ENVIRONMENTAL ANALYSIS

FOR THE

RITSENBERG/FITZSIMMONS TIMBER SALE

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INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS

The Ritsenberg Fitzsimmons Timber Sale Environmental Analysis includes four chapters:

I. Chapter one - Purpose and Need for Action

A. This chapter outlines the project and explains the purpose and need for actions associated with the project.
B. Recommends an alternative for implementation.
C. Explains the process used to obtain public and specialist input and the issues analyzed in the EA.

II. Chapter two - Alternatives

A. This chapter describes the alternatives evaluated in this analysis. Three alternatives are presented in detail including no-action and two action alternatives.
B. Provides a summary comparison of environmental effects of the alternatives.

III. Chapter three - Affected Environment

This chapter presents the existing environment which would be affected by the actions associated with the project.

IV. Chapter four - Environmental Effects

This chapter explains the environmental effects of the alternatives.

CHAPTER I

I. PURPOSE AND NEED FOR ACTION

The Department of State Lands (DSL) proposes to harvest up to 6.45 million board feet of timber and construct and reconstruct roads in the Upper Stillwater River, Fitzsimmons, Dog and Meadow Creek drainages on the Stillwater State Forest. The proposal would harvest timber and reforest up to eight hundred acres, construct 1.7 miles of road, reconstruct 25.4 miles of roads and install or repair four bridges. The proposed action would be implemented during 1992 and the anticipated completion would be during or before 1993. Regeneration and Timber Stand Improvement practices in harvested stands would begin by 1993.

A. THE PRINCIPAL OBJECTIVES OF THIS PROPOSAL ARE:

1. Harvest timber to generate revenue for school trust accounts.
2. Improve existing road systems to meet Best Management Practice Specifications and reduce potential for impacts to watershed and fisheries values from the existing roads.
3. Salvage Mountain Pine Beetle-killed trees and remove high-risk trees prior to potential attacks.
4. Initiate implementation of DSL Interim Grizzly Bear Standards & Guidelines (Bear Guidelines) to provide for grizzly bear security and habitat needs.

B. THE PROPOSED ACTION WOULD OCCUR ON THE FOLLOWING SCHOOL TRUST LANDS.

Legal Description

TWN	RGE	SECTION	GROSS SALE ACRES
T33N	R23W	28	480
		29	640
		30	360
		32	505
T34N	R24W	3	196
		4	319
		5	521
		8	320
		17	320
		20	40
		30	581
T34N	R25W	25	200
		36	418
T35N	R24W	31	160
		32	40
		34	200
		35	40

II. DECISIONS TO BE MADE

1. This EA may be revised following review to insure that all recommendations of DSL specialists and staff have been incorporated into the design. The public should also be informed of its availability, and known interested persons requested to review it with an opportunity to provide input prior to implementation.

2. The proposed alternatives should be reviewed, and if necessary adjusted to better meet objectives or reduce effects. Following adjustments and revisions, an alternative should be selected for implementation.

3. A determination should be made whether environmental effects of the selected alternative would be insignificant. If the effects are insignificant, preparation of an EIS would not be necessary prior to implementation.

THE RECOMMENDATIONS OF THIS ANALYSIS ARE AS FOLLOWS:

1. The preparers recommend implementation of Alternative 2 as summarized in Chapter II. This alternative meets the objectives of the proposed action and provides sufficient conditions, stipulations and modifications for reduction or mitigation of environmental effects of issues identified by the analysis.

III. SCOPE OF THE PROPOSAL

The proposed action is limited to specific management activities which are needed to implement the timber sale and provide for resource protection. This assessment documents site-specific analysis and is not a general management plan or a programmatic analysis of the area. The scope of this Environmental Analysis (EA) was determined through DSL interdisciplinary analysis and public involvement.

The Upper Stillwater River and Fitzsimmons Creek was first considered as a separate project from the Ritsenberg Meadow area. Project work began with independent preliminary reconnaissance of the two proposals by DSL. Early development cost data indicated the Fitzsimmons area would require expensive investments in bridge repair and road reconstruction, while the Ritsenberg area had relatively low development costs. The decision was made to combine the two projects to absorb some of the costs so dead and dying timber in the Upper Stillwater and Fitzsimmons drainages could be salvaged. Once the proposals were combined and initial specifications clearly defined, more extensive public involvement and resource specialist analysis was conducted.

Public involvement has been solicited through a combination of news releases, advertisements and letters sent to known interested people (copies are on file at the Stillwater state Forest). Some individuals have also been contacted in person to clearly identify their concerns. Responses have been used to determine issues of concern. DSL foresters and specialists, Department of Fish, Wildlife and Parks biologists and other agency specialists have also helped identify the issues that are analyzed in this EA. The following statements summarize the primary issues identified by this analysis:

IV. ISSUES

1. Distribution and amount of old growth timber stands could be changed by logging unit design and location.

2. A bark beetle epidemic is killing stands of lodgepole pine and large white pine trees. An increased fire hazard, loss of tree growth, timber volume, and loss of income to school trusts would result if the trees are not harvested.

3. Harvesting and road building associated with the sale and other non-sale-related forest activities may affect grizzly bear habitat components, risk of mortality, and risk of bear/human conflicts. DSL Interim Grizzly Bear Standards and Guidelines should be implemented by this action.

4. If large or improperly spaced cutting units were included in the design, they could reduce habitat effectiveness for big game species.

5. Harvest and road building activities could result in soil compaction, displacement and erosion.

6. The road system in the Upper Stillwater River and Fitzsimmons area has deteriorated to an unsafe and unmaintainable condition. If repairs are not made, catastrophic damage could occur from flood washouts, collapsed bridges or other safety hazards. This could result in soil and watershed damage, injury or property liability and lost access for the State, U.S.F.S, private owners and lessees.

7. Timber harvesting has the potential to change the visual characteristics of the landscape.

8. Open road density needs to be reduced to 1 mile per square mile or less to meet Bear Guidelines. This would prevent some forest users from driving on roads they have traditionally used.

9. Timber harvesting and road construction have the potential to produce sediment, increase water yield and reduce fisheries habitat quality.

10. Slash burning would temporarily lower air quality below state standards if burning is conducted during unfavorable smoke dispersal conditions.

The following additional concerns were identified by local residents. Measures to limit the effects of these concerns need to be incorporated into any action alternative:

1. Dust is likely to be produced from road and bridge construction and timber hauling near residences and cabin sites on the Stillwater River.

2. Spotted knapweed and other noxious weeds may be encouraged by road construction.

CHAPTER II, ALTERNATIVES

I. INTRODUCTION

This chapter describes the alternatives considered in this analysis and compares the environmental effects produced by each one. The chapter is arranged as follows:

1. Project development: This section describes the development of the project and its modification through resource specialist and public review to incorporate design features and create Alternative 1.

2. Alternatives considered in detail: These include the fully developed proposal titled Alternative 1, an alternative with added grizzly bear stipulations titled Alternative 2 and No Action.

3. Comparison table of environmental effects of alternatives: This table summarizes the analysis results presented in Chapter IV. This section along with the discussion of environmental effects in Chapter IV provides the information needed to evaluate the alternatives.

4. Alternatives considered, but eliminated from detailed study. These include Alternate Access Routes, Elimination of Fitzsimmons Units, Seasonal Road Closure Management and Bridge Alternatives.

II. PROJECT DEVELOPMENT

A proposal was developed to define the project in terms of the purpose of the action, known laws, rules and environmental factors. Unit and road locations were based on harvesting approximately 6.45 MMBF on about eight hundred acres. They reflected consideration for known issues and incorporated features designed to reduce or eliminate potential effects to resources.

Proposed harvest units in the Upper Stillwater and Fitzsimmons drainage are dominated by lodgepole pine trees that are dead, dying or at high risk to future mortality from mountain pine beetle infestation. Unit locations in the Fitzsimmons area were primarily designed to salvage the maximum amount of beetle affected and at-risk lodgepole pine and minimize site effects from logging and road building.

Proposed harvest units in the Ritsenberg area were selected based on silvicultural priorities. Stands with the following characteristics were included in the proposal:

1. Highly productive sites with residual timber stands that are not growing at a rate that reflects site potential.

2. Stands with root diseases that are causing accelerated decay, loss of growth, vigor and mortality. Remnant western white pine that are dead, dying or at high risk to mountain pine beetles.

3. Stands that have manageable understories and would benefit from overstory removal and need regeneration where understory stocking is low.

4. Mature stands with medium to high decline in growth rates.

project development incorporated laws, rules, and policies into the project plan. The following list shows these major considerations:

1. Logging systems and access plans would incorporate forestry Best Management Practices (BMP's) into all phases of the project.
2. Streamside Management Zones (SMZ's) and riparian areas would require special consideration. Recommendations to prevent damage would be included in final plans.
3. DSL Bear Guidelines would be implemented in areas affected by the sale.
4. Other wildlife habitat components and use would be evaluated and adjustments made to incorporate their needs.
5. Deteriorated road systems would be repaired or reconstructed to protect water quality and fish habitat in the associated streams.
6. White-tailed Deer Summer Habitat Management Guidelines, Cross, 1983, were used to plan unit layout and treatment considerations in the Ritsenberg area.

III. ALTERNATIVES CONSIDERED IN DETAIL

The following alternatives are considered in detail in this analysis. This section describes two action alternatives and the no action alternative. The action alternatives meet the purpose of the action and address the issues identified in Chapter I.

A. ALTERNATIVE 1

This alternative would provide for harvesting 5.2 MMBF on 627 acres (see map, Appendix A). Proposed harvest methods and acres treated are presented in the following table.

ALTERNATIVE 1	
Total Harvest Acres	627
Volume harvested	5.2
Number of Harvest Units	47
Old growth	
Acres to be harvested	7.5
Total acres affected by this sale	29
Roads:	
New construction miles	1.7
Reconstruction miles	25.4
Harvest Method	**Acres**
Salvage	24.7
Seedtree/shelterwood	18.1
Overstory removal	125.2
Clearcut	273.3
Species Selection	37.8
Single tree selection	1.5
Seed tree	137.7
Shelterwood	8.3
Overstory removal/seed tree	119.0

Design features of Alternative 1.

The proposal was modified based on site specific review by specialists and responses to issues identified from public comments. Their recommendations were incorporated into the plan to further define the general considerations noted above. Specific measures were included to reduce potential impacts to resources. Unit boundaries, road locations, and other design features were adjusted. The refinement of the proposal resulted in Alternative 1.

The primary description of this alternative consists of these design features to limit or prevent potential impacts. The following list is a summary of design features which address the issues in Chapter I. More complete explanations are given in chapters III and IV. A detailed list of stipulations and specifications is included in Appendix B.

Old growth timber stands: Alternative 1 does not involve any old growth timber stands identified in the Russky-Stillwater-Fitzsimmons old growth analysis area. In the Dog-Meadow analysis area, 7.5 acres of identified old growth would be cut.

Bark beetle epidemic: Originally, the sale was proposed to harvest a maximum amount of beetle killed and threatened stands. Some of the identified stands were reduced in size or dropped from the proposal to protect sensitive resources such as soils, watershed, and wildlife. The Alternative 1 would still harvest most of the accessible beetle killed and threatened timber.

Wildlife - Grizzly Bears: Alternative 1 would implement the Bear Guidelines in the areas affected by the sale. A biological review and cumulative effects analysis was conducted to identify elements necessary for implementation. Primary features of the proposal are providing security for bears and reducing the potential for bear/human conflicts. Actions to accomplish this include reducing open road density to 1 mile per square mile or less, scheduling project activities in space and time, providing screening around many sale units, designing units to meet the Bear Guidelines, and providing secure displacement areas in the event grizzly bears are displaced by sale activities.

Wildlife - Other than bears: Alternative 1 addresses wildlife needs primarily through unit design. Unit design includes retaining hiding and thermal cover, maintaining riparian areas and travel corridors, avoiding denning and nesting sites, and control of open road density. The Bear Guidelines were used as a design tool, since they accomplish a dual purpose in providing for other wildlife needs as well.

Soil compaction, displacement and erosion: Alternative 1 includes protective requirements to prevent or reduce effects to soils. Most of these requirements are specific to different phases of the logging and road building operations, but include the following major areas of emphasis. Compaction and displacement would be reduced by controlling the location, number and season of use of skid trails. Equipment operations would be closely controlled. Erosion would be reduced by reconstructing roads with proper drainage features, installing drainage structures in skid trails and landings, seeding disturbed areas and improving road maintenance.

Road system deterioration: Alternative 1 would reconstruct the Stillwater and Fitzsimmons road system to reduce problems with safety, drainage and maintenance. The Edmonds, lower Fitzsimmons and Chepat bridges would be replaced. Collapsed, inoperable or missing culverts would be replaced. Surfacing, visibility and other road problems would be repaired.

Visual characteristics: Timber sale units visible from U.S. 93 were designed to limit changes to the view from the highway. Shelterwood and selective harvest systems along with unit locations were used to achieve this goal.

Recreational use: Adhering to Bear Guidelines would reduce the open road density to one mile per square mile or less. This alternative would implement road closures in BMA's affected by the sale. The road closure design includes leaving roads open to provide public access into most of the major drainages on the Stillwater Forest. Most of the BMA's would be maintained at or near one mile per square mile open roads. Exceptions would be BMA s where existing road density is less than one mile per square mile.

Water Quality and Fisheries: Alternative 1 includes protective requirements to avoid or reduce effects to water quality. Most of these requirements are specific to different phases of the logging and road building operations, but include the following major areas of emphasis. Skidding and other logging operations would be controlled by season of use, location and type (cable vs. tractor) to reduce sediment production. Equipment use would be restricted in or near streamside management zones, and unit boundaries are designed to exclude these areas. Road drainage structures would be replaced with properly sized and located culverts, ditches and bridges. Installation of these structures would be strictly controlled with sediment traps and revegetation designed to limit sediment delivery. Structures would be designed to allow fish passage and protect the integrity of fish habitat.

Air Quality: All prescribed burning would be done in cooperation with the Montana Airshed Group. This would provide for burning when conditions are acceptable in terms of ventilation and dispersion. Dust abatement would be applied near residential areas.

Noxious Weeds: Distrubed areas would be revegetated to prevent noxious weed establishment.

B. ALTERNATIVE 2

This alternative is the same as the Alternative 1, but includes the following additional specifications that reduce the potential for bear/human conflict and the risk of mortality to grizzly bears in the Fitzsimmons area:

> The Fitzsimmons Road would be closed until regrowth replaces screening between the Stillwater - Fitzsimmons junction (Section 5, T34N, R24W) and Fitzsimmons - West Fork divide (Section 2, T34N, R24W). This would reduce open road density to well below the recommended 1 mile per square mile. It would prevent driving access along roads where sale units are not screened from the road.
>
> Sight barriers would be installed in units 1F, 3F, 5F, 7-9F, 12F, 15-17F and 19F to limit sight distance from the Stillwater and Fitzsimmons Roads into the units. These barriers would be slash windrows constructed from 3 inch and larger cull logs, and would incorporate residual vegetation where available. The barriers would be built at strategic points where topography, vegetation or other natural barriers are not present.

C. NO ACTION ALTERNATIVE

Under the no action alternative, none of the proposed activities would be accomplished by this action. No timber harvesting or major road improvements would be done. Routine road maintenance would still occur, to the limits allowable by the existing road condition. Bear Guidelines would not be implemented by this operation, so other means would be needed to accomplish road closures and other connected activities. Chapter III describes the current conditions which represent the effects of the no action alternative in the short term. The effects discussion in Chapter IV outlines long-term consequences of taking no action. Dynamics of the biological systems require readers to examine Chapter IV to appreciate the consequences of this alternative.

IV. COMPARISON OF ENVIRONMENTAL EFFECTS

The following tables define and compare alternatives by summarizing their environmental consequences. The proposed actions shown in the alternatives above would cause these consequences. The reader should refer to the more detailed information in Chapter IV to fuily understand the effects summarized here. Where specific areas are not mentioned in the table, the information applies to both the Ritsenberg and Fitzsimmons areas.

ISSUE/RESOURCE	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2
1. VEGETATION Harvested acres	-0-	627	627
Old Growth: % remaining in analysis area	15.9% Ritsenberg 2.1% Fitzsimmons	14.9% Ritsenberg 2.1% Fitzsimmons	14.9% Ritsenberg 2.1% Fitzsimmons
Weeds	Now established, continued invasion	Cut/fill revegetation would limit invasion along roads	Cut/fill revegetation would limit invasion along roads
2.INSECT/DISEASE Fire hazard & risk	Increasing with poor access Fitzsimmons area	Lower along roads, improved access	Lower along roads, improved access
Volume lost to MPB	60-80% loss, Fitzsimmons creek	25-30% loss, Fitzsimmons creek	25-30% loss, Fitzsimmons creek
Trust income	Value of dead trees would be lost	Partial recovery of dead sawlog value, full recovery of green sawlogs	Partial recovery of dead sawlog value, full recovery of green sawlogs
Future growth/yield	Severely reduced and dependent on natural rate of succession.	Dead trees replaced by regeneration	Dead trees replaced by regeneration
3. WILDLIFE Grizzly Bear Standards and Guidelines: Open road density (ORD) (mi/sq mi)	Fitzsimmons 0.5-1.7 Ritsenberg 2.1-3.2	Doesn't I.D. Seasonal Closure Fitzsimmons ≤ 1 BMA 3 = 0.6 BMA 4 = 0.6 Ritsenberg ≤ 1	Fitzsimmons ≤ 1 BMA 3 =.427 BMA 4 = 0.0(temp) Ritsenburg ≤ 1
Spring habitat acres	No change	Additional 120 ac	Additional 120 ac
Security	ORD high, little control of human activity	Secured BMA's, low ORD, scheduled entries	Secured BMA's, low ORD, scheduled entries

ISSUE/RESOURCE	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2
Deer and other big game habitat	Spring-summer-fall range status quo	Maintain adequate thermal, hiding, travel corridors. maintain riparian integrity.	Maintain adequate thermal, hiding, travel corridors. maintain riparian integrity.
Cavity nesters	No effect	Retain replacement snags in sapling stands	Retain replacement snags in sapling stands
4. SOILS Compaction	No effect	≤15% area using located skid trails and restrictions	≤15% area using located skid trails and restrictions
Displacement	Possible flooding loss in large event, surface erosion on roads	Lower flood loss risk and surface erosion due to improved drainage and revegetation of cut/fill slopes	Lower flood loss risk and surface erosion due to improved drainage and revegetation of cut/fill slopes
5. HISTORIC/CULTURAL	Historical sites recorded	Historical sites recorded. Some potential for prehistoric discovery	Historical sites recorded. Some potential for prehistoric discovery
6. ROADS Safety	Existing danger and potential liability for clear width, curves, turnouts, bridge collapse	Meets state needs for safety	Meets state needs for safety
Bridges	Danger of collapse from flood or loading	Improved bridge clearance and flood provision, meets load needs	Improved bridge clearance and flood provision, meets load needs
Access	No heavy fire engines or timber hauling. Near-future expense to replace bridges for any access	Provides long term access	Provides long term access
7. VISUAL U.S. 93 view	Retains existing mature stand appearance	Little noticeable change to motorists	Little noticeable change to motorists
Visual other than 93	Brush tunnels, jackstrawed MPB-killed stands	Opens some brush tunnels. Some cutting units visible	Opens some brush tunnels. Some cutting units visible Bear screening structures evident in BMA's 3 & 4

ISSUE/RESOURCE	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2
8. RECREATION Road miles open to recreationists	194	107	102 until screening recovers
alternative uses	No effect	Loss of closed road use by motorized recreationists	Loss of closed road use by motorized recreationists, Fitzsimmons loop closed.
9. WATER QUALITY sediment from harvest units	No effect	Special measures to reduce delivery to streams	Special measures to reduce delivery to streams
Sediment from existing roads	Surface runoff and sediment delivery due to deteriorated structures	Reduced due to improvement of overall drainage	Reduced due to improvement of overall drainage
Flood risk from drainage and bridge problems.	Sediment delivery from mass wasting possible from floods	Sediment delivery reduced due to flood event planning and adequate structures	Sediment delivery reduced due to flood event planning and adequate structures
Water yield increase	No effect	540 ECA in new cutting units. 8,840 ECA remaining	540 ECA in new cutting units. 8,840 ECA remaining
10. FISHERIES Spawning habitat	Increasing risk of deterioration due to road, CMP or bridge failure	Reduced risk by repairing structures	Reduced risk by repairing structures
Species composition and genetic constitution	Eastern brook and rainbow could gain competitive advantage if habitat deteriorates	Road repairs would limit risk of habitat deterioration	Road repairs would limit risk of habitat deterioration
11. AIR QUALITY Dust	Current levels of road dust from variety of uses	Dust abatement near developments	Dust abatement near developments
Smoke	Wildfires could reduce air quality	Burning conducted under control of air quality group. Wildfires still possible	Burning conducted under control of air quality group. Wildfires still possible.

V. ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY.

The following alternatives were considered during the analysis process, but were dropped following preliminary review of important environmental factors.

A. ALTERNATE ACCESS ROUTES

Due to the cost of replacing or repairing the Stillwater River (Edmonds) bridge, alternate access routes were considered. Two routes were evaluated. The first route would leave highway 93 near Spring Creek campground (SW¼ Sec. 10, T33N, R24W), and follow Spring Creek to the East side of Fish lake. It would connect with the existing road above the Edmonds bridge. The second route would leave Highway 93 near the Flathead/Lincoln county line and follow the Bull Lake road, passing North of Bull and Fish Lakes. It would also connect to the existing road above the Edmonds bridge.

The first route was rejected because estimated development costs would be as great or greater than bridge replacement. The second route was rejected because of engineering considerations (unstable and wet areas) and right of way acquisition difficulties near Fish Lake. Both routes also have potential to add to the effects of the existing road on deer winter range habitat, and increase fishing pressure on Fish and Bull Lakes.

B. ELIMINATION OF FITZSIMMONS UNITS

Elimination of several sale units along the Fitzsimmons road was proposed as a way to reduce potential for bear/human conflicts that might be caused by roadside clearcuts. This proposal would have reduced the harvest volume by about 1 million board feet. In addition, this proposal would result in loss of available timber to bark beetles and increase the fire hazard from dead trees along the road. Trust revenue would be reduced as well as the stumpage to cover improvement costs. Discussions with the DSL wildlife biologist indicated adequate security could be provided for bears without eliminating the units.

C. SEASONAL ROAD CLOSURE MANAGEMENT

Managing road closures seasonally to allow additional recreational access was reviewed. There is currently no legal status for recreational uses that do not return income to the trusts. Diversion of trust income from timber sales for recreation management has not been authorized by the State Land Board or the legislature.

D. BRIDGE ALTERNATIVES

Replacement of the Edmonds bridge has been proposed for many years, but has been delayed due to lack of funding. Several options were proposed to reduce replacement costs or repair the existing bridge. Repair of the existing bridge would result in a 14 ton load limit, necessitating temporary shoring and operations in the stream for timber hauling or other heavy loads. The approaches to the existing bridge deliver sediment directly into the stream from road surface runoff. This problem would be difficult and expensive to repair. As cost of repair to achieve mediocre results mounted, replacement became the apparent best option.

CHAPTER III - AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the existing environment within which the proposed action would occur. It serves as a baseline against which action alternatives may be compared and represents changes that would occur under the no action alternative.

I. PHYSIOGRAPHY

The Fitzsimmons portion of the project is located in the bottom of the deep alpine glacial troughs of the Upper Stillwater River and Fitzsimmons Creek drainages. Sale units are located on alluvial fans of side drainages and on the valley floor. The base of the glacial trough walls where slopes steepen rapidly delineate the upper unit boundaries. Slopes of sale units range from 20-40%, with limited areas up to 60%. Elevation ranges from 4000 to 5200 feet. Aspects are primarily west and south, except in units 1, 6 and 13 which face north.

A significant topographic feature exists in the Fitzsimmons drainage in the NW¼ Section 3. A remnant of a glacial terminal moraine blocks the canyon bottom. This moraine has been cut through by Fitzsimmons Creek, but it still forms an effective air drainage block and creates a frost pocket in the valley above. This is evidenced by a change to the colder menziesia phase of the ABLA/CLUN habitat type[1] above the blockage.

The Ritsenberg area has been strongly influenced by continental glaciation. Glacial movement and the resultant topography trends northwest to southeast. Depositional land forms consist of gently rolling ground moraines. Some low ridges in the area were scoured to bedrock and are now overlain with thin residual soils. Slopes in harvest units are generally less than thirty percent. Small areas within some harvest units have slopes greater than forty percent; however, slope distances are less than 200 feet. Elevation ranges from 3200 feet to 4300 feet. Topographic maps of the sale area are included in Appendix C.

II. VEGETATION

A. HABITAT TYPES

Habitat types were sampled and extrapolated to the surrounding area based on topography, photo interpretation and field observations. The sale units fall into three primary habitat types (ABLA/CLUN, THPL/CLUN, ABGR/CLUN) with a variety of phases represented.

The lower Stillwater River drainage is subject to cold air drainage and pooling. The cold air extends from river level to between 3400 and 3500 feet elevation. Habitat types within the ABLA series are found in this cold air zone. Above this zone, on warm aspects where Stryker Ridge produces orographic rainfall from maritime air masses, the ABLA series gives way to the THPL series. The THPL series extends from about 3500 feet elevation up the Stillwater river to about 4200 feet - about 2 miles below the confluence of the Stillwater River and Fitzsimmons creek. Above this level, the normal elevational temperature gradient resumes and THPL types are replaced by the ABLA series. The ABGR series is found on slightly drier areas west of Stryker Ridge.

These habitat types and their corresponding yield potential are shown in the table below.

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[1] Complete names for habitat types used in this document are provided in the attached glossary.

HABITAT TYPES AND POTENTIAL YIELD

HABITAT TYPE	YIELD CLASS	MEAN POTENTIAL YIELD Cu.Ft./Acre/Year
ABGR/CLUN,XETE	high	95
THPL/CLUN,ARNU	very high	120
THPL/CLUN,CLUN	high to very high	103
ABLA/CLUN,CLUN	moderate to high	92
ABLA/LIBO	low to high	72
ABLA/CLUN,XETE	moderate to high	82
ABLA/CLUN,ARNU	high to very high	111
ABLA/CLUN/VACA	moderate to high	79
ABLA/CLUN,MEFE	moderate to very high	96
ABLA/OPHO	moderate to high	86
ABLA/MEFE	moderate to high	80

B. STAND DESCRIPTION

All the timber stands in the Fitzsimmons vicinity are the result of reproduction following the fire of 1926. This fire was severe and resulted in the destruction of the majority of timber stands in the Stillwater and Fitzsimmons drainages. Reproduction on the valley floor away from the edges of the fire was slow, with most timber stand establishment delayed 10-15 years. Stands are primarily lodgepole pine, especially those above the valley floor.

Of the Fitzsimmons stands cruised for this sale, approximately 75% of the volume is lodgepole pine. The remaining 25% is spruce, larch and Douglas-fir, scattered through the units. Three distinct stand types have been identified in the Stillwater and Fitzsimmons drainages.

TYPE 1 - The predominant stand type is nearly pure lodgepole pine with minor amounts of Douglas fir, larch and subalpine fir. Sawtimber stands are barely merchantable due to the young age and size. These stands cover all the included habitat types and represent early seral conditions. There are very few understory trees in these stands due to their density, and brush is generally light to moderate except near openings and roads. (Proposed Units 7F-10F, 14F-19F)

TYPE 2 - Stands in the ABLA/CLUN/MEFE and some in the ABLA/CLUN/CLUN habitat type are a mixture of spruce and lodgepole pine with a variable component of larch, Douglas-fir and subalpine fir. The stands are even-aged, but have an understory component of scattered subalpine fir and spruce with heavy alder and menziesia brush. Huckleberries are also present in these stands. (Proposed Units 1F, 3F-6F, 12F-13F, 20F-21F)

TYPE 3 - Other valley bottom stands are dominated by spruce and larch. These stands are generally mixtures of sapling and pole sized trees which are beginning to develop dominance relationships. Lodgepole pine is either absent or a minor stand component. Many of these stands have a dense understory of mixed brush species and sapling trees. The under-

stories are dominated by alder, cedar and spruce in variable ratios. There are no proposed sale units in these stands.

Forest types within the Ritsenberg area can generally be described in relation to elevation zones. The ABLA series occurs from the Stillwater river to approximately 3500 feet in elevation. Mixed species stands in this area are composed of western larch, Douglas-fir, lodgepole pine, western white pine, subalpine fir and spruce. Variations in dominant overstory species and stand structure are primarily the result of past forest management. The following descriptions catagorize the main stand types in the ABLA series:

TYPE 4 - Mature stands with overstory densities that have not been significantly reduced by previous entries. The understories are composed of Douglas-fir, subalpine fir, and spruce. (Proposed Units 13R, 15R, 16A, 17R, 19A, 21R)

TYPE 5 - Stands that have had major reductions in overstory density and the residual overstory is primarily composed of seral species. The understories are composed of western larch, Douglas-fir, lodgepole pine, western white pine, subalpine fir, grand fir and spruce that range in size from seedlings to poles. (Proposed Units 8R, 10R, 16R, 18R, 19B, 20R, 22R)

TYPE 6 - Stands with overstories the same as TYPE 5 above, but with poorly devoloped understories of Douglas-fir, spruce and subalpine fir of seedling to sapling size. (Proposed Units 9R, 12R, 19R)

The THPL series occurs from approximately 3500 to 4200 feet in elevation. Stands are composed of western larch, Douglas-fir, western white pine, spruce, lodgepole pine, grand fir, subalpine fir, and western red cedar.

Most of the stands in this elevation zone have been affected by previous harvests. Dominant stand types can be categorized as follows:

TYPE 7 - Stands that were treated with even aged regeneration methods that are dominated by sapling-sized trees and have various amounts of residual overstory trees. (Proposed Unit 14R)

TYPE 8 - Stands that were selectively logged and seral species in the overstory are poorly represented. The understory is primarily composed of shade tolerant species. Understory tree size varies from seedlings to small sawtimber. (Proposed Units 5R, 6R, 6A, 7R, 11R, 23R)

TYPE 9 - Stands that were selectively logged but still have adequate representation of overstory seral species. The understory is composed of seral species that vary in size from seedlings to saplings. (Proposed Units 3R, 4R, 5A)

TYPE 10 - Above 4200 feet in elevation, the ABGR series occurs on south to west aspects with the ABLA series present in draws. The stands are composed of Douglas-fir, lodgepole pine, spruce, grand fir, minor amounts of western larch and occasionally subalpine fir. This zone has also been affected by previous harvesting and stand types are similar to those within the THPL series. (Proposed Units 1R, 2R).

C. RARE AND ENDANGERED PLANTS

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

D. OLD GROWTH TIMBER

The extent and distribution of old growth timber was evaluated in the sale area. There is no current policy in DSL regarding status or value of old growth, however, the ecological value of old growth stands is recognized and an interim recommendation has been adopted. Until policy is developed, at least 10% of analysis areas within the Stillwater State Forest will be retained as old growth stands.

The table below shows the existing old-growth amounts in the Russky-Stillwater-Fitzsimmons and Dog-Meadow analysis areas below 5000 feet elevation. Locations of the analysis areas are shown in Appendix D.

EXISTING OLD GROWTH BELOW 5,000 FEET ELEVATION

ANALYSIS UNIT & OWNER	TOTAL ACRES	OLD-GROWTH ACRES	PERCENT OLD-GROWTH
Russky-Stillwater-Fitzsimmons:			
DSL	3,132	65	2.1
Plum Creek	0	0	0
Other private	0	0	0
TOTAL	3,132	65	2.1
Dog-Meadow:			
DSL	9,461	1993	21.0
Plum Creek	2,493	0	0
Other Private	523	0	0
TOTAL	12,477	1993	15.9

The Russky-Stillwater-Fitzsimmons area is already far below the ten percent threshold for old-growth amounts. This is a result of the 1926 fire that burned virtually all of this area.

The old growth in the Dog-Meadow analysis area was extensively harvested prior to the mid-1950's, and most of the large-diameter trees were removed. Many of these stands now possess an overall old-growth character but are deficient in numbers of large trees. Many of these stands do not meet the screening criterion of 15 trees per acre larger than 19 inches diameter (Flathead National Forest, 1990). These stands generally do possess a number of 14-to-16-inch trees, including vigorous western larch and Douglas-fir, and therefore fit the category of "potential old growth". Field checking has been used to classify these stands as old-growth or non-old-growth based on how well they meet the overall ecological definition and screening criteria.

Many of the other identified old-growth stands have had more recent partial cutting. This cutting has been primarily sanitation and salvage, and has had some impact on the amounts of decadence and standing snags. However, the overall harvesting has not substantially changed old-growth characteristics.

Some old-growth stands appear to be in an accelerated breakup phase, where large seral trees are dying faster than smaller trees can grow into the large diameter classes. The trend over the next few decades in these stands will be toward near-climax stands dominated by grand fir and, in some cases, western redcedar. These stands will have few large

trees and high incidence of rot. Under natural conditions, these stands would be highly subject to stand-replacing wildfires, with the possible exception of those in riparian areas. Many stands can be found that already exhibit these "post old-growth" conditions. These stands are unlikely to develop old-growth conditions again over time without wildfire or application of prescribed silvicultural treatments.

The partial cutting prior to the mid-1950s was done primarily in the area within one to two miles of Highway 93 in the Dog-Meadow analysis area. The result is that the southwest half of the analysis area has relatively little old growth, and most of the stands that are identified as old growth are currently marginal for numbers of large trees. The northern portion of the analysis area contains the bulk of the old-growth stands. Some of these stands have had sanitation-salvage cutting which has reduced the amount of decadence, but otherwise they possess good old-growth characteristics.

The Plum Creek ownership is entirely in a block on the east end of the analysis area. Little if any intact old growth remains in this area after recent harvests. The Plum Creek land had received extensive partial cutting several decades ago, similar to that on the State land, so old-growth characteristics may not have been present even before the recent harvest.

Contiguous blocks of old growth, without narrow portions less than about 400 feet wide, range in size up to about 700 acres in the Dog-Meadow analysis area. The largest blocks are in the north portion of the analysis area.

Within the State-owned portion of the analysis area, the old-growth patches are distributed in such a way that no patches are more than 1.5 miles from another patch. Based on the proportion of relatively mature, closed-canopy stands within the State land in the analysis area, connecting corridors do not appear to be a limiting consideration.

III. INSECT AND DISEASE

A catastrophic fire occurred in the Stillwater and Fitzsimmons drainages in 1926, resulting in extensive pure lodgepole pine stands throughout this area. A limited buildup of mountain pine beetles began in about 1979. Salvage logging of some accessible stands was conducted in 1981, but this had little effect on the overall extent of the beetle attacks. The attacks subsided after 1981, but have substantially increased since 1987. Significant increases were noted during aerial surveys of 1988 and 1989. Ground survey estimates within proposed sale units indicate that about 14% of the lodgepole volume was killed by new beetle hits in 1989. Fourty six percent of the total lodgepole volume in sawtimber stands has been beetle-killed since the epidemic began. Beetle attacks are not as extensive in the smaller trees on steeper slopes and poorer sites away from the valley bottom.

A serious infection of Lodgepole Pine Needle Cast appeared in Fitzsimmons Creek in 1990. From the air this appeared to be fading of beetle-killed trees from the previous year, however, it extended over the whole drainage on a much larger scale than the patchy condition associated with bark beetles. This infection may be related to moist conditions the previous year. Only one age class of needles is affected, and some trees are more tolerant than others. The primary result will be a temporary loss of growth and reduced resistance to bark beetles.

A severe cold period occurred in the winter of 1988-89 in which a Pacific warm air mass was displaced by a series of Arctic cold fronts with high winds. This resulted in serious "redbelt" or winter damage to the spruce in Fitzsimmons Creek. Lodgepole pine was not as noticeably affected. Foliage turned yellow and then dark brown in the following spring, then fell off. The effect is similar to the appearance of Douglas-fir infected with Ar-

millaria. The crowns appear very sparse due to segments of branches without needles. Some growth loss due to defoliation will occur. Almost no tree mortality was observed.

Root and stem rots and other pathogens are not evident in these stands due to the young stand age and cleaning effects of the 1926 fire. Some mechanical damage from snow and limited blowdown were noted.

White pine blister rust has been infecting western white pine in the Ritsenberg area. This rust has caused mortality and top kill. Mountain pine beetle is also causing wide-spread mortality in western white pine. White pine not attacked to date are considered to be at risk. White pine is losing its representation in stands in this area.

Indian paint fungus occurs in subalpine fir and grand fir in the Ritsenberg area. Brown cubical butt rot and brown butt rot are causing heart rot in cedar. Many trees within proposed harvest units were damaged during previous entries. The wounding has provided additional infection sites for pathogens and may predispose stands to infection by the shoestring root rot. Armilleria mortality pockets were found in subalpine fir and western red cedar stands.

IV. WILDLIFE

White-tailed deer is the primary big game species present in the Ritsenberg area with black bear, moose, elk and mule deer also occurring in the sale area. The seasons of use are spring, summer and fall for all species except moose, which use the area on a year-round basis. Winter range habitat components for white-tailed deer are not present in the sale area. Due to dense stand conditions and observed usage, the Fitzsimmons area is not considered a major use area. It is primarily a summer range for big game and bears.

A pair of mature bald eagles nest on Upper Stillwater Lake. A review of the Interim Montana Bald Eagle Guidelines indicates the nest and primary use areas are not likely to be within the project areas. Site specific nest management guidelines for this pair of eagles are currently being developed and anticipated to be completed by fall of 1991. A draft map was produced based on preliminary observations and data collected (See Appendix E). The map indicates nest and primary use areas are not within areas affected by project actions. The Ritsenberg area may be part of the eagles' home range.

Grey wolves are present in the Upper Stillwater and Dog creek drainages. These areas may be a portion of their home range. No denning or rendezvous sites have been located to date. A DFW&P monitoring program for wolves in this area began in the summer of 1991.

Grizzly bears are present in a portion of the Stillwater State Forest. Part of the State Forest is contained within the Stillwater Bear Management Unit (BMU) which is a subdivision of the Northern Continental Divide Ecosystem. The Stillwater Bear Management Unit is divided into 16 Bear Management Analysis Areas (BMA's). The proposed project involves 11 analysis ares within the Stillwater Bear Management Unit. A map of the Stillwater BMU is provided in Appendix F.

A biological review was prepared by Department of State Lands wildlife biologist and provided in Appendix G. Part of this document describes the existing environment. Habitat and open road density data for BMA's that are included in this project are displayed in the following tables.

