nutrients for remaining trees.

Hazard Reduction: Purchaser will be required to meet hazard reduction standards as applied under the State Fire Hazard Reduction Law. Lopping and scattering, skidding tops to landings, dozer or excavator piling, or a combination of methods may be used. Purchaser will pile slash at landing and State crews will burn.

Site Preparation: None prescribed for this entry.

Regeneration: None prescribed for this entry.

Anticipated Future Treatments: 2003-2006 log, 2004-2008 Monitor area for weeds.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 5 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current basal area: 140 Target basal area after marking: 60-80

The commercial thinning should favor the youngest, healthiest trees in the stand. Douglas-fir and any western larch (few) should be favored over lodgepole pine or any scattered true firs.

Leave tree selection guidelines:

1. Healthy trees free of insects or disease with pointed full crowns and minor defects.
2. Standing snags greater than 16".
3. Dominant and co-dominant trees.
4. Species preference: Western larch, Douglas-fir over lodgepole pine & scattered true firs.
5. Standing cull.

Cut tree selection guidelines:

1. Unhealthy trees infected with bark beetles, mistletoe or having major defects.
2. Intermediate and suppressed trees and those dominant and co-dominant trees that do not meet leave tree guidelines.

Cruising Guides:

Volume estimates will be done with 9, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: **6**

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 4900 Slope: **50%** (40%-75%) Aspect: **N**, NW, NE

Habitat type: ABGR/XETE Acres: 58

Soils: Andic Ustochrepts, Andic Dystrochrepts. Soils are deep and well drained. Surface layers are formed in volcanic ash influenced loess. Subsoils are rocky, containing 55 to 95 percent rock fragments. Soil erosion hazard and sediment delivery efficiency are moderate.

Description of existing stand: The unit is an uneven aged, multi storied stand of Douglas-fir (53%), lodgepole pine (27%), western larch (11%) and minor components of white pine, ponderosa pine, alpine fir and grand fir (9%). The approximately 90 year old unit averages 152 trees per acre with an average diameter of 10 inches. Tree growth and vigor is declining due to overstocked stand conditions. Understory is scattered in clumps, mainly in the openings created in the canopy after the lodgepole pine bark beetle epidemic in the 1980's. The unit overall is healthy with minor components of bark beetles and dwarf mistletoe present in the overstory.

Treatment Objectives:

1. Retain 10-30 trees per acre to provide a seed source for natural regeneration, favoring western larch.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

3. Remove shade tolerant species that have encroached upon historic western larch cover types.

4. Promote regeneration of western larch and white pine.

5. Prescribe burn unit after logging to reduce current fuel loading and prepare a seed bed for natural and planted regeneration.

Prescribed Treatment: Seed Tree

Harvest method: Cable logging Unit. Harvest method will consist of individual tree selection. Logging will use existing and newly constructed roads. Forest Officer will approve landing locations prior to use. Seed Tree/ Shelterwood harvest will focus on removing suppressed, intermediate, and co-dominant trees that are of poor form and vigor.

Leave trees will be marked on a 40 to 50 foot spacing with the best 10-30 trees per acre left to provide a seed source for natural regeneration.

Hazard Reduction: Unit will be prescribed burned. Assessment for fuel loadings required to successfully burn unit will be accomplished after logging. Slashing of sub-merchantable grand fir alpine fir, Douglas-fir and lodgepole pine may be done to provide adequate fine fuels to carry fire. Purchaser will pile slash at landing and State crews will burn.

Site Preparation: Unit will be prescribed burned. Unit will be assessed after logging to determine appropriate slash loading. Slashing of seedlings and sapling grand fir, alpine fir and Douglas-fir will occur to provide fine fuels to carry the prescribed fire.

Regeneration: Plant partial acres of unit with western larch and white pine and rely on natural regeneration in others. Exact locations will be determined after logging and prescribed burn.

Anticipated Future Treatments: 2003-2006 log, 2006 prescribe burn, 2007 plant, 2004-2008 Monitor area for weeds.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 6 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current trees per acre: 152 **Target trees per acre after marking: 10-30**

Leave tree selection guidelines:

1. Healthy trees free of insects or disease with pointed full crowns and minor defects. Spacing of leave trees should be 40 to 50 feet apart.
2. Species preference: Western larch, Douglas-fir, white pine, ponderosa pine.
3. Standing snags greater than 16".
4. Standing cull free of insect and disease.
5. All trees within 50 feet of stream.

Cut tree selection guidelines:

1. Unhealthy trees- trees with insect, disease, or major defects.
2. Intermediate and suppressed trees, and those dominant and co-dominant trees that do not meet leave tree guidelines.
3. Lodgepole pine, grand fir and alpine fir.