GRIZZLY BEAR HABITAT DATA

PROJECT AREAS	STILLWATER BEAR MGT UNIT			ACRES IN DSL OWNERSHIP			
	BEAR MGT. ANALYSIS AREA	TOTAL ACRES	DSL ACRES	SPRING HABITAT	SUMMER HABITAT	FALL HABITAT	HIDING COVER
FITZSIMMONS	1	4,559	2,365	74	1594	1665	2,270
	2	6,619	3,958	23	1314	1692	3,808
	3	5,281	4,879	13	2166	2355	3,979
	4	5,368	4,372	177	1033	1517	3,652
	9	4,923	4,878	101	1080	1457	3,545
RITSENBERG	6	5,528	4,681	191	3701	2410	4,320
	7	5,762	5,762	110	4095	2679	5,524
	8	5,791	2,746	429	4926	3172	2,245
	13	6,874	6,874	67	2830	2374	6,449
	14	8,563	5,270	406	5597	4163	4,604
	16	11,066	3,060	596	9471	7342	2,234

EXISTING OPEN ROAD DENSITY

BEAR MANAGEMENT AREA	CURRENT OPEN ROAD DENSITY (MILES/SQUARE MILE)
1	0.9
2	0.8
3	0.6
4	0.6
5	1.7
6	2.1
7	3.1
8	2.2
9	0.5
11	0.8
13	3.2
14	1.3
16	2.4

V. SOILS

In the Fitzsimmons area, soils are mainly glacial outwash and tills, alluvial fan deposits and residual soils in glacial scoured areas. Top soils are primarily silt loams derived from volcanic ash. In both areas these soils are very fertile for forest vegetation and generally well drained. Landtypes in the Upper Stillwater and Fitzsimmons areas are:

10-3	Allivial soils
16	Alluvial fans
26C-7	Deep glacial tills
27-7	Fluvial reworked glacial deposits
28-7 and 8	Glacial outwash
72	Alpine ridges and cirque headwalls
73	Glacial troughwalls

In the Ritzsenburg area topsoils are silt loams derived from volcanic ash. They are generally 8 to 12 inches in depth. The subsoils are deep gravelly silt loams and glacial till. Landtypes in the Ritsenberg area are:

12	Organic soils
26C-7 and 8	Deep glacial tills
28-7	Glacial outwash
78	Glacial and structural breaklands

Soils maps and additional information prepared by DSL soils scientist is provided in Appendix H.

VI. HISTORIC AND CULTURAL

This area has a long history of logging and timber management beginning in the early 1920s. Ritsenberg Meadow was a homestead area established by C.S. Reichenberg in 1923 and was subsequently used for a logging camp. Some remnants of the camp are still on site. The Fitzsimmons burn was snagged by the Civilian Conservation Corps from a camp near the Edmonds bridge, and some other salvage logging camps were built in the 1940's.

The sale area was surveyed by the DSL archaeologist for cultural and historic sites. Four historic logging and/or trapping camp sites were located. These were photographed and the sites recorded and sent to the State Historic Preservation Office. None of the artifacts discovered were deemed important and no specific measures are required to preserve them. Sale unit boundaries were located to exclude these sites.

This area is very difficult to survey effectively for prehistoric cultural evidence due to the heavy brush and timber cover. No evidence of occupation was found in areas such as roadsides or other cleared spots where testing was conducted.

VII. ROADS

The road system in the Stillwater river and Fitzsimmons Creek drainages was originally built following the 1926 fire by the Civilian Conservation Corps and used for logging salvage, fire protection access, and snag felling in the burned area. Construction and drainage met the standards for the era in which the roads were built, but flooding, limited maintenance, erosion of steep grades, continuous public use and service life of structures has resulted in extensive rehabilitation needs on the road system.

Bridges are old and have been damaged by flood events, and are now unsafe for heavy hauling. Encroachment by trees and brush has narrowed or eliminated ditches and turnouts,

making maintenance impossible and creating a safety hazard. The following are some of the specific problem areas.

1. Edmonds Bridge - This is a three-span steel and treated timber bridge with concrete piers. A flood in 1974 undercut the piers and nearly resulted in destruction of this bridge. It has been restricted to light loads since the flood.

2. Lower Fitzsimmons Bridge - This is a native log sill bridge which has deteriorated past its usable life. It is too short, has inadequate clearance for flood passage, and is located so that runoff from the north approach drains directly into the creek. Even though the bridge is unsafe, it is still in use by administrative personnel, recreationists and other users. Replacement is required before commercial use can occur.

3. Chepat and Upper Fitzsimmons bridges - Both these bridges were built following destruction of the crossings by the 1974 flood. They are native timber structures and are adequate for hauling in this entry with redecking and minor repairs, but are nearing the end of their service life.

4. Existing culverts are in very poor condition. They have been exposed by surface erosion, ruptured by grading, rusted by time, buried by sediment, and rendered inoperable by brush encroachment. Very few culverts are in usable, maintainable condition, and water continually runs down the road during spring runoff, high water and storms.

Primary access routes to the Ritsenberg area are from Highway 93 via the McCabe, Stryker Face, Ritsenberg and Dog Lake road systems. These roads are in reasonably good condition due to recent sales in the area and intermittent maintenance. A few areas have drainage and surfacing problems that need attention.

VIII. VISUAL CHARACTERISTICS

The appearance of the Fitzsimmons area is strongly influenced by the natural stand progression since the 1926 fire, since no significant forest management operations have been conducted in this vicinity recently. Travel along the road gives the impression of driving through a tunnel due to brush encroachment and very limited visibility. A few timber sale units and natural openings in the upper Stillwater River and Fitsimmons Creek allow more distant views and vistas.

The background views in the Fitzsimmons area consist of valley vistas including timbered slopes, rock outcrops and slides, and mountain peaks. These features are seldom visible from the road due to the dense timber.

In the Ritsenberg area along highway 93 the view is dominated by a variey of forest stands of different tree size and species composition. The viewing includes rock outcrops, meadows and panoramic vistas of the west flank and peaks of Stryker ridge. The majority of viewing occurs from people driving through the area on highway 93. Dog Creek Campground is an important viewpoint.

Viewing from forest roads in the Ritsenberg area is also dominated by forest stands. There is a great variety of stand size, structure, tree and understory species composition. This appearance is the direct result of forest management and exclusion of wildfires.

IX. RECREATION AND OTHER USES

A wide variety of recreational and other uses occurs on the Stillwater State Forest. Recreational uses within the proposed sale area include snowmobile trail use and a dogsled tour operator, who uses Ritsenberg area roads for commercial tours. Firewood cutting occurs generally throughout the forest. Fitzsimmons recieves fairly heavy use by hunters, primarily as a base camp for hunting ridgetops and open areas. The Ritsenberg area is also heavily hunted. Other uses currently include traditional family and group activities such as camping, fishing, hiking and berry picking.

Nearly all of these uses require roads to either do the activity or provide access to a starting point. There are currently about 255 miles of main and spur roads within the BMA's affected by this sale. Of these, about 58 miles are closed by gates, berms, brush or other means for various reasons (wildlife protection, unusable roads, brush encroachment, etc,). The remaining 194 miles are open to public use except when closed by snow or other conditions. Of these, roughly 100 miles comprise main system roads providing access to major drainages within the forest. The rest are spur roads built for logging access.

X. WATERSHED

The Stillwater River originates in the Whitefish Range in the vicinty of Bruin Lake. Russky, Chepat and Fitzsimmons Creeks are the major subdrainages flowing into the Upper Stillwater River. Most of these drainages were severly burned by the catastrophic fire of 1926. Hydrologic recovery is estimated to be complete based on vegetative recovery.

The average annual precipitation in the Upper Stillwater[2] and Fitzsimmons drainages ranges from approximately 40 inches on the lower end of the Stillwater River to 50 inches at the confluence of the main and north fork of Fitzsimmons creeks.

Streams in the Upper Stillwater River and Fitzsimmons drainages are characterized by fairly steep gradients, high velocity, flashy and high runoff volume, and good water quality. Data analyzed for the ten year period ending in 1986 indicates a mean annual discharge of 1702 acre feet per square mile and a mean total suspended solid yield of 11 tons per square mile. The Stillwater River provides the domestic water source for the town of Stryker. The diversion point is located approximately 3 miles below the Edmonds bridge.

Road drainage structures in the Stillwater Fitzsimmons area are semi-functional or non-functional. This has resulted in water running down the road removing fine graded road material and creating "erosion pavements" consisting of large cobbles and boulders.

Dog Creek and Meadow Creek are the watersheds in the Ritsenberg area. Dog Creek is the largest watershed on the west flank of Stryker Ridge. Meadow creek is the next drainage south of Dog Creek drainage. Both of these watersheds have very similar characteristics and are described together.

The average annual precipitation in these drainages ranges from approximately 30 to 40 inches. Highly fractured bedrock and a deep soil mantle result in a large amount of water leaving this drainage via subsurface flows. Surface drainage is characterized primarily by discontinuous and intermittent streams, with numerous meadows and bogs providing water

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[2] For watershed analysis, the Upper Stillwater watershed was defined as that portion of the Stillwater river above the confluence of Fitzsimmons creek and Stillwater river. The Middle Stillwater watershed was defined as the reach of Stillwater river from near the town of Stryker to the mouth of Fitzsimmons creek.

storage. Channel stability for Dog Creek is among the best on the forest and is indicative of water being transmitted into and through bedrock rather than in the stream channel. Meadow Creek also has good channel stability. Approximately one-half mile south east of the Stillwater Forest office, Meadow Creek goes underground and presumably discharges into Lower Stillwater Lake.

The following table provides descriptive data for watersheds involved in this proposal.

EXISTING WATERSHED CHARACTERISTICS

Drainage	Acres	Runoff (ac/ft)	Percent Burned in 1926	Existing ECA [3]	Available ECA [4]
Upper Stillwater River	9382	28,592	36	236	1,998
Middle Stillwater River	9549	18,565	92	102	2,291
Fitzsimmons Creek	7258	21,464	85	113	1,727
Dog Creek	9827	10,868	N/A	1089	2,818
Meadow Creek	6552	4,387	N/A	1722	546

XI. FISHERIES

Bull trout, westslope cutthroat and eastern brook trout are present in the upper reaches of Fitzsimmons Creek and in the southern reaches on the North Fork of Fitzsimmons Creek. Department of Fish, Wildlife and Parks fisheries biologist observations indicate that this area is used by bull and westslope cutthroat trout for spawning and may be used for limited rearing by bull trout that reside in the Stillwater lakes. Observation of streambed substrate conditions in lower Fitzsimmons Creek indicate that higher densities of rearing bull trout may be present. Westslope cutthroat and eastern brook trout are also present in Chepat Creek. Pure strain westslope cutthroat trout may be present in upper Stillwater River. Rainbow trout are present in Stillwater river.

Little fisheries information is available for the smaller tributaries in the sale area. Based on the fisheries biologist input, bull, westslope cutthroat and eastern brook trout may be present in many of the tributaries. Eastern brook trout are present in Dog Creek.

Genetic testing (Electrophoretic analysis) of westslope cutthroat trout caught from the upper reaches of Fitzsimmons Creek indicates that these fish are a pure genetic strain of this species.

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[3] ECA = Equivalent Clearcut Acres: This is a concept which involes forest canopy removal and changes in average annual water yield. Existing ECA indicates the number of acres without forest canopy now in the watershed. These data were generated from a water yield analysis conducted by DSL hydrologists.

[4] Available ECA indicates a calculated level of canopy removal that could occur before detrimental effects are anticipated in the stream channel characteristics.

The streambed and rearing habitat quality in the upper reaches of Fitzsimmons and Chepat Creeks were sampled and documented. A significant relationship exists between fry survival and the percentage of sediment less than 6.35 mm in diameter for bull and cutthroat trout. The sampling indicates that the percentage of sediment smaller than 6.35 mm was 31.2% and 24.8% respectively. By comparison, nine "undisturbed" watersheds in the Flathead basin had an average value for sediment smaller than 6.35mm of 31.7%. Based on sampling data completed to date, Fitzsimmons and Chepat Creeks are not threatened or impaired streams for either westslope cutthroat or bull trout. Stream status (threatened, impaired) is defined in the Flathead Basin Report (Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Program, Final Report, 1991).

Considering the observations in Fitzsimmons Creek, the upper portion of the Stillwater river provides bull trout rearing. The Stillwater River is a migration corridor from the Stillwater lakes to the spawning areas.

XII. AIR QUALITY

Air quality in the proposed sale area is generally very good. Temporary reductions in air quality result from slash burning and wildfires particularly when inversions or other stable weather systems prevail. This area is currently managed under the Montana Airshed Group who monitors weather conditions and manages open burning restrictions in the airshed to prevent or limit burning operations during poor dispersion and ventilation conditions.

Road dust is produced from vehicles driving on native surfaced roads. At current levels, the dust normally reduces road visibility temporarily and dusts roadside vegetation. Existing dust production contributes to normal summer and fall haze, but does not add significantly to ambient particulate levels.

CHAPTER IV - ENVIRONMENTAL EFFECTS

INTRODUCTION

The environmental effects of each alternative are described in this chapter. A description and comparison of alternatives is presented in Chapter II.

The analysis in this chapter is limited to the affected environment described in Chapter III and focuses on effects to resources that would result from proposed alternatives. The description of the No Action alternative provides a baseline for describing and comparing changes to the existing environment. Action alternatives should be compared to the No Action alternative to measure effects. Cumulative impacts are considered for old growth, grizzly bear, watershed and soils.

This chapter is organizated by resource. Environmental effects are described by alternative for each resource.

I. VEGETATION EFFECTS

Effects of action alternatives on vegetation would result from cutting trees, disturbance to associated plants during timber harvest, fire hazard reduction, site preparation, road work, and regeneration of harvest units. There would also be effects to vegetation under the no action alternative.

Wildfires, forest management and natural succession of plant communities have contributed to changes in vegetation. Cummulative effects from the proposed action and past activities involve changes in tree age and size class distribution of stands, species composition, and the amount of area in roads. The effects of these changes on other resoures are discussed in the applicable sections of this chapter.

A. EFFECTS OF NO ACTION

No stands, or portion of stands, would be harvested with this alternative. In the Upper Stillwater/Fitzsimmons area, stand density in lodgepole pine stands would be reduced as trees are killed by mountain pine beetles (MPB). Dead lodgepole pine trees would gradually fall down and create openings. Mountain pine beetle population levels are predicted to remain high for several more years and continue to kill lodgepole pine in these drainages.

Understory plant composition would not change significantly as long as wildfires are excluded. There may be growth response in openings created by dead and dying trees primarily due to decreased competition for light and moisture.

Western white pine will continue to be weakened and killed by white pine blister rust and MPB in Dog and Meadow Creek drainages. Western white pine will continue to lose its representation in stands throughout these drainages.

Overstory growth and vigor would continue to decline in mature and overmature stands. Natural regeneration of seral species would continue to be limited due to shading and lack of suitable seed beds unless there is a fire.

Shade tolerant trees in the understory would continue to establish and grow. Dense stands have slower growth rates (which is particularly true of shade tolerant species). Shade tolerant species are more susceptible to insects and diseases. Insect and disease losses would increase.

In stands with overstories above manageable understories, understory growth is suppressed due to competition for sunlight and moisture. As understory trees continue to grow, overstory removal would become more difficult and costly. Risk of damaging the understory by logging the overstory would also increase.

In the short term, the number and spatial distribution of seral and old growth stands in affected drainages would be unchanged provided wildfires are suppressed. In the longer term, this will have consequences in terms of fire ignition (increased) and control (more difficult and costly). Wildlife species associated with seral and old growth forest communities will also be affected.

No timber harvest is planned within the next ten years in the Upper Stillwater and Fitzsimmons areas. Two sales - the Ewing Face and the Dog Mountain sales - are planned in Dog creek drainage within 2 to 3 years.

B. EFFECTS OF ACTION ALTERNATIVES

Stands proposed for harvest have the following harvest methods prescribed: overstory removal, seed tree, clearcut, species selection, shelterwood and salvage. These methods are related to stand type descriptions in Chapter III and specific stand conditions identified in the field.

The following table displays the number of acres and associated treatments for Alternative 1.

VEGETATION EFFECTS OF ALTERNATIVE 1

Harvest Units	Harvest Method	Hazard Reduction	Site Preparation	Acres	Regeneration
1F,15F,16F	clearcut	whole tree, spot pile	mechanical	27.5	natural
3F,17F,18F	clearcut	whole tree	skidding	33	natural
4F,5F	clearcut	whole tree, jackpot burn	skidding	23.3	natural
9F(east half)	clearcut	dozer spot pile	mechanical	27.3	natural
7F,8F,10-14F, 20F,21F	clearcut	broadcast burn	burn	140.8	natural
6F,19F, 9F(west half)	species selection	whole tree	skidding	67	natural
1R	seed tree	whole tree, dozer pile	mechanical, jackpot burn	7.5	natural
2R,13R,16A,19A	seed tree	dozer pile	mechanical	37.4	natural
3R,4R,8R,11R, 12R,16R,19R, 19B,20R,22R,	overstory removal/ seed tree	spot pile	mechanical	119	plant/natural
5R,5A	seed tree	dozer pile	mechanical	16.9	plant/natural
6R,7R,23R	clearcut	dozer pile	mechanical	34.8	plant
6A	salvage	lop and scatter	N/A	24.7	N/A
10R,14R,18R	overstory removal	lop and scatter	N/A	40	existing
9R,15R	seed tree/ shelterwood	dozer pile	mechanical	18.1	natural
17R	shelterwood	dozer pile	mechanical	8.3	natural
21R	single tree selection	lop and scatter	N/A	1.5	N/A

In harvest areas where overstory removals are prescribed, most remaining overstory trees would be cut. These areas were previously harvested and currently have seedling to sapling-sized trees established in the understory. Felling and skidding is planned to minimize damage to young trees. Other plants would be damaged by falling trees; however, most damage to these plants would occur in skid trails. Removing overstory trees will improve growth of young trees. The few remaining overstory trees will provide seed to improve stocking in open areas of these stands.

Seedtree and clearcut systems would create openings. These methods are primarily designed to regenerate stands. Tree regeneration would be accomplished naturally by relying on seed trees, seed walls and/or seeds remaining on site. Artificial regeneration would be accomplished by planting or direct seeding.

Plant communities within openings created by logging would progress through typical successional stages of forest development which include:

grass/forb	1 to 5 years
tree seedling/shrub	5 to 10 years
seedling/sapling sized trees	10 to 30 years
pole sized/immature trees	30 to 80 years
sawlogs/maturing trees	over 80 years

In the species selection areas, stand density would be reduced. Remaining trees are immature and would respond by accelerating their growth rate. Existing understory vegetation would be stimulated. Responses are related to decreased competition for moisture, nutrients and sunlight.

Shelterwood systems would also reduce stand density. This system is primarily designed to provide for a seed source and seedling protection. Remaining trees are mature and large forest openings would not immediately be created. When regeneration is established, overstory trees could be removed.

In salvage areas, dead and dying western white pine would be removed. There are few western white pine trees on any one acre of the harvest areas and their removal would have little effect on remaining vegetation.

Timber Productivity: Proposed harvest units are located in stands or portions of stands which have relatively high silvicultural priorities. These are listed in detail in chapter II under the project development description, and briefly restated, are: 1) highly productive sites being poorly utilized by existing stands, 2) stands impacted by insect and disease, and 3) mature stands with declining growth rates.

Harvesting in the first group of stands (#1 above) would have the following effects: maintain seral tree species in the understory, provide for regeneration of seral species where stocking is inadequate, and reduce the amount of shade tolerant species. Adjustments to species mix and stocking would increase utilization of site productivity, since seral species normally produce forest products more rapidly than climax species.

Replacement of the second group of stands (#2 above) would reduce losses to insects and diseases. New, young lodgepole pine stands would generally be more resistant to attack from Mountain Pine Beetle than those harvested. Future stocking control may also improve resistance. Where root diseases occur, more resistant species would be established. Vigorous stands dominated by resistant species would limit proliferation of and growth loss to root disease.

Treatments proposed for the third group of stands (#3 above) have potential to realize site productivity similar to the second group; however, losses in this group are due to declining growth rates and vigor rather than insect mortality.

Fire hazard reduction: Fuel loads resulting from harvest and road building operations would be reduced to meet State standards. This would be accomplished by prescribed burning, burying (along roads) and machine piling.

Site preparation: Tree-seed beds would be prepared within two years after harvest in lodgepole pine stands. Seed trees and shelterwood stands would have site preparation timed with seed production years (four years maximum delay). Scarification would be accomplished by prescribed burning and machine operations.

Noxious weeds: Road construction and road improvement projects would cause soil disturbance and increase potential for noxious weeds to become established.

Noxious weeds could become established on disturbed sites. Prompt tree regeneration and maintenance of vigorous stands of timber would help preclude or minimize noxious weed establishment in harvest units. Roads and landings adjacent to roads would be grass seeded and fertilized.

C. EFFECTS OF PROPOSED ACTION ON OLD GROWTH

In the Russky-Stillwater-Fitzsimmons analysis area, the proposed sale would not affect any old-growth stands. The stands to be harvested are primarily small-sawtimber immature lodgepole pine stands. These stands have relatively little potential to develop into old growth over time. Other stands in the analysis area contain spruce and western larch, and have greater potential as eventual old-growth replacement stands. Therefore, it does not appear that the proposed harvest would have an impact on future old-growth potential in this analysis area.

In the Dog-Meadow analysis area, one 7-acre unit of the Ritsenberg-Fitzsimmons sale is in a stand currently identified as old growth. However the location of this harvest unit would also isolate a 22-acre island of old growth from a patch that is currently more than 50 acres. Therefore, the total old-growth reduction is 29 acres. Tentatively-identified units of the proposed Ewing Face timber sale that lie in the Dog-Meadow analysis area would harvest another 89 acres of old growth, and isolate an additional 46-acre island, for a reduction of 136 acres. Thus, the combined effect of the two sales would be a reduction of 165 acres of old growth. As the table below shows, this would leave 19.6 percent of the State ownership in old-growth. Old growth would be left on 14.9 percent of the overall analysis area.

POST HARVEST OLD GROWTH BELOW 5000 FT. ELEVATION

LAND OWNER	TOTAL ACRES	POST HARVEST OLD GROWTH ACRES	POST HARVEST OLD GROWTH PERCENT
Russky-Stillwater-Fitzsimmons analysis unit			
DSL	3,132	65	2.1
Plum Creek	-0-	-0-	-0-
Other Private	-0-	-0-	-0-
TOTAL	3,132	65	2.1
Dog-Meadow analysis unit			
DSL	9,461	1,854	19.6
Plum Creek	2,493	-0-	-0-
Other Private	523	-0-	-0-
TOTAL	12,477	1,854	14.9

The proposed Ritsenberg-Fitzsimmons sale would have little effect on the existing spatial arrangement of old growth. Three of the tentative Ewing Face units would remove 65 acres from an existing 250-acre block in the Dog-Meadow analysis area. The remainder of the block would contain several narrow stringers. However, this block is in the northern portion of the analysis area, in close proximity to a 700-acre block that would be unaffected.

Distance between old-growth patches would not be affected by the two timber sales. Proposed units of both sales, including units not located in old-growth stands, would be separated from each other by closed-canopy stands. This would maintain connecting corridors between areas of old-growth habitat.

Stand-level inventory information for the old-growth stands proposed to be harvested in the proposed Ritsenberg-Fitzsimmons and Ewing Face timber sales was checked. The cover type, habitat type and species composition information for these stands did not suggest the presence of unique or unusual vegetation types. Cover types represented are Douglas-fir, mixed conifer, western larch, Douglas-fir/western larch, and lodgepole pine. Habitat types are ABLA/CLUN, ABGR/CLUN and THPL/CLUN.

The way in which the proposed cutting is carried out can help maintain some old-growth values in the areas to be harvested. Leaving seed trees through another rotation on seed-tree units would maintain a large-tree component. The advisability of this depends in part on factors such as dwarf mistletoe in the seed trees and the risk of blowdown. Similarly, leaving large snags and cull trees where they are present would maintain some old-growth components, and would not reduce the harvest volumes. Leaving some large cull logs on the site, rather than pushing them all into slash piles, would help retain the down log component and also provide for long-term nutrient cycling.

Incorporating these provisions into the silvicultural prescriptions may be valuable for retaining habitat values associated with old growth. This may have as much importance as the actual retention of intact old-growth stands, especially where the old-growth stands are breaking up rapidly and are unlikely to persist much longer as old growth. These provisions would also have relatively little effect on long-term harvest volumes or on returns from timber harvest.

D. CUMULATIVE EFFECTS ON VEGETATION

No additional timber harvests are planned for the Upper Stillwater/Fitzsimmons area for at least the next ten years or until timber becomes more mature. In the Dog creek drainage, the Dog Mountain and Ewing Face timber sales are planned for 1993. Past management activities in these areas have removed vegetation by timber harvest and construction of roads. Cumulative effects from the proposed action combined with past activities are represented by changes in the age class distribution, road densities and forage/cover ratios. These changes are discussed in the wildlife section of this chapter.

II. INSECT AND DISEASE EFFECTS

A. EFFECTS OF NO ACTION

The bark beetle epidemic in Fitzsimmons Creek is expected to continue until the food supply and/or trees suitable for beetle reproduction are depleted or some other catastrophic condition such as severe cold weather or natural controls stop it. This may result in a 60 to 80% lodgepole pine timber volume loss in the Fitzsimmons Creek stands identified for harvest (Wolf, 1990). Mortality in the smaller sized trees outside proposed units is predicted to be lower since they are less desirable to beetles.

As beetle-killed trees lose needles, deteriorate and eventually fall down, a severe hazard for intense fire would be created due to high dead fuel loading. Lightning occurrence is frequent in this drainage, and the probability for a stand-replacing fire is relatively high. Dead trees would also create road maintenance problems by blocking roads and ditches as they fall. Wildlife use patterns would be altered because of the difficulty of travel where down dead trees are jumbled together. In terms of timber productivity, the existing stands would be reduced to partially stocked stands of surviving trees, and the openings created would be filled in by shade tolerant tree species or remain unstocked. This could result in under utilization of the site for timber growth because of wide and patchy tree spacing. If a fire occurred, new stands would grow from residual seed sources, but the existing volume and revenue would be lost.

In the Ritsenberg area, most of the high value white pine timber would be lost if it is not salvaged. Where diseases are active, a gradual, natural increase in the extent of the various diseases would result in timber volume and value losses and overall stand health would be reduced as the trees are weakened and die.

B. EFFECTS OF ACTION ALTERNATIVES

The proposal was initially designed to salvage the maximum amount of beetle-susceptible lodgepole pine volume available in the Fitzsimmons drainage. Timber volume loss would be confined to trees that are not as attractive to beetles because of their smaller size. Expected mortality in these smaller tree stands is predicted to be less than 25% of the trees. Where trees have been harvested, replacement stands would be started from residual seed in the units and adjacent seed sources. The potential fire hazard would be reduced by burning fuel buildups in the harvest areas under controlled conditions. The fire hazard would still be high in unharvested stands, but fuel continuity would be broken up in the valley bottom by the spaces created by cutting units.

In the Ritsenberg area, unit locations were designed to salvage the majority of white pine affected by blister rust and beetle attacks. In addition, trees in active disease centers would be harvested and replaced by more resistant species.

III. WILDLIFE EFFECTS

A. INTRODUCTION

Effects of action alternatives on wildlife could result from harvest method, harvest unit size, shape and distribution, follow-up treatment of harvested stands, roads and road construction. Effects considered in this analysis are changes to habitat components, travel corridors, use of open roads and closing roads. This analysis pertains to grizzly bear, big game (white-tailed deer, elk, black bear, mule deer and moose), bald eagles, gray wolf, and non-game species.

B. GRIZZLY BEAR ANALYSIS

The effects analysis that pertains to the grizzly bear involved the application of the DSL Interim Grizzly Bear Standards and Guidelines (Bear Guidelines) in consultation with the DSL Wildlife Biologist, Montana Department of Fish, Wildlife and Parks, U.S. Forest Service, Plum Creek Timber Company and U.S. Fish and Wildlife Service.

The first step of the analysis process was to clearly define the Bear Management Unit (BMU) boundary which is a subdivision of the Northern Continental Divide Ecosystem. The Stillwater BMU was then subdivided into 16 areas called Bear Management Areas (BMA's). These subdivisions were determined by integrating size recommendations in the Bear

Guidelines with watershed boundaries (which provide topographical definition) and coordination with the U.S. Forest Service districts that have contiguous lands.

Within each subdivision, cover and seasonal habitat components were determined by reviewing the stand level inventory data base. Season of use was determined based on forest habitat type, and the successional stage of development. Cover and seasonal habitat data from the inventory was further refined by ground truthing and knowledge provided by Stillwater unit foresters.

Another step involved the evaluation of Open Road Density. Open road density is defined as the miles of road open for public use per square mile within a BMA. The Bear Guidelines provide for a maximum open road density of one mile per square mile for a BMA to provide grizzly bear habitat security. All roads on the Stillwater Forest and ownerships contained within were mapped. Necessary closures were identified that would reduce road density to one mile per square mile.

Further information about the grizzly bear analysis and probable effects is detailed in appendix G. Appendix G and the following information together give a more complete picture of the probable effects to bears.

C. EFFECTS OF NO ACTION

1. Big game

Seral stands are a key habitat component used by big game animals for browsing and foraging areas. Under no action, no new seral stands would be created in the Ritsenberg area unless wildfires were allowed. As succession continues in existing stands, forage would gradually be reduced. In the Fitzsimmons area, forage would gradually increase in openings created as lodgepole pine trees die and fall over. Passage by game animals may become more difficult due to deadfall. Travel corridors and the relative amounts of hiding and thermal cover would not change appreciably. Overstories in riparian areas would remain relatively stable.

Existing road density would not change and loop roads would remain open. Motorized vehicle traffic would remain at current levels or increase.

2. Bald eagles

Habitat elements within the home range of the Upper Stillwater Lake nesting pair would not be affected by this alternative.

3. Gray Wolf

In terms of current habitat status, prey base distribution and numbers would not change. No den sites would be affected.

4. Grizzly bear

Seasonal habitat components by season of use would not be affected in the short term, however a gradual change would occur as a result of succession and other natural events.

The amount of cover within affected BMA's is well above the 40% level.

Existing road density in the Ritsenberg area would remain greater than recommended by the Bear Guidelines. Risks of grizzly bear mortality and bear/human conflict would remain at current levels.

Existing road density and risk levels in the Fitzsimmons area would not change.

5. Cavity dependent species

Cavity dependent species would continue to use available habitat components.

D. EFFECTS OF ALTERNATIVE 1

Department of Fish wildlife and Parks and DSL wildlife biologists' input along with a detailed review of all recommendations, standards and guidelines were applied during project development. Alternative 1 reflects this input and review. The analysis of effects to wildlife that would result from Alternative 1 follows.

1. Big game

The effects to big game that would result from this proposal were reviewed by a Dept. of Fish Wildlife and Parks (DFWP) biologist. The primary concerns in the Ritsenberg area were relative to white-tailed deer and involved a) roads, b) amount and size of harvest units c) travel corridors d) screening along open roads where even-aged harvest methods are prescribed and e) maintaining the integrity of riparian areas. In the Fitzsimmons area, use by big game species does occur in the general area of the harvest units, but only at relatively low densities.

a) Roads: Two loop roads would be closed with this proposal. The Ewing cross over road would be closed at the Ewing Face and McCabe road junctions. The Fitzsimmons/West Fork loop would be closed during Spring and Fall hunting seasons. Open road density in the Fitzsimmons area would decrease with the closure of the North Fork of Fitzsimmons road and a segment of the Fitzsimmons and West Fork roads. All new roads and roads re-opened for the sale would be closed. (Additional roads would be closed to meet Bear Guidelines - See section D4)

b) Harvest Units: Timber sale units in the ABGR and THPL habitat types with even-aged silvicultural systems would be converted into spring foraging areas. The conversion to spring range would still maintain an adequate cover/forage ratio. Harvest units were designed to meet distance to cover criteria outlined in white-tail summer range guidelines.

c) Travel Corridors: Harvest unit locations and spacing between them would maintain travel corridors in these areas.

d) Screening Along Open Roads: Harvest unit 2R would not have screening along the Stryker Face road. Fitzsimmons units 1F, 3F, 5F, 7F-9F, 12F, 15F-17F and 19F would not be screened along the Fitzsimmons and Stillwater River Roads due to harvesting of lodgepole pine that could be killed by bark beetles. Big game animals using the improved forage base in these open units would be more vulnerable to hunters until vegetation recovers. Screening would be provided for other harvest units along open roads.

e) Riparian Areas: Stream side management zones (SMZ's) and riparian areas in the sale area would be protected from activity and not affected by this action.

2. Bald eagle

Potential perch trees in the Ritsenberg area that are within 1/4 mile of identified eagle feeding areas have been marked for retention. Most harvest unit boundaries were designed or adjusted to exclude perching and feeding areas. No other habitat elements would be affected.

3. Gray wolf

The proposed changes to vegetation would increase big game forage production and may result in increased big game use. This would be beneficial to the maintenance of the wolf prey base. Overall prey base numbers and distribution would not substantially change. If any den sites are identified during the course of the sale, the area would be protected from logging activity.

4. Grizzly bear

With regard to the grizzly bear and all action alternatives, no activities would occur during the spring season of use and none of the proposed harvest units and road projects are within the elevational zone where denning occurs.

Harvest units within warm, moist habitat type groups (ABGR/CLUN, THPL/CLUN) that currently provide summer and fall range would be converted to spring range. The amounts of cover throughout the affected BMA's following logging would be well above the 40% minimum level (see Grizzly Bear Habitat Data table below).

Fitzsimmons harvest units F1, F3, F5, F7-F9, F12, F15-F17 and F19 would only have limited topographical screening of the cutting units from the road following logging.

Existing open road density in the Fitzsimmons area would decrease with the closure of the North Fork of Fitzsimmons road and seasonally with spring and fall closures of the Fitzsimmons and West Fork roads during bear hunting seasons. All new spur roads and re-opened roads would be closed in this area.

Sale activities in the Fitzsimmons area are planned and scheduled to reduce the potential for effects to bears. Activities would be limited to a two-year period. Secure BMA's would be available adjacent to active BMA's 2,3 and 4 throughout the period of the sale. Road construction activities in BMA's 5 and 9 are planned only along proposed open roads, while the remainder of the BMA would be secure for bears (≤1 mi/sq mi ORD).

Open road density would be reduced to one mile per square mile or less in BMA's 5, 6, 7, 8, 13 and 14 by the time the sale is completed. Open road density is already below one mile per square mile in BMA's 1-4, 9 and 11, and would remain so. BMA's used to provide security would have road closures installed prior to operations beginning in the adjacent active areas. Active BMA's would have road closures installed as sale activities progress and be reduced to one mile per square mile or less open road density as soon as operations are complete in the BMA.

The following tables show changes that would occur to habitat, cover and road density as a result of Alternative 1. Data in these tables should be compared to the existing habitat tables in Chapter III. The information in the tables also applies to Alternative 2 with the exceptions shown in the next section.

GRIZZLY BEAR HABITAT DATA

PROJECT AREAS	STILLWATER BEAR MGT UNIT			ACRES IN DSL OWNERSHIP EFFECTS OF ALTERNATIVE 1			
	BEAR MGT. ANALYSIS AREA	TOTAL ACRES	DSL ACRES	SPRING HABITAT	SUMMER HABITAT	FALL HABITAT	HIDING COVER
FITZSIMMONS	1	4,559	2,365	74	1,594	1,665	2,270
	2	6,619	3,958	23	1,314	1,692	3,808
	3	5,281	4,879	29	2,166	2,284	3,795
	4	5,368	4,372	193	1,033	1,310	3,538
	9	4,923	4,878	101	1,080	1,457	3,545
RITSENBERG	6	5,528	4,681	191	3,701	2,410	4,320
	7	5,762	5,762	153	4,095	2,636	5,056
	8	5,791	2,746	474	4,926	3,127	2,181
	13	6,874	6,874	67	2,830	2,374	6,449
	14	8,563	5,270	406	5,597	4,163	4,604
	16	11,066	3,060	596	9,471	7,342	2,234

POST HARVEST OPEN ROAD DENSITY

BEAR MANAGEMENT AREA	PROPOSED OPEN ROAD DENSITY FOLLOWING SALE (MILES/SQUARE MILE)
1	0.9
2	0.8
3	0.6
4	0.6
5	0.9
6	0.7
7	1.0
8	0.9
9	0.5
11	0.8
13	1.0
14	1.0
16	0.9

w/o closure of Fitz road

5. Cavity Nesting Species

In all action alternatives, snags and den trees showing evidence of use would be left standing within sale units and in adjacent timber stands. The limited area encompassed by the sale together with the above measures should result in negligible effect on these species.

E. EFFECTS OF ALTERNATIVE 2

The primary focus of Alternative 2 is to provide protection to bears from potential for bear/human conflict in sale units along the Stillwater River and Fitzsimmons roads. Fitzsimmons harvest units F1, F3, F5, F7-F9, F12, F15-F17 and F19 would provide only some topographical screening of the cutting units from the road if no protective measures were added. These units would have little vegetative screening cover following logging of beetle infested and high risk timber and completion of proposed road drainage improvements. Consultation with the DSL wildlife biologist provided information to develop Alternative 2 (See description in Chapter II).

The proposed year round road closure between the Stillwater/Fitzsimmons junction and Fitzsimmons/West Fork divide would allow only walk-in access along the most exposed units (Units 1F, 3F, 5F, 7F-9F) and reduce open road density to 0.4 mi/sq mi in BMA 3 and to zero in BMA 4. Artificial visual barriers constructed on unscreened units would reduce direct viewing into the sale units (without the deliberate intent of looking for something).

The proposed closure would block an important driving loop which has traditionally tied Stryker to Upper Whitefish lake. This closure may be difficult to maintain in the short term, and regular monitoring and maintenance would be necessary. When vegetative screening cover has recovered, the road could be reopened and still keep open road density below one mile per square mile.

IV. SOILS EFFECTS

A. EFFECTS OF NO ACTION

Failure of deteriorated drainage structures could result in significant erosion when water is rerouted or damming is produced, especially during spring runoff. Damage resulting from the 1974 flood indicates that soil movement could be severe. Under no action, soil effects from skid trails, landings, new roads, hazard reduction and site preparation would not occur.

B. EFFECTS OF ACTION ALTERNATIVES

Effects to soils could result from machine skidding and piling operations within proposed harvest units, prescribed fire used for hazard reduction and site preparation, road design, construction, and reconstruction. Effects to the soil resource considered in this analysis are soil productivity and soil loss. Soil productivity is affected by compaction, displacement and nutrient capital. Soil loss would result from erosion.

Alternatives were not developed specifically to limit anticipated effects to soils. Stipulations, specifications and contract requirements listed in Appendix B would limit the extent and severity of soil impacts for both action alternatives. These requirements are intended to reduce or prevent soil compaction, displacement and erosion and provide for maintenace of nutrient capital.

The area covered by skid trails would be limited to a maximum of fifteen percent within each harvest unit. Approved and designated skid trails would further reduce the area affected by machine operation. Use of skid trails would be monitored to prevent rutting or overuse, and operations shut down during possible damaging conditions. Designated or approved trails would be used where winter logging is not possible, required or practical.

During winter logging, one or more of the following practices would be used to further reduce or prevent potential compaction:

1. Machine operations would be limited to compacted snow depths sufficient to protect soils.
2. Skid trails would be plowed and allowed to freeze to a depth sufficient to support skidding machinery.

The effect of using frozen skid trails would be considerably less than from skidding over unprotected soils. Frost penetration followed by freeze thaw cycles would ameliorate compaction.

The top few inches of soil profiles are most fertile. Displacement of topsoil also exposes subsoil, which has higher bulk density and lower fertility. These factors have detrimental effects on tree seed germination, root growth and vigor.

Displacement of top soil would be limited by requiring use of approved equipment and methods for landing operations, machine piling and scarification. Timely contract administration of all machine operations would reduce the potential for top soil displacement. Machine track tearing and use of dozer blades for anything other than road work and installing erosion control features, such as water bars, would not be allowed.

Site productivity is related to the presence of organic matter on and within the soil. Logging, site preparation and hazard reduction activities would leave prescribed material size and tonnage amounts distributed on each harvest unit. In harvest units where prescribed burning is used, a minimum of one-half inch of duff would be retained over approximately sixty-five percent of a harvest unit area.