Cruising Guides:

Volume estimates will be done with 15, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: 7

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 5000 Slope: **50%** (30%-70%) Aspect: NE

Habitat type: **ABGR/XETE**, ABLA/MEFE Acres: 28

Soils: Andic Ustochrepts. Soils are deep,well drained and moderately coarse. They have a silty surface derived from volcanic ash influenced loess. Subsoils contain 55-80 percent rock fragments. Soil erosion hazard and sediment delivery efficiency are moderate.

Description of existing stand: The unit is an even aged stand of Douglas-fir (47%), lodgepole pine (27%), western larch (17%), and alpine fir (6%). The 100-year-old overstory averages 130 trees per acre with an average diameter of 11 inches. The canopy is fairly homogenous on the east side of the draw that bisects the unit. The west side canopy is more broken and open due to mountain pine beetle mortality in the overstory lodgepole pine. The understory (mostly Douglas-fir and grand fir) is scattered and sparse due to dense canopy (east side) and brushy conditions where the canopy is broken (west side). The unit overall is healthy with minor components of bark beetles in the lodgepole pine and scattered overstory larch infected with dwarf mistletoe.

Treatment Objectives:

1. Retain 10-30 trees per acre to provide a seed source for natural regeneration, favoring western larch.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

3. Prescribe burn unit after logging to reduce current fuel loading and prepare a seed bed for natural regeneration.

4. Promote western larch and white pine regeneration by planting a portion of the harvest unit acres.

Prescribed Treatment: Seed Tree/ Shelterwood

Harvest method: Cable logging unit. Harvest method will consist of individual tree selection. Logging will use existing and newly constructed logging roads. Forest Officer will approve landing locations prior to harvest. The Seed tree/ Shelterwood treatment will focus on removing the co-dominant, intermediate, suppressed and trees of poor form. Groups of trees that are stagnant and of poor form and vigor will be selected. The best 10-30 trees per acre will be left to provide a seed source for regeneration. The unit will be

prescribed burned to reduce the existing fuel loads and prepare the seedbed for natural regeneration.

Hazard Reduction: Unit will be prescribed burned. Lopping of tops prior to yarding will be required on the west side of the main draw to provide adequate fuel loadings for prescribed burn. Additional slashing of sub-merchantable grand fir alpine fir, Douglas-fir and lodgepole pine may be done to provide more fine fuels. Purchaser will pile slash at landings and State crew will burn.

Site Preparation: Unit will be prescribed burned. Unit will be assessed after logging to determine appropriate slash loading. Slashing of seedlings and sapling grand fir, alpine fir and Douglas-fir will occur to provide fine fuels to carry the prescribed fire.

Regeneration: Plant partial acres of unit with western larch and white pine and rely on natural regeneration in others. Exact locations will be determined after logging and prescribed burn.

Anticipated Future Treatments: 2003-2006 log, 2006 prescribe burn, 2007 plant, 2004-2008 Monitor area for weeds. 2007-2010 Monitor success of natural regeneration.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 7 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current trees per acre: 130 Target trees per acre after marking: 10-30

Leave tree selection guidelines:

1. Healthy trees free of insects or disease with pointed full crowns and minor defects. Spacing of leave trees should be between 40 and 50 feet apart.
2. Species preference: Western larch and Douglas-fir.
3. Standing snags greater than 16".
4. Standing cull- only if free of insects and disease.
5. All trees within 50 feet of stream.

Cut tree selection guidelines:

1. Unhealthy trees- trees infected with bark beetles or mistletoe.
2. Trees with major defects- crooks, forks, sweep.
3. Lodgepole pine, grand fir, alpine fir.

Cruising Guides:

Volume estimates will be done with 14, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)

RICHARDS PEAK UNIT PRESCRIPTION

Sale Name: Richards Peak Unit Number: **8**

Location – Section 16 TWP: 24N RGE: 27W Subd:

Elevation: 4600 Slope: **55%** (20%-80%) Aspect: **NE**, N, E

Habitat type: ABGR/LIBO, ABGR/XETE, THPL/CLUN Acres: 31

Soils: Andic Dystric Eutrochrepts. Andic Ustochrepts, Andic Dystrochrepts. Soils are deep and well drained. Surface layers are formed in volcanic ash influenced loess. Subsoils are rocky, containing 55 to 95 percent rock fragments. Soil erosion hazard and sediment delivery efficiency are moderate.

Description of existing stand: A mostly even-aged stand. The overstory averages 190 trees per acre consisting of Douglas-fir (48%), western larch (23%), alpine fir (12%), grand fir (10%), lodgepole pine (5%), and western red cedar (2%). There are 3-5 large diameter western larch and Douglas-fir scattered per acre. Basal area averages 140 square feet an acre. The stand is approximately 135 years of age, with the scattered overstory larch and Douglas-fir being around 175 to 190 years of age. The majority of the overstory is between 60 and 140 years of age. The overstory averages 11" in diameter and 72 feet tall. The understory is clumpy in distribution with approximately 150 trees per acre, consisting mostly of Douglas-fir and grand fir. Insect and disease problems can be found throughout the unit. Dwarf mistletoe is severely affecting the western larch. Scattered pockets of the dead and dying Douglas-fir, killed by the Douglas-fir beetle, are also present.

Treatment Objectives:

1. Remove intermediate, suppressed, diseased, and less vigorous trees to increase tree growth, health and vigor in overstory.

2. Protect soil productivity by minimizing soil displacement, compaction and erosion, and site productivity by retaining 10-15 tons of down woody debris and fine fuels per acre after treatment.

3. Remove shade tolerant species that have encroached upon historic western larch cover types.

4. Retain approximately 15-30 trees per acre to provide a seed source for natural regeneration.

5. Promote regeneration of western larch and white pine.

6. Prescribe burn unit after logging to reduce current fuel loading and prepare a seed bed for natural regeneration.

Prescribed Treatment: Seed Tree/ Shelterwood

Harvest method: Cable logging unit. Harvest method will consist of individual tree selection. Logging will use newly constructed logging roads. Forest Officer will approve landing locations prior to harvest. The seed tree/shelterwood treatment will focus on removing the overstory that is diseased, suppressed, and less vigorous to provide more growing space for seedlings and saplings.

Hazard Reduction: Unit will be prescribed burned. Assessment for fuel loadings required to successfully burn unit will be accomplished after logging. Slashing of sub-merchantable grand fir alpine fir, Douglas-fir and lodgepole pine may be done to provide adequate fine fuels. Purchaser will pile slash at landings and State crew will burn.

Site Preparation: Unit will be prescribed burned. Unit will be assessed after logging to determine appropriate slash loading. Slashing of seedlings and sapling grand fir, alpine fir and Douglas-fir will occur to provide fine fuels to carry the prescribed fire.

Regeneration: Plant partial acres of unit with western larch and white pine and rely on natural regeneration on other acres. Exact locations will be determined after logging and prescribed burn.

Anticipated Future Treatments: 2003-2006 log, 2006 prescribe burn, 2007 plant, 2004-2008 Monitor area for weeds. 2008- first year survival survey. 2007-2010 Monitor success of natural regeneration.

Marking Guides: Using blue paint, mark unit boundary with 3 horizontal stripes interspersed with an occasional 8 to identify unit number. Using blue paint, mark trees to leave with a single horizontal stripe at breast height. The paint stripe shall completely encircle the tree so that (at a minimum) paint marks will be seen from the uphill and downhill sides of the tree. Paint marks are to be placed on the stump as well.

Current trees per acre: 190 Target trees per acre after marking: 15-30

Marking will focus on removing overstory so that approximately 15 to 30 of the best overstory trees are left per acre. The east-facing slope in the unit contains mostly Douglas-fir that is healthy and more open grown than the north-facing slope. Leave more trees per acre on the east -facing slope, but maintain at least 25 to 40 foot spacing between leave trees.

The north-facing slope contains more western larch, grand fir and scattered lodgepole. The timber on the north facing is more diseased and decadent. Timber marking should leave only those trees that are healthy and capable of producing seed. Spacing on the north-facing slope will be 40 to 50 feet +.

Leave tree selection guidelines:

1. Healthy trees free of insects or disease with pointed full crowns and minor defects. Spacing of leave trees should be between 40 and 50 feet apart.
2. Species preference: Western larch and Douglas-fir.
3. Standing snags greater than 16 inches.
4. Standing cull- only if free of insects and disease.
5. All trees within 50 feet of stream.

Cut tree selection guidelines:

1. Unhealthy trees- trees with insect, disease, or major defects.
2. Lodgepole pine, grand fir, alpine fir, Red Cedar.
3. Dominant and Co-dominant trees that do not meet leave tree guidelines.

Cruising Guides:

Volume estimates will be done with 12, 20 BAF cruise plots. Plots are to be laid out in a grid system over the entire unit. Data to be recorded at each plot includes:

1. Plot #
2. # trees per plot
3. Cut or leave tree
4. Species
5. Diameter to the nearest inch
6. Tree height to nearest foot (estimate leave tree heights)
7. % defect (for cut trees only)