These forest soils are very porous and generally not susceptible to erosion. When the soils are compacted and/or channelized, infiltration is reduced, water volume and velocity increased, and erosion susceptibility increases.

On steep slopes (more than thirty-five percent) compacted and/or channelized soils are more susceptible to erosion. Cable logging would be required and skidding corridors would be monitored for erosion control needs.

Road design for construction and reconstruction operations incorporate BMP's and recommendations from DSL's hydrologist and soil scientist.

V. HISTORIC AND CULTURAL EFFECTS

See summary under Chapter III.

VI. ROADS EFFECTS

A. EFFECTS OF NO ACTION

Roads in the Fitzsimmons area are in poor condition. No action would perpetuate the problems and may result in complete loss of vehicle access as well as liability for safety hazards due to catastrophic events. Culverts and bridges are marginal, and it is expected

that crises would occur as structures fail from washouts or collapse. No heavy hauling is currently allowed for fire, log hauling or other access needs due to bridge load limits. This situation would continue and deteriorate further with increasing safety hazards, especially on bridges and narrow blind curves. The bridge problem would worsen with limited funding options for replacements in the future. Drainage and surfacing cannot be maintained with routine measures, and brush encroachment and surface deterioration would be expected to increase.

Road maintenance can still be accomplished in the Ritsenberg area, although some road drainage and location problems are present. Under no action, none of these problems would be solved. The risk of structural safety problems is much lower than in the Fitzsimmons area, except at the Dog creek bridge. Dropping or deferring this sale would forego an opportunity to improve significant road problem areas. Additional timber volume and planned future sales could still be used to provide for improvements in the Ritsenberg area.

B. EFFECTS OF ACTION ALTERNATIVES

One objective of the action alternatives is to provide long term access for all types of uses, repair or replace deteriorated structures, add new drainage features where needed, and improve the general safety of the road system.

Culverts - damaged, collapsed, rusted out and otherwise inoperative culverts would be replaced, and the sites improved using proper application of Best Management Practices. The ditches and culverts would be maintainable using ordinary grading and cleaning measures. This would result in reduced occurrence of washouts and their associated safety hazards, and provide reasonably reliable access.

Safety Hazards - the Stillwater/Fitzsimmons road between U.S.93 and the Edmonds bridge would be reconstructed to improve surfacing, widen dangerous blind curves and relocate the unsafe approach to the highway. On the remainder of the existing roads, brush and trees encroaching on the road prism would be cleared to improve sight distance on blind curves, and lost surfacing would be replaced. During construction, delays and temporary closures would be necessary to complete bridge and culvert installations. In the Fitzsimmons area, this may temporarily prevent access to Marston Lookout, Edmonds area leases, Fish lake and Bull Lake.

Access - The road system would be improved to provide permanent, maintainable access to the area, however, all roads would not be open for public use due to grizzly bear habitat needs.

Bridges - All bridges included in the proposal would be repaired or replaced to handle logging truck loads, or removed and the site protected. Detailed cost data is on file at the NWLO. The various proposals and their effects are shown in the following table:

BRIDGE EFFECTS

DESCRIPTION	NO ACTION (EXISTING)	ALL ACTION ALTERNATIVES
Edmonds Bridge	Bridge piers undercut, structurally unsound, load limit - 14 tons	new HS-20 highway load limit concrete bridge. (temporary shoring and use of existing bridge for construction)
Effects	Piers are in the channel. unsafe for hauling. danger of collapse if overloaded.	No piers in channel, safe design and load limits, improved approaches
Lower Fitzsimmons bridge	Unsound native log bridge, unknown load rating. Unsafe for any use, but still in use	new HS-20 concrete bridge in new upstream location. approaches designed to pass flood water
Effects	nearly washed out in 1974. May collapse under any load, safety hazard, sediment from north approach dumps directly into Fitzsimmons Creek	Much higher clearance, safe design and load limits, long- term use
Chepat Bridge	native log bridge, new in 1974. Rotten decking and some stringers.	Repair bridge for hauling. Replace bridge with portion of old Edmonds bridge set on new sill plates above the old deck height.
Effects	Unsafe for heavy hauling, short life span ≤5 years before major repairs needed. inadequate flood clearance.	Long term replacement. Improved flood clearance, highway load limit
Upper Fitzsimmons Bridge	Native log bridge, new in 1974 after washed out in flood. Rotten decking, toe of one crib is being undercut	Replace deck and riprap crib with large native rock
Effects	Unsafe for heavy hauling, life span ≤5 years before major repairs needed.	Repairs will extend life to ±10 years
Dog Creek Bridge	Native log bridge. stringers and decking rotted.	Remove stringers and decking and install barricades in approaches.
Effects	Unsafe for any use, continued deterioration	Removes loop road, no maintenance needed, access from Ewing road on North, McCabe road on south.

VII. VISUAL RESOURCE

A. EFFECTS OF NO ACTION

The view along the Highway 93 corridor would not change in the near future. Excluding blowdown and wildfire, plant succession would be the primary factor affecting change to stands in this area. Increasing amounts of Douglas-fir, spruce, and subalpine fir will develop in the understories. In the long term, these species will become major components of the overstory. During this replacement process, western larch density will be reduced.

In the Fitzsimmons and Upper Stillwater drainages openings would be created in stands as trees die and fall over. Effects to stands dominated by lodgepole pine will vary by the size and distribution of openings. The openings would gradually increase in size as mortality from mountain pine beetles continues. The inherent resistance of stands to wind and snow damage will diminish as tree density is reduced. The openings would contain "jackstraw" piles of dead trees with lodged and broken trees on as well. Shade tolerant species would be released or established. Where opening are created relatively quickly and are large enough, lodgepole pine may become established.

Middle and background areas would become more visible due to the new openings; however, foreground views would have the dead and dying jackstrawed appearance. Brush encroachment severely limits and in some places precludes viewing. This condition would continue and worsen.

B. EFFECTS OF ACTION ALTERNATIVES

Visual effects vary in duration and intensity primarily from prescribed silvicultural systems, roads, skid trails, and landings. Seedtree and clearcut regeneration systems have the largest potential to affect visuals by creating openings. The following factors influence what effect openings would have:

1. Size, shape and location of harvest units
2. Existing visual diversity (natural and manmade)
3. Degree of modification to features associated with harvest units (landings, skid trails and temporary roads)

Where not screened from the roads, evenaged systems harvest units would provide viewing to middle and background areas of valley vistas, open and timbered slopes, avalanche chutes, rock outcrops and moutain peaks. Unscreened units would also allow foreground views of logged areas and subsequent slash disposal and regeneration treatments. Visual screens would be left along open roads adjacent to many units, primarily for wildlife protection (see wildlife section for screening information). This screening would also limit viewing of foreground.

Harvest units along Highway 93 were located and sized so that they are not readily apparent in terms of a forest opening. The prescribed harvest methods would also tend to subdue their visual effects. Access roads will not be obvious from Highway 93 with the exception of the road into harvest unit 17R. The access to this harvest unit is via a segment of the old highway.

Alternatives were not developed to address specific visual effects. The primary difference between alternatives is that driving access would not be possible in the Fitzsimmons drainage under Alternative 2. Viewers behind closed roads would see the area when walking instead of driving. Barriers installed to screen Fitzsimmons units would be visible to viewers.

VIII. RECREATION AND OTHER USES

The primary effects of the proposal to recreation would occur as a result of road closures designed to implement Bear Guidelines. These closures would reduce the open road density to one mile per square mile within the Stillwater BMU. Many of the closures would be implemented through this proposal, and the rest are planned to be completed with future timber sales. The effects of closures to be implemented by this sale are discussed here.

The 1991 legislature passed legislation dealing with recreation access on state land. At a minimum, permits will be required for some of the uses currently allowed without charge. Permits for hunting and fishing use are required by the law, and other uses may be added by rule making. Changes may also occur in the allowed use of access roads by recreationists.

A. EFFECTS OF NO ACTION

If this proposal is not implemented, road closures would not be installed by the timber sale operator. In order to meet DSL Standards and Guidelines, some other strategy would have to be used to meet the road density guidelines. Other timber sales or other unidentified funding sources would be used to complete the closures. This would alter the scheduling of closures, but the closures would still be completed.

Recreation use would continue at the present level until closures are installed. At that time, use would be altered in the ways outlined under the action alternatives below.

B. EFFECTS OF ACTION ALTERNATIVES

1. Dogsled tour operator: Some of the Ritsenberg roads would be unavailable for dogsled tours when plowed for logging and hauling. Alternate routes could be used while the roads are plowed. New logging units would change the character of some areas along existing roads. Most proposed logging units would be screened from direct view of the main roads and only be partially visible. A viewer would be able to see further into selectively logged units along the dogsled routes, but the overall appearance would not be appreciably changed. While logging would change the local visual character of individual sale units, the overall visual impression of the area would be the same.

2. Open Roads: Of the 194 miles of currently open roads, 91 miles would be closed. this leaves a total of 107 miles open throughout the affected BMA's. The proposed open road system is shown on the map in Appendix F. In order to meet the Bear Guidelines for 1 mi/sq mi open road, most of the spur class roads would need to be closed. A closure strategy was developed to allow main road systems to stay open, permitting access to most areas of the forest. Primary results of this closure plan are shown on the open road map and outlined in the following tables.

POPULAR USE ROUTES THAT WOULD REMAIN OPEN

Swift Creek Drainage

Upper Whitefish Lake Road
Lower Whitefish Lake Road
Red Meadow Lake
Link Lake trail head
Lower end of Stryker Ridge (Stryker Ridge Road)
West Fork Swift Creek to Fitzsimmons Divide
Werner Peak Road
Taylor Creek Road (Big Mtn.)
Smith Lake

Stillwater River Drainage

Fish Lake access
Bull Lake access (via Fish Lake)
Marston Lookout road
Fitzsimmons Creek (see Alternatives below)
Ewing road to the Stryker Peak trail head
Russky Creek to Shorty Creek Divide
McCabe Road
Stryker Face Road
Roads within 1/2 mile west of U.S.93

Lazy Creek Area

Kinshella Road
Lazy Creek Road
Lupfer Meadow Road (Powerline access)

NOTABLE ROUTES THAT WOULD BE CLOSED

Stryker Ridge Road (from Sec 22, T33N, R23W to the north)
Logging roads in the Antice Creek basin
Jeep trails in the Lazy Creek area
* Fitzsimmons Creek Road (See Alternatives below)
Most dead end secondary and spur roads

The main effect of the road closures would be to those who do not stay on main roads. Road hunting would be limited, although many Stillwater Forest roads are bounded by brush and do not offer good road hunting opportunity. Other side road pursuits such as berry picking, gopher hunting, pleasure driving, and firewood gathering would also be limited. Closures would tend to concentrate activities on the open roads or force users to move to less restricted areas off the state forest. Opportunities for walking or bicycling on closed roads would be improved, since the mileage of these roads would increase. Winter use would not be affected, since snow depths on the state forest normally allow snowmobilers and skiers to go over or around most closures, and bears are not active in winter months.

The state land access law affects which roads can be used by recreationists. Until rules are made and further analysis occurs, these effect can not be evaluated. Proposed road closures for this project are designed to implement Bear Guidelines, and unless the guidelines are changed, any recreation access proposals would be within the context of 1 mi/sq mi open road density during bear activity periods.

inconsistent

C. EFFECTS OF ALTERNATIVE 1

* This alternative would seasonally close the main road in Fitzsimmons Creek during spring bear season (4.4 miles). This would close a major loop road on the forest and prevent spring road damage as well as road access to clearcut units along the road during a sensitive period for bear risk to mortality.

D. EFFECTS OF ALTERNATIVE 2

This alternative would close the Fitzsimmons road year round (except in winter) to protect grizzlies from risk to mortality along the road. The road could be reopened as soon as vegetative visual barriers into sale units are reestablished. This could occur in 5-10 years depending on regeneration success. Non-motorized access would be necessary from the Stillwater - Fitzismmons junction in Section 5, T34N, R24W to the Fitzsimmons - West Fork divide in Section 2, T34N, R24W. This closure would effectively prevent vehicle access to traditional hunting campsites along Fitzsimmons Creek.

IX. WATERSHED EFFECTS

The primary effects of this proposal to watersheds and resultant water quality would occur from the proposed road and bridge work. Additional effects would result from actions associated with logging of harvest units if stipulations and specifications were not incorporated. The Roads section of this chapter details the proposed road and bridge work. Vegetation and Soils sections in this chapter detail the effects from harvesting.

A. EFFECTS OF NO ACTION

In the short term, water yield would remain relatively stable. In the long term, water yield would decrease as hydrologic recovery proceeds in existing logging units and regenerated fire areas.

Seasonal runnoff and storm events currently produce and deliver sediment to Fitzsimmons creek and Upper Stillwater River. The existing drainage has deteriorated to the point that it is inadequate to handle normal spring runoff or average thunderstorms. Given the current situation regarding roads, bridges and culverts, the current level of sediment production and delivery would at least continue and may increase. The potential for catastrophic washouts is already present. It is impossible to predict when a washout may occur, however, the circumstances that would lead to washouts can be identified. Flood events from delayed runoff or extreme thunderstorms would result in washouts due to inadequate and nonfunctional drainage features and structures. Since there is no scheduled culvert cleaning or spring maintenance, culvert plugging is common and water often runs down or across the road until discovered or reported.

In the Ritsenberg area, current levels of sediment delivery from roads would continue.

B. EFFECTS OF ACTION ALTERNATIVES

Removing vegetation would increase water yield. An evaluation of water yield increase was done by calculating Equivalent Clearcut Acres for the watersheds involved. The results of these calculation were compared with field observations of current stream channel condition. This combined approach correlates field review and modelled predictions. The watershed data are shown in the following table.

WATERSHED ECA EFFECTS			
Watershed	Available ECA	No Action ECA	Project Proposal ECA
Upper Stillwater	1998	0	33
Middle Stillwater	2291	0	56
Fitzsimmons	1727	0	198
Dog Creek	2818	0	220
Meadow Creek	546	0	33

The available ECA represents threshold values beyond which effects to stream channels can be expected. Given the relatively minor amounts of project proposal ECA compared to the available ECA values and a field review of channel condition, no water yield increase effects are expected.

Sediment production would increase temporarily from proposed road construction. Stipulations and specifications incorporated into the proposals would limit sediment production and delivery potential to a minimum. Overall sediment production and delivery would be reduced below current levels once the installation of drainage features and bridges are complete. As vegetation becomes established on and along side of roads, it will tend to stabilize soils and further reduce sediment production and delivery.

The domestic water source for Stryker is located approximately 3 miles downstream from the last source of construction sediment delivery near the river (Edmonds bridge work site). Work at this site and all upstream sites would be conducted during low water, and sediment production limited through control measures. The river may experience some minor increases in turbidity when sediment fences are removed or cleaned, or from an accidental discharge of dirt into the river (e.g. dirt chunks spilled from equipment crossing the bridge). Turbidity increases would be limited due to the distance to the intake, the small amount of sediment delivered to the stream, and short term nature of the increase. The effects would be far less than the normal spring runoff increases in turbidity.

Leaking equipment could discharge small amounts of petroleum products in or near streams. To minimize risk to the domestic water source, equipment would be inspected for leaks and repaired prior to operation upstream from Stryker.

X. FISHERIES

A. EFFECTS OF NO ACTION

Under current conditions, the potential for road, culvert and bridge failure would continue to increase. If a major road, or series of drainage or bridge failures occurred, habitat conditions could deteriorate. Sediment produced from these types of failures may influence the relative fish species compositon. Eastern brook and rainbow trout are less sensitive to sediment than bull and cutthroat trout. Eastern brook and rainbow trout may gain a competitive advantage which could increase the probability of interbreeding. This would lead to compromising the genetic constitution of bull and cutthroat trout and shift the relative population levels to one dominated by eastern brook and rainbow trout.

If road, culvert and bridge failures do not occur, the current fisheries environment would remain relatively stable.

B. EFFECTS OF ACTION ALTERNATIVES

All proposed road improvements and new road construction will include BMP's, site specific design features and operational installation methods intended to reduce detrimental effects to water quality and fisheries. Road improvements would substantially improve existing road drainage conditions. This would at least maintain the present conditions and may improve future conditions in terms of water quality and sediment production that affects the fisheries environment. These improvements may also prevent potential detrimental effects from existing drainage conditions and deteriorating culverts and bridges. Permit and contract specifications would limit as much as possible the effects to water quality and the potential for sediment production that may affect the fisheries environment.

Provisions for fish passage would be included in drainage features where known and suspected fisheries occur.

Implementing the modified and grizzly bear alternatives would address the recommendation by the Department of Fish, Wildlife and Parks fisheries biologist to improve the current conditions of the existing road system.

XI. AIR QUALITY

Air quality could be affected by dust produced from logging and hauling operations. Smoke from prescribed burning of sale units and slash piles would reduce air quality temporarily as long as burning continues.

Dust from skidding and landings would be localized and short term. Road dust from hauling could reduce visibility and remove fine material from road surfaces. Road dust abatement would be required to limit dust in residential areas near Fish Lake and Stryker.

Smoke from burning is increased by incorporating dirt in piles and by burning when fuels are wet or green. Proper equipment (brush blade, excavator or log loader) would be required to prevent construction of dirty piles. Fuel moisture would be monitored for proper broadcast burning conditions, and piles would be burned after a curing period. Unstable weather systems with transporting and mixing winds tend to disperse smoke and keep particulate at low levels. The Montana Airshed Group monitors industrial and government burning operations to limit the number of operations at any one time and prohibits burning during unfavorable weather conditions. All burning would be done in cooperation with the airshed group.

INDIVIDUALS CONSULTED IN PREPARATION OF THIS EA

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REFERENCES

Pfister, Robert D., et.al., Forest Habitat Types of Montana, U.S.D.A. Forest Service General Technical Report, INT-34, May 1977

Flathead Basin Commission, Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Program, Final Report June 1991

Remington, Dave, Old-Growth Cummulative-Effects Analysis For Ritsenberg-Fitzsimmons Timber Sale, March 1991

Water Yield Analysis, Forest Hydrology, Hydrologic Effects of Vegetative Manipulation, Part 2, U.S.F.S., 1974.

Wolf, Allen, A Silvicultural Prescription For Fitzsimmons Creek Unit #6 Stillwater State Forest Section 3, T34N, R24W September 1990

Montana Bald Eagle Management Guidelines, Montana Bald Eagle Working Group, June, 1989.

Forest Management Standards and Guidelines, Montana Department of State Lands.

LIST OF COMMON AND SCIENTIFIC NAMES

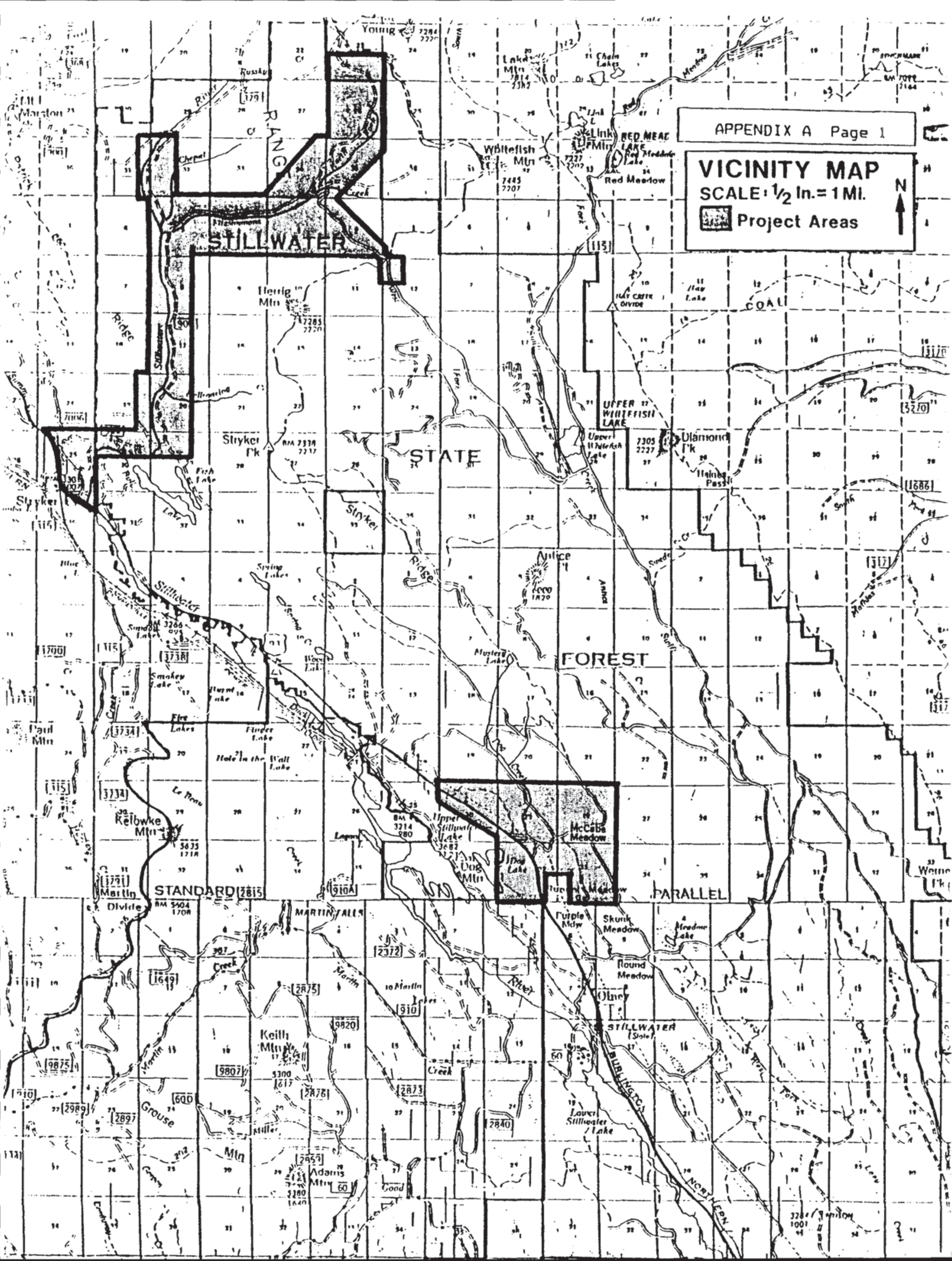
DISEASES

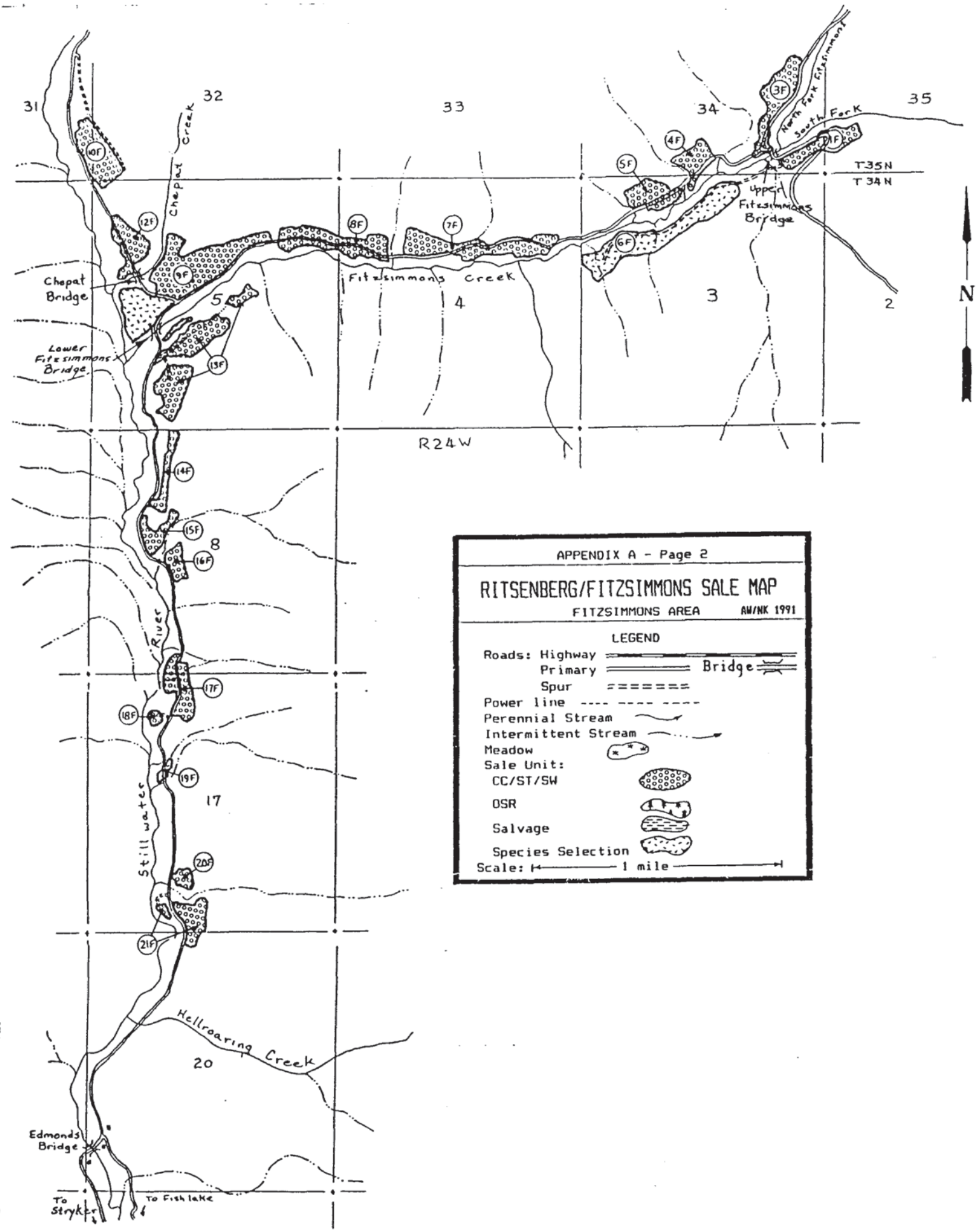
White pine blister rust	Cronartium ribicola
Indian paint fungus	Echinodontium tinctorium
Brown cubical butt rot	Phaeolus schweinitzii
Cedar brown pocket rot	Poria sericeomollis
Shoestring root rot	Armillaria sp.
Lodgepole Pine Needle Cast	Lophodermella concolor
Red ring rot	Phellinus pini

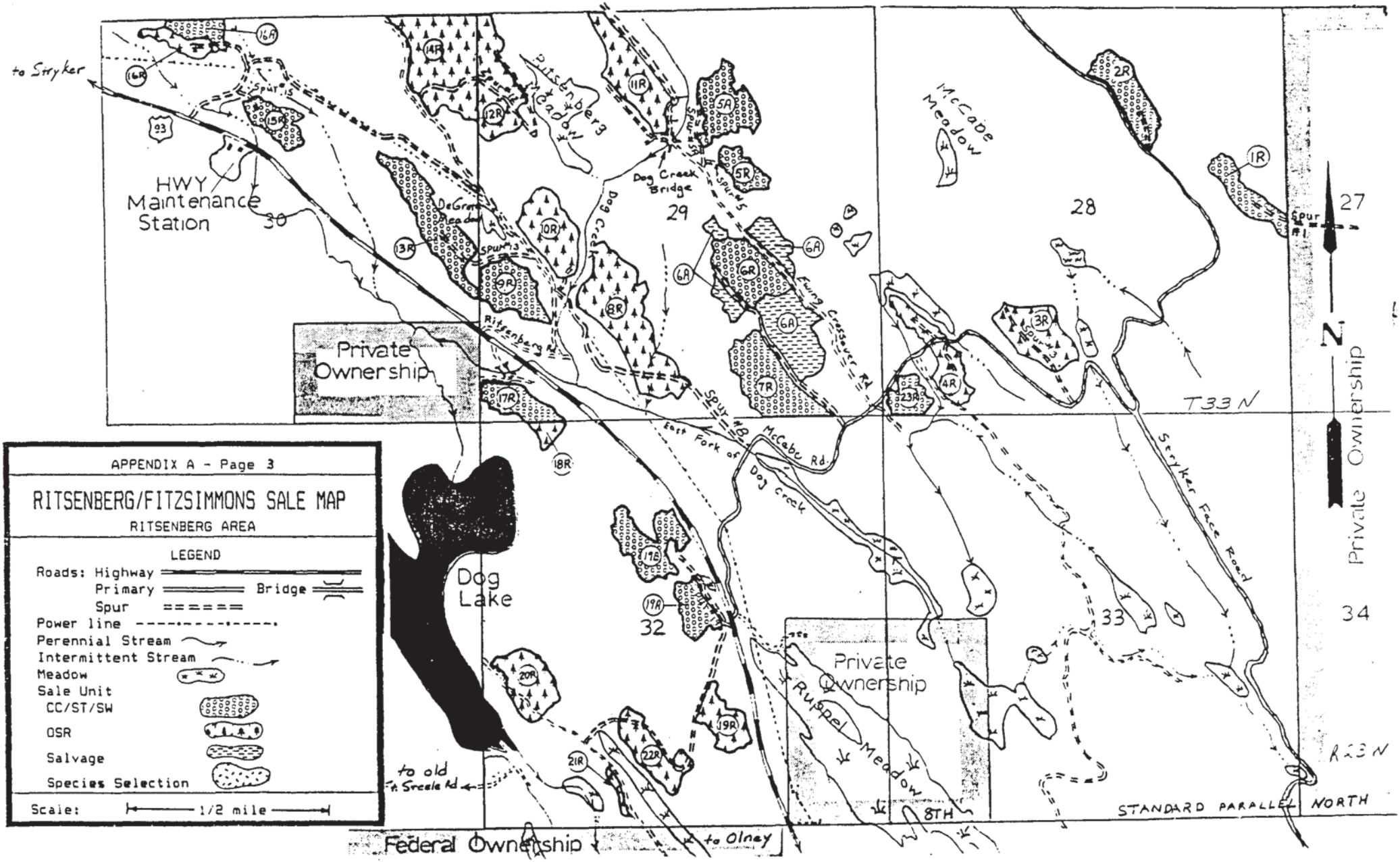
HABITAT TYPES

Scientific Names	Abbreviation
Abies grandis/clintonia uniflora/xerophylum tenax	ABGR/CLUN/XETE
Thuja plicata/clintonia uniflora/clintonia uniflora	THPL/CLUN/CLUN
Thuja plicata/clintonia uniflora/aralia nudicaulis	THPL/CLUN/ARNU
Abies lasiocarpa/clintonia uniflora/aralia nudicaulis	ABLA/CLUN/ARNU
Abies lasiocarpa/clintonia uniflora/clintonia uniflora	ABLA/CLUN/CLUN
Abies lasiocarpa/clintonia uniflora/menziesia ferruginea	ABLA/CLUN/MEFE
Abies lasiocarpa/clintonia uniflora/vaccinium caespitosum	ABLA/CLUN/VACA
Abies lasiocarpa/clintonia uniflora/xerophllum tenax	ABLA/CLUN/XETE
Abies lasiocarpa/linnaea borealis	ABLA/LIBO
Abies lasiocarpa/menziesia ferruginea	ABLA/MEFE
Abies lasiocarpa/oplopanax horridum	ABLA/OPHO

APPENDIX


VICINITY MAP
SCALE: 1/2 In.= 1 Mi.
N
Project Areas
STILLWATER
STATE
FOREST
STANDARD
PARALLEL
Young
Chain Lakes
Whitefish Mtn
Red Meadow
Herrig Mtn
Stryker Pk
Stryker
Stryker Ridge
Upper Whitefish Lake
Diamond Pk
Haines Pass
Antice Pk
Spring Lakes
Mystery Lake
Smokey Lake
Fire Lakes
Finger Lake
Hole in the Wall Lake
Paul Mtn
Kelowke Mtn
Martin Divide
McCabe Meadow
Upper Stillwater Lake
Dog Mtn
Dog Lake
Logan Cr
MARTIN FALLS
Purple Mdw
Skunk Meadow
Meadow Lake
Round Meadow
Olney
STILLWATER
Keith Mtn
Adams Mtn
Grouse Mtn
Lower Stillwater Lake
BURLINGTON NORTHERN
COAL
Marston


31
32
33
34
35
Chepat Creek
North Fork Fitzsimmons
South Fork
T 35 N
T 34 N
Upper Fitzsimmons Bridge
Chepat Bridge
Fitzsimmons Creek
Lower Fitzsimmons Bridge
R24W
River
Still water
Hellroaring Creek
Edmonds Bridge
To Stryker
To Fish lake
N
APPENDIX A - Page 2
RITSENBERG/FITZSIMMONS SALE MAP
FITZSIMMONS AREA
AW/NK 1991
LEGEND
Roads: Highway
Primary
Spur
Bridge
Power line
Perennial Stream
Intermittent Stream
Meadow
Sale Unit:
CC/ST/SW
OSR
Salvage
Species Selection
Scale: 1 mile


APPENDIX A - Page 3
RITSENBERG/FITZSIMMONS SALE MAP
RITSENBERG AREA
LEGEND
Roads: Highway
Primary
Bridge
Spur
Power line
Perennial Stream
Intermittent Stream
Meadow
Sale Unit
CC/ST/SW
OSR
Salvage
Species Selection
Scale: 1/2 mile
to Stryker
HWY Maintenance Station
Private Ownership
Dog Lake
Ritsenberg Meadow
McCabe Meadow
Dog Creek Bridge
Dog Creek Rd
Ritsenberg Spur
Spur #8
East Fork of Dog Creek
McCabe Rd.
Stryker Face Road
Ruppel Meadow
Private Ownership
to old Steele Rd
Federal Ownership
to Olney
8TH STANDARD PARALLEL NORTH
T33N
R23N
Private Ownership
27
28
29
30
32
33
34
N

STIPULATIONS AND SPECIFICATIONS FOR THE RITSENBERG FITZSIMMONS TIMBER SALE

Stipulations and specifications for action alternatives were designed to prevent or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification. This section is organized by resource. The stipulations and specifications that apply to each resource are listed.

Stipulations and specifications that apply to operations required by and occurring during the contract period would be contained with the timber sale contract. As such, they are binding and enforceable. Stipulations and specifications relating to activities such as hazard reduction, site preparation and planting that may occur during or after the contract period would be enforced by project administrators.

WILDLIFE

Grizzly bear

1. Identify habitat components by season of use (see Biological Review, Appendix G). This was done to evaluate current habitat, and develop a project proposal that would meet the Bear Guidelines regarding changes to habitat.

2. Conduct a grizzly bear cumulative effects analysis (see Biological Review, Appendix G) to identify and coordinate various activities on other ownerships and schedule security areas.

3. To meet the one mile per square mile open road density criteria, a road closure design was developed. Roads to be closed were identified for each affected Bear Management Area (BMA). BMA's used for security areas (1, 2, 5, 7, 9, 11, 13) would be closed prior to operations in adjacent BMA's. Road closures in active BMA's (3, 4, 7, 8) would be installed by the time harvesting and hauling are completed.

Items 4-6 are intended to reduce the risk of mortality to bears and reduce potential for bear/human conflict.

4. Grass seeding and fertilizing would be done along new, reconstructed and disturbed road segments, and landings immediately adjacent to open roads. Less palatable grass species would be used to discourage grizzly bear feeding in these areas.

5. No logging camps would be allowed in the sale area.

6. Garbage hauling would be required daily.

7. No activities would be allowed during the spring season (March 15 through June 30). Spring range is the most limited habitat component.

The intent is to prevent additional activities that may displace grizzly bears from this resource.

8. The Forest Officer would immediately suspend any or all activities directly related to the proposed action if necessary to prevent imminent confrontation or conflict between grizzly bears and humans.

9. Hazard reduction and site preparation operations would be designed to reduce forage production in harvest units within the half mile corridor immediately east of Highway 93 and for harvest units along roads that would remain open. This would be done to reduce the potential risk of grizzly bear mortality and human/grizzly bear conflict. Hazard reduction and site preparation in all other harvest areas would be conducted to maintain or improve forage.

10. Harvest unit design incorporates cover guidelines listed in the grizzly bear standards and guidelines.

11. The Ewing cross-over and North fork of Fitzsimmons roads would be closed. This would eliminate loop roads connecting McCabe and Ewing roads and connecting Fitzsimmons and Russky Creek roads. This was necessary to meet the 1 mile per square mile open-road density requirement in BMA 7 and 8 (This was also identified as a need for big game in the Ritsenberg area).

12. Road design is consistent with Bear Guidelines.

Big Game

1. Where even-aged harvest methods are prescribed, strips of screening cover would be retained along open roads.

2. Where proposed harvest units have the potential to affect riparian ares, the integrity of the riparian areas for wildlife values would be maintained. Most unit boundaries exclude riparian areas.

3. Travel corridors were specifically designed adjacent to units 9, 13 and 15 in the Ritsenberg area to maintain these areas as movement corridors.

4. Units 6R and 19R as originally proposed would not meet distance to cover needs identified during the biologist review. These units were altered to incorporate these cover needs.

5. All new and reopened roads would be closed when the use associated with contractual operations are complete.

Gray Wolf

1. A contract clause would provide for protection of any wolf den site that may be identified during implementation of this proposed action.

2. Stipulations and specifications used for game animals will maintain the wolves' prey base.

Eagles

1. Potential perch trees that are within one-quarter mile of potential feeding areas would be retained. Where proximity of harvest units may increase blowdown potential of perch trees, adjustments to unit boundaries were made.

Cavity dependent species

1. Trees with cavities excavated by birds have been retained. Additional trees that have characteristics that would make them suitable in the near term as replacement trees would also be retained.

SOILS

1. Logging equipment will not operate off forest roads unless soil moisture is less than 20 percent, frozen to a depth that will support machine operations or snow covered to a depth that will prevent compaction, rutting or displacement.

2. Ground based skidding equipment will not be operated on steep slopes (greater than 45 percent). The intent is to prevent erosion and displacement of top soil.

3. Skidding machinery will not be equipped with grapples on slopes greater than 35 percent. This type of equipment combination would displace topsoil, require greater ground disturbance, compact a greater percentage of harvest unit area and increase the potential for erosion.

4. Designated skid trails would be required where moist soils or short steep pitches (less than 300 feet) would not be accessed by other logging systems. This would reduce the number of skid trails and erosion potential.

5. Where designated skidding trails are required, timber on the trails will be felled and skidded before the remaining timber in a harvest unit is felled. This would define felling patterns, facilitate skidding on designated trails and reduce the harvest unit area impacted by skidding equipment.

6. Tree length skidding is required on slopes greater than 35 percent where ground based systems are permitted. This would reduce the number of trails and trips required by skidding equipment and leave trails in better shape to be rehabilitated or installing erosion control features. Line skidding is required on most slopes over 35% and all slopes over 40%.

7. Water bars, logging slash barriers and in some cases temporary culverts will be installed on all skid trails where erosion is anticipated.

8. Existing skid trails and landings will be used where their design meets current BMP guidelines.

9. Dozer hazard reduction will be restricted to slopes less than 35 percent. Dozers operating on steeper ground will displace more topsoil and increase erosion potential.

10. Ten to fifteen tons per acre of woody material greater than three inches in diameter would be left distributed over each harvest area. This material will provide for long term soil fertility.

11. Mechanical site preparation would have the same restrictions as hazard reduction. In addition, mineral soil exposure would be less than 40 percent. This will maintain soil fertility and reduce erosion potential.

12. Logging slash and other nonmerchantable material will be piled in existing landings or skid trails when available. This would limit the amount of new compaction by reusing previously impacted areas.

13. Broadcast and jackpot burning would be required on slopes greater than 35 percent.

14. Roads used by the purchaser will be reshaped and the ditches redefined following use. This will reduce surface erosion.

15. Drain dips and gravel will be installed on roads as needed to improve road drainage, reduce maintenance needs and reduce erosion.

16. Some road sections will be reconstructed. This will be done to upgrade the roads to design standards that reduce erosion potential and maintenance needs.

17. Some road segments will be closed with permanent erosion control measures installed. These segments are either not suitable for reconstruction because of location or not needed for future access. Maintenance and erosion would be a continuing problem if the roads remained open.

18. Certified weed free grass seed and fertilizer would be applied to all newly constructed road surfaces, cut and fill slopes. These amendments would also be applied to any existing disturbed cut and fill slopes and landings immediately adjacent to open roads. This would be done to stabilize soils and reduce or prevent noxious weed establishment.

VISUALS

1. Locations and harvest methods for harvest units 9R, 13R, 15R, 17R, 19A and 19B were designed to reduce changes to existing visual quality.

RECREATION

1. In order to implement Bear Guidelines, open road density would be reduced to one mile per square mile or less. The proposed access design would allow vehicle access to the major drainages in the forest.

HYDROLOGY

1. Winter logging is required in harvest units where moist soils are prevalent. Designated skid trails would be required where winter logging is not feasible.

2. Streamside Management Zones have been delineated where they occur within harvest units (most SMZ's were excluded from units). This was done to protect the areas adjacent to streams to maintain water quality and water resources.

3. Equipment is not permitted to operate within streamside management zones. Winch-line skidding will be used to remove trees to prevent ground disturbance. Directional felling is required to prevent debris from entering stream channels, protect hardwood vegetation and facilitate tree removal.

4. A segment of the Ewing cross-over road located within the Dog Creek streamside management zone would be eliminated. Removing the road and stabilizing the roadbed will reduce the potential for bank failure and sediment delivery to Dog Creek.

5. Culverts that are less than 18 inches in diameter would be replaced, and additional relief culverts added. This would reduce water volume and velocity in ditches and on road surfaces, decreasing erosion and sediment delivery to channels. Increasing minimum culvert size would reduce maintenance needs.

6. Cable logging systems will be used to skid logs on steep slopes. This will minimize ground disturbance and prevent sediment from reaching streams.

7. Whole tree skidding would be required in areas where seasonally high water tables are present. This would reduce sediment production that could result from hazard reduction operations by eliminating the need for subsequent machine piling.

8. Harvest unit 13F was divided into three separate areas. Wet areas within the original unit were eliminated and the remaining blocks connected with designated skid trails. In this way, the crossing sites can be controlled and proper drainage installed to prevent sediment production and erosion.

9. Harvest unit 15F would have skidding equipment restricted to ridges. This unit is on an alluvial fan which is dissected by several dry swales.

These swales are remnants of ancient channels which could become active if natural events or skidding operations altered the existing drainage pattern.

10. Slash filter windrows will be installed in spur road 6 in the Fitzsimmons area to prevent sediment delivery to a spring below the road.

11. Culvert sizing for all road projects will be as recommended by DSL hydrologist.

12. Stream crossings where culvert installations are planned will have the following requirements:

A. Slash filter windrows will be constructed on the approach fills.

B. Filter fabric fences will be in place down stream prior to and during culvert installation.

C. Erosion control fences will be installed on fill slopes at crossing sites and remain in place until slopes stabilize and revegetate.

D. Diversion channels will be constructed and lined with plastic to divert stream flow prior to any in-channel operations.

E. Stream crossing with any machine is prohibited except for the machine used to construct the crossing. The machine used for crossing construction will be limited to no more than 2 crossings.

F. Water quality monitoring will continue in the Upper Stillwater and Fitzsimmons drainages to assess and track water quality and resource values associated with water quality. In addition, the monitoring will provide data for water quality studies being conducted in the Flathead basin.

13. Brush would be removed from existing road prisms to allow effective road maintenance. Improved road maintenance would reduce sediment delivery.

14. Road segments with silty surfaces would be graveled to reduce sediment sources.

15. Residents of Stryker would be notified when operations begin on bridge construction and culvert installation in the Fitzsimmons area. In the event stream turbidity is accidentally increased by construction activity, residents would be immediately informed.

16. The contractor would be responsible for immediate cleanup of any spills (fuel, oil, dirt, etc.) which could affect water quality.

17. Leaking equipment would not be permitted to operate in stream crossing construction sites.

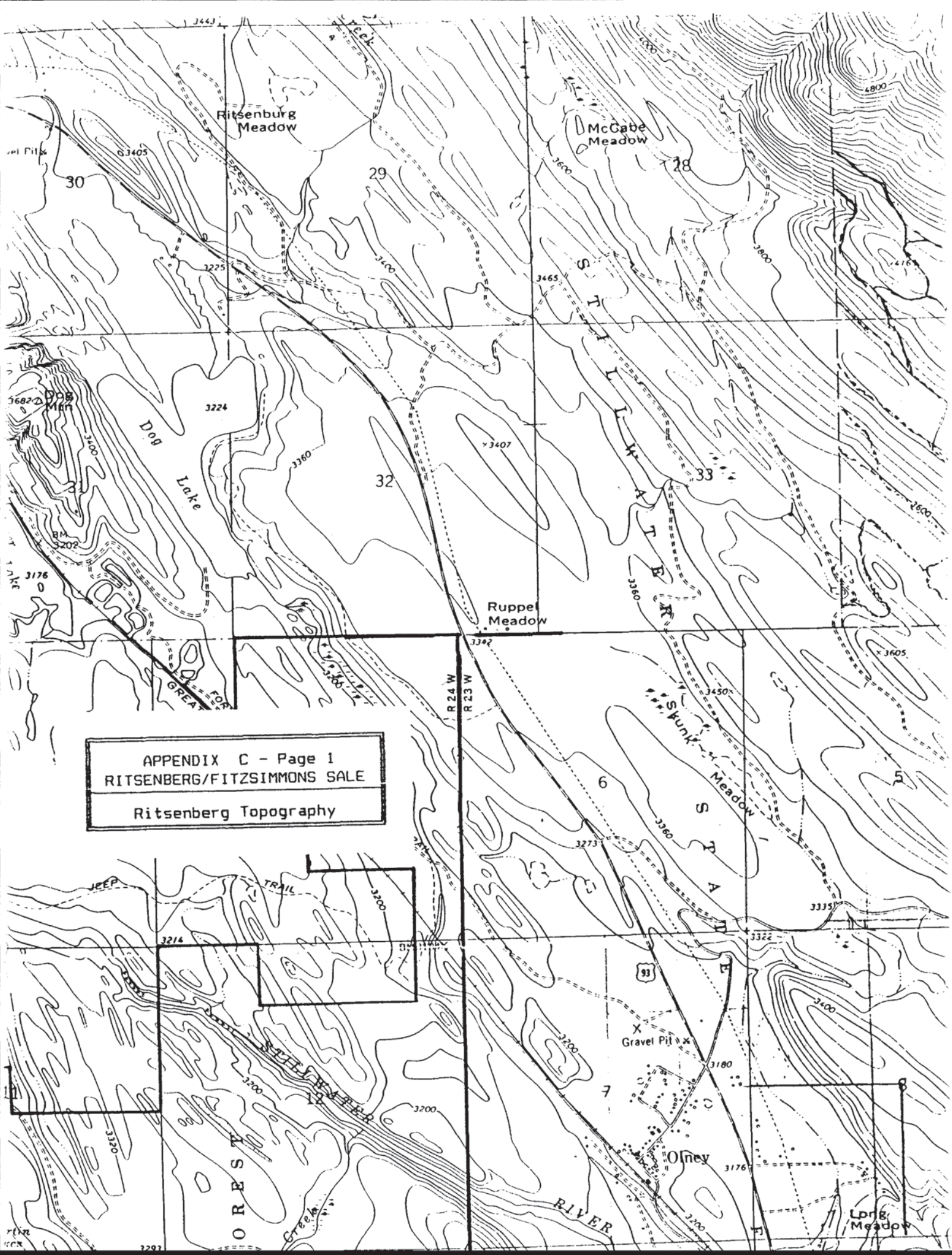
FISHERIES

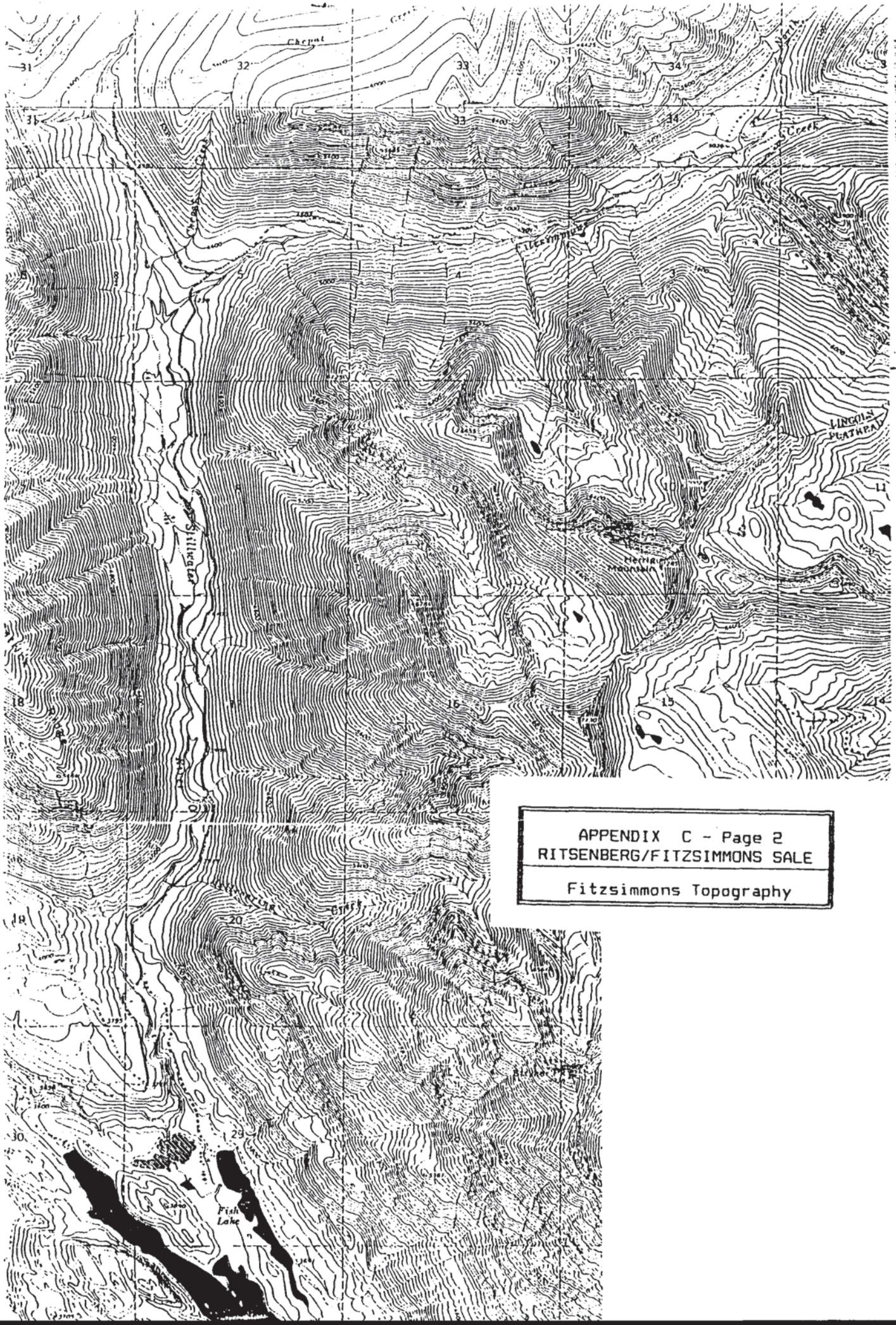
1. In part, road and bridge construction and culvert replacement and new installation would be done to reduce sediment delivery to Stillwater River and its tributaries. This would at least maintain and probably improve the fisheries environment. Provisions for fish passage would be included for creek crossings where known or suspected fisheries occur.

AIR QUALITY

1. All prescribed burning would be done in cooperation with the Montana Airshed Group. This would provide for burning during acceptable ventilation and dispersion conditions.

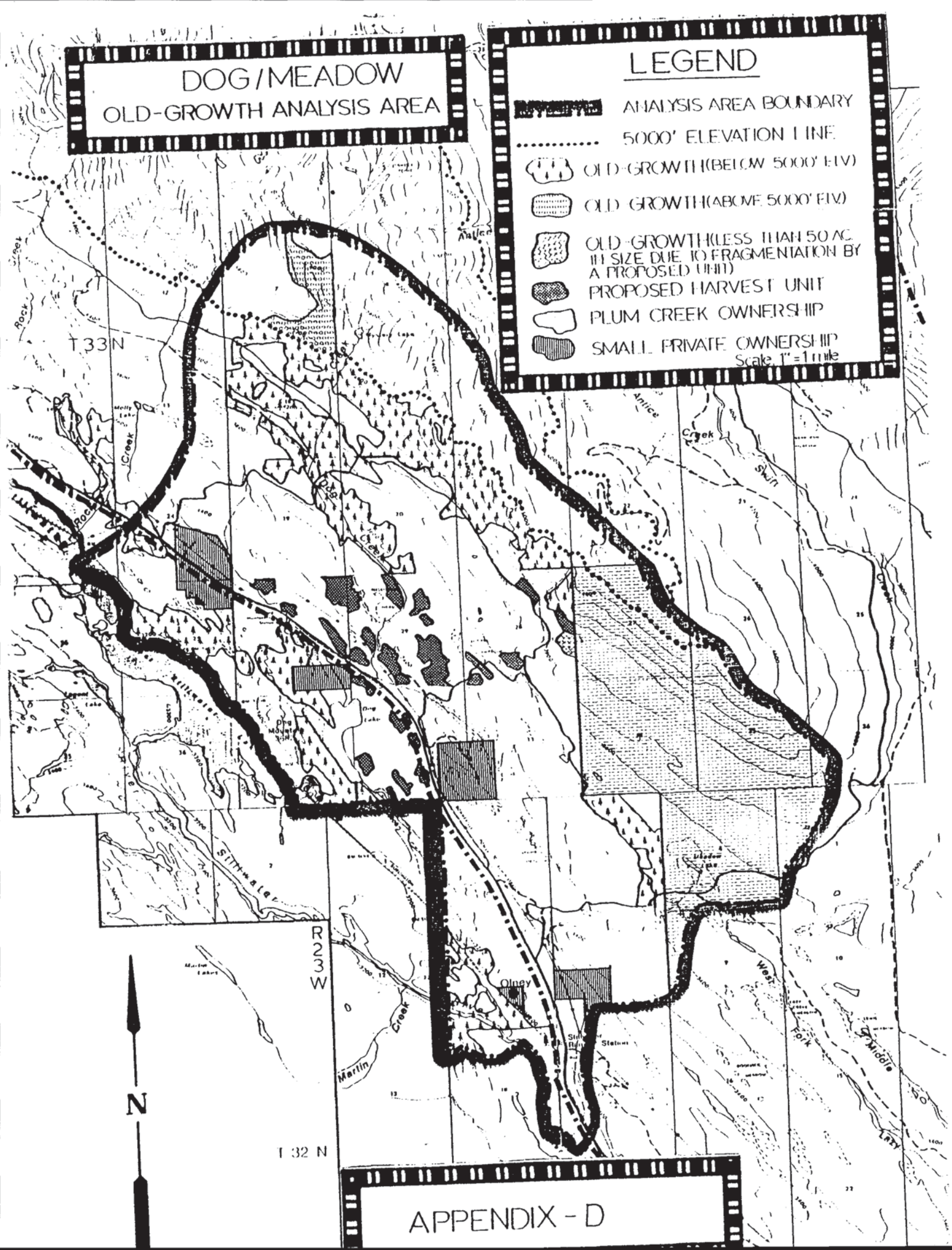
2. Dust abatement would be applied on the Stillwater River road from one-quarter mile above the Edmonds bridge to the junction of Highway 93 and Stillwater River road. This would control dust near residences and cabin sites that is likely to be produced from road and bridge construction and timber hauling.

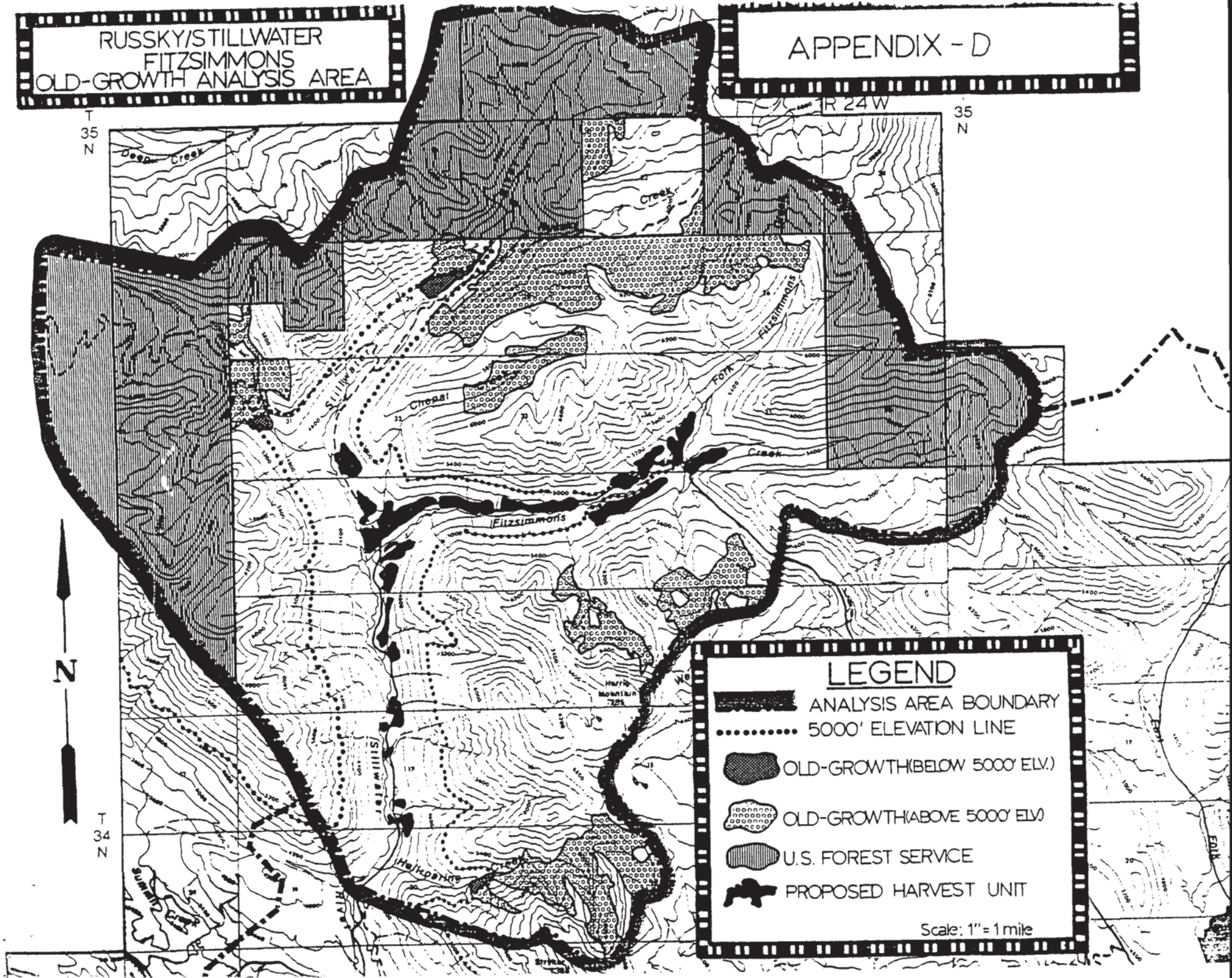

Ritsenburg Meadow
McCabe Meadow
Dog Lake
Ruppel Meadow
Skunk Meadow
STILLWATER
FOREST
RIVER
Olney
Long Meadow
Gravel Pit
JEEP TRAIL
R 24 W
R 23 W
APPENDIX C - Page 1
RITSENBERG/FITZSIMMONS SALE
Ritsenberg Topography

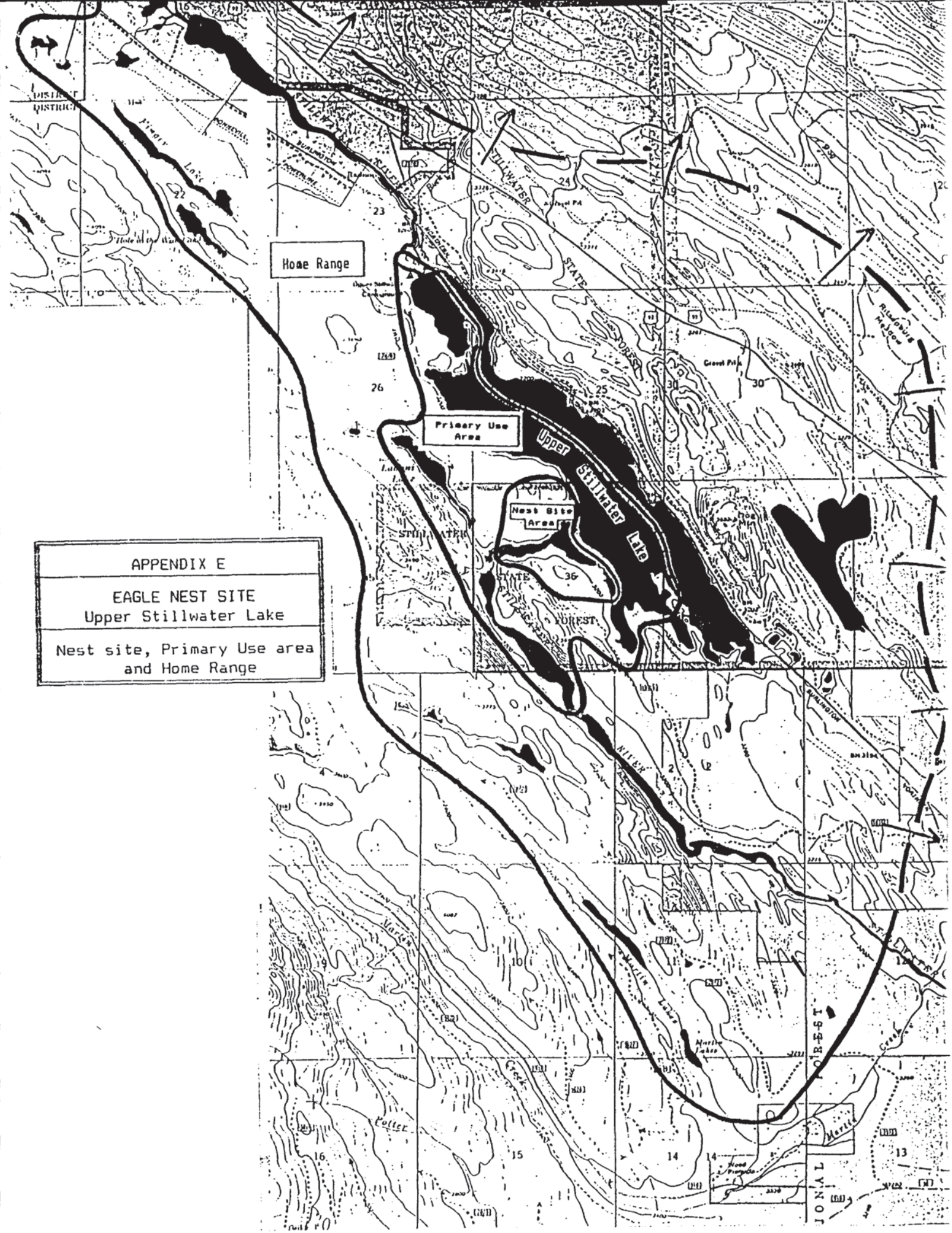


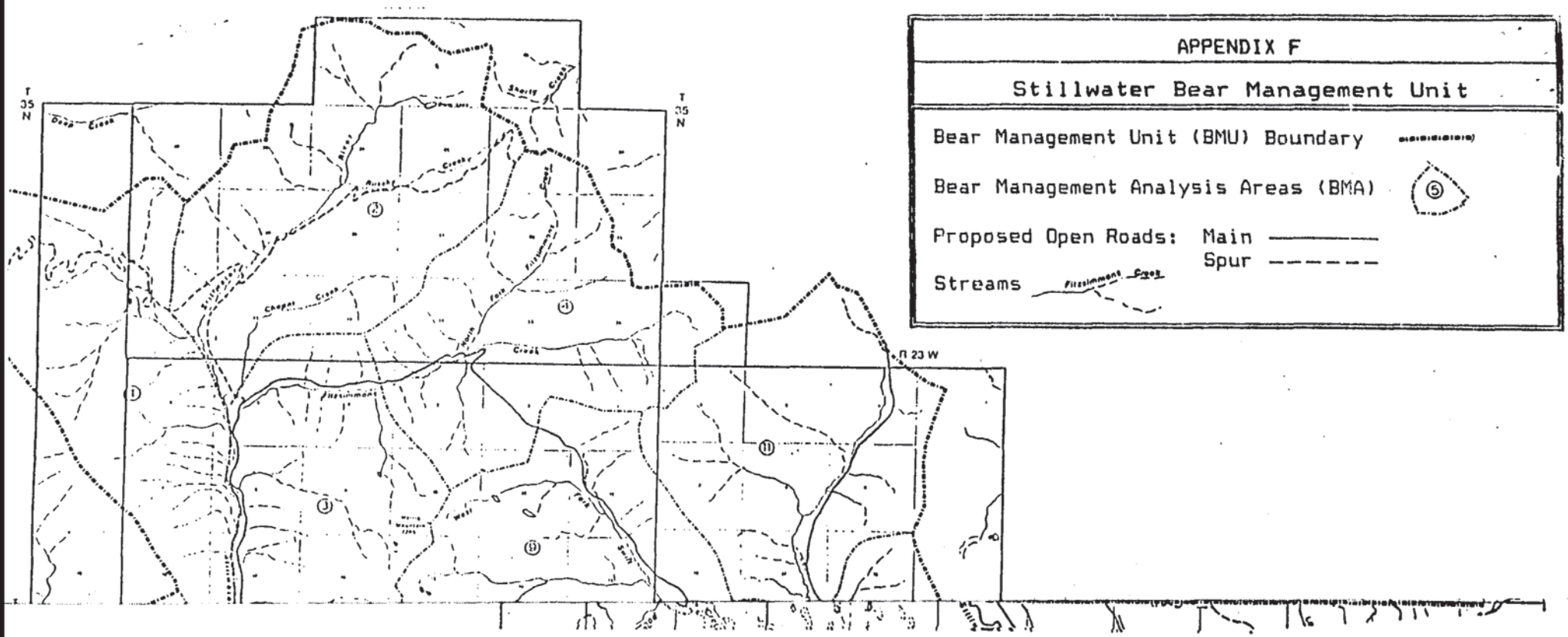
APPENDIX C - Page 2
RITSENBERG/FITZSIMMONS SALE

Fitzsimmons Topography


DOG/MEADOW
OLD-GROWTH ANALYSIS AREA
LEGEND
ANALYSIS AREA BOUNDARY
5000' ELEVATION LINE
OLD-GROWTH (BELOW 5000' ELV)
OLD-GROWTH (ABOVE 5000' ELV)
OLD-GROWTH (LESS THAN 50 AC. IN SIZE DUE TO FRAGMENTATION BY A PROPOSED UNIT)
PROPOSED HARVEST UNIT
PLUM CREEK OWNERSHIP
SMALL PRIVATE OWNERSHIP
Scale 1" = 1 mile
T 33 N
R 2 3 W
T 32 N
N
Olney
Martin Creek
Middle Fork
APPENDIX - D


RUSSKY/STILLWATER
FITZSIMMONS
OLD-GROWTH ANALYSIS AREA
APPENDIX - D
T 35 N
R 24 W
35 N
Deep Creek
Fitzsimmons
Stillwater
Creek
Fitzsimmons
Fork
Creek
Fitzsimmons
Stillwater
Creek
Stillwater
River
T 34 N
N
LEGEND
ANALYSIS AREA BOUNDARY
5000' ELEVATION LINE
OLD-GROWTH(BELOW 5000' ELV.)
OLD-GROWTH(ABOVE 5000' ELV)
U.S. FOREST SERVICE
PROPOSED HARVEST UNIT
Scale: 1" = 1 mile


Home Range
Primary Use Area
Upper Stillwater Lake
Nest Site Area
APPENDIX E
EAGLE NEST SITE
Upper Stillwater Lake
Nest site, Primary Use area and Home Range



APPENDIX F

Stillwater Bear Management Unit

Bear Management Unit (BMU) Boundary

Bear Management Analysis Areas (BMA) ⑤

Proposed Open Roads: Main ————

Spur – – – – –

Streams

May 20, 1991

BIOLOGICAL REVIEW
for the proposed
Ritsenburg - Fitzsimmons Timber Sale

I. T&E SPECIES OF CONCERN

Threatened or endangered species known to occur in the vicinity of this proposed action include the gray wolf, bald eagle and grizzly bear. Management of lands to support the recovery of wolves translates into management for the benefit of their prey and protection of active den sites. Currently there is a suspected wolf den and rendezvous site approximately 2 miles from a cutting unit and 1 mile from the main access road. Harvest activities should be restricted from March 15 to July 1 within 1 mile of the den site (US Fish & Wildlife Service recommendation).

The general area included in the Ritsenburg portion of this proposal is part of the home range area for a pair of bald eagles nesting on Upper Stillwater Lake. The Ritsenburg area was identified as a possible foraging area during ongoing field studies to develop a nest management plan. Specific feeding areas and perch sites were never determined. Lakes and streams in this part of the forest support brook trout populations. The eagles could be feeding on fish or waterfowl, or rodents in surrounding marshes and meadows. Consequently, potential perching trees with open crowns that occur within proposed cutting units, that provide a direct line-of-site and occur within 1/4 mile of marshes, meadows, lakes or streams should be left standing. Management activities should be designed to maintain the integrity of perch trees by minimizing potential for blowdown and by providing appropriate screening. Harvest activities should be delayed immediately adjacent to potential feeding areas until after young birds have fledged (about August 15th) if there is reason to believe that eagles are or would use these sites. Such delays are only necessary if logging activities are visible from feeding areas.

The remainder of this biological review deals specifically with grizzly bears and design of this proposed action to comply with the Department of State Lands interim grizzly bear management standards and guidelines (December 1988).

A. INTRODUCTION TO GRIZZLY BEAR BIOLOGICAL REVIEW

The interim grizzly bear guidelines require a biological review of forest management activities to determine their effects on grizzly bears, their habitat and on the potential for bear-human conflicts. This review will include:

1) scheduling of sales in time and space to provide adequate security. Security is defined as freedom from the likelihood of displacement due to human disturbance and freedom from the likelihood of removal from the population as a result of confrontation or conflict with people;

2) sale layout and design as they affect movement corridors and hiding cover;

3) silvicultural prescriptions and systems as they affect forage and hiding cover;

4) analysis of roads and access. Road management analysis should include new roads, all open roads and closed roads within the analysis area.

5) a discussion of cumulative effects of the project in relation to known past, current, and planned projects of all landowners.

Each of these factors will be addressed separately for the Ritsenburg and Fitzsimmons portions of this proposed timber sale. They are evaluated separately because of the distance separating proposed sale units. Data are summarized in bear management areas (BMA's). These are 4,500-11,000 acre sub-compartments within the Stillwater bear management unit. BMA's included in this analysis were chosen based on the scope of the proposed action and on evaluations of past, present and anticipated future actions (any that would require an environmental analysis) of all landowners in the vicinity.

Given these criteria and the details of the analysis below, both BMA's directly involved in the proposal and all those immediately adjacent were considered in the Ritsenburg review. BMA's 7 and 8 include proposed Ritsenburg harvest units. Consequently, the Ritsenburg portion of this analysis includes BMA's 6, 7, 8, 13, 14, and 16, covering approximately 43,500 acres (Table 1). The Fitzsimmons portion of this analysis includes BMA's 1, 2, 3, 4 and 9 (26,750 acres) (Table 1). BMA's 2, 3 and 4 include proposed cutting units.

Table 1. Summary of bear management areas evaluated and acreage involved in this cumulative effects analysis for the proposed Ritsenburg-Fitzsimmons timber sale.

Sale portion	Bear mgt. area	Total	DSL	Other
Ritsenburg	06	5,528	4,681	847
	07	5,762	5,762	0
	08	5,791	2,746	3,045
	13	6,874	6,874	0
	14	8,563	5,270	3,293
	16	11,066	3,060	8,006
Fitzsimmons	01	4,559	2,365	2,194
	02	6,619	3,958	2,661
	03	5,281	4,879	402
	04	5,368	4,372	996
	09	4,923	4,878	45

II. RITSENBURG PORTION

A. SCHEDULING WITH OTHER PROPOSED ACTIVITIES

Initial evaluations indicated several current and proposed future timber harvests in the vicinity (Fig. 1). The Ritsenburg units of the proposed sale would result in timber harvest activities in the southern portion of BMA 7 and the northern portion of BMA 8 (anticipated to run summer 1991 through March 1993). The McCabe small round wood sale is currently scheduled in both BMA 7 and 8 (to be completed by the end of 1991). The proposed Ewing Face sale may also be active in BMA 7 (1992). Other activities likely to occur in BMA's surrounding 7 and 8 include portions of the Ewing Face and Woods Lake proposals in BMA 6 (1992), the Werner-Taylor proposal in BMA 14 and 15 (scheduled for 1991-95), and ongoing Plum Creek harvests in BMA 16. No harvests are scheduled for BMA 13 during the proposed Ritsenburg-Fitzsimmons sale.

There are no adjacent secure areas provided for current activities associated with the McCabe sale in BMA's 7 and 8 or for Plum Creek harvests proposed for BMA 16. The proposed Ritsenburg-Fitzsimmons sale would provide for installation of road closures to increase security (see road density analysis). McCabe sale activities will be coordinated with Ritsenburg activities to meet grizzly bear security needs once road closures are installed in BMA 7.

It was necessary to develop a potential schedule of activities for timber harvests in BMA's 7 and 8 given the proposed activities likely to occur in surrounding BMA's. The intent of this scheduling was to insure: (1) at least one secure area would be available adjacent to each BMA containing an active timber sale, (2) a proposed project was not scheduled in a BMA needed as security for an adjacent sale, and (3) adjacent secure areas provided similar habitats. The seasons considered in this analysis are summer and fall because no Department of State Lands (DSL) harvest activities included in this analysis are scheduled during spring, and winter harvest activities do not require adjacent security areas.

During 1991, BMA 7 could provide a secure displacement area for activities associated with the McCabe and Ritsenburg timber harvests in BMA 8 (Fig. 2). Other DSL activities are likely to begin on the Werner-Taylor sale in BMA 14 and both BMA 12 and 13 would be available for security. BMA 15 would be provided as security for Plum Creek activities in BMA 16.

During 1992, Ritsenburg harvests would be restricted to BMA 7 using BMA 13 for security (Fig. 3). Werner-Taylor activities should be restricted to BMA 15, allowing 14 for security. Plum Creek activities in 16 could use 8 as adjacent security. Any Ewing activities that may occur in BMA 6 could use 5 as adjacent security. Ewing activities in BMA 7 could use 13 for security.

It may be necessary to extend Ritsenburg harvest activities in BMA 7 into summer 1993. If this happens, that activity would be concurrent with proposed Ewing sale activities in BMA 7. BMA 13 would provide security for both sales.

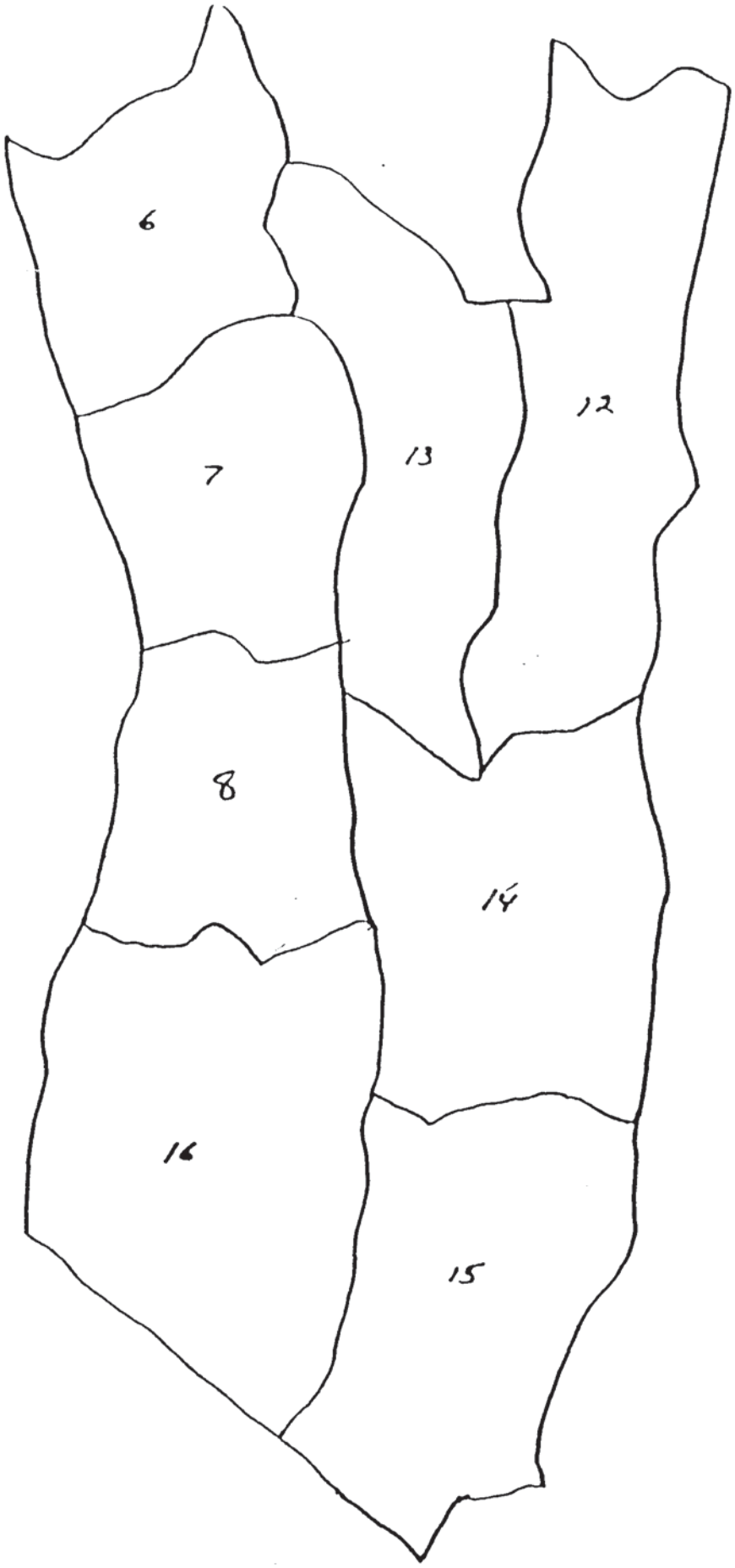


Figure 1. Bear management areas (BMA's) and anticipated future activities evaluated for the Ritsenburg portion of the proposed Ritsenburg-Fitzsimmons timber sale in the Stillwater State Forest.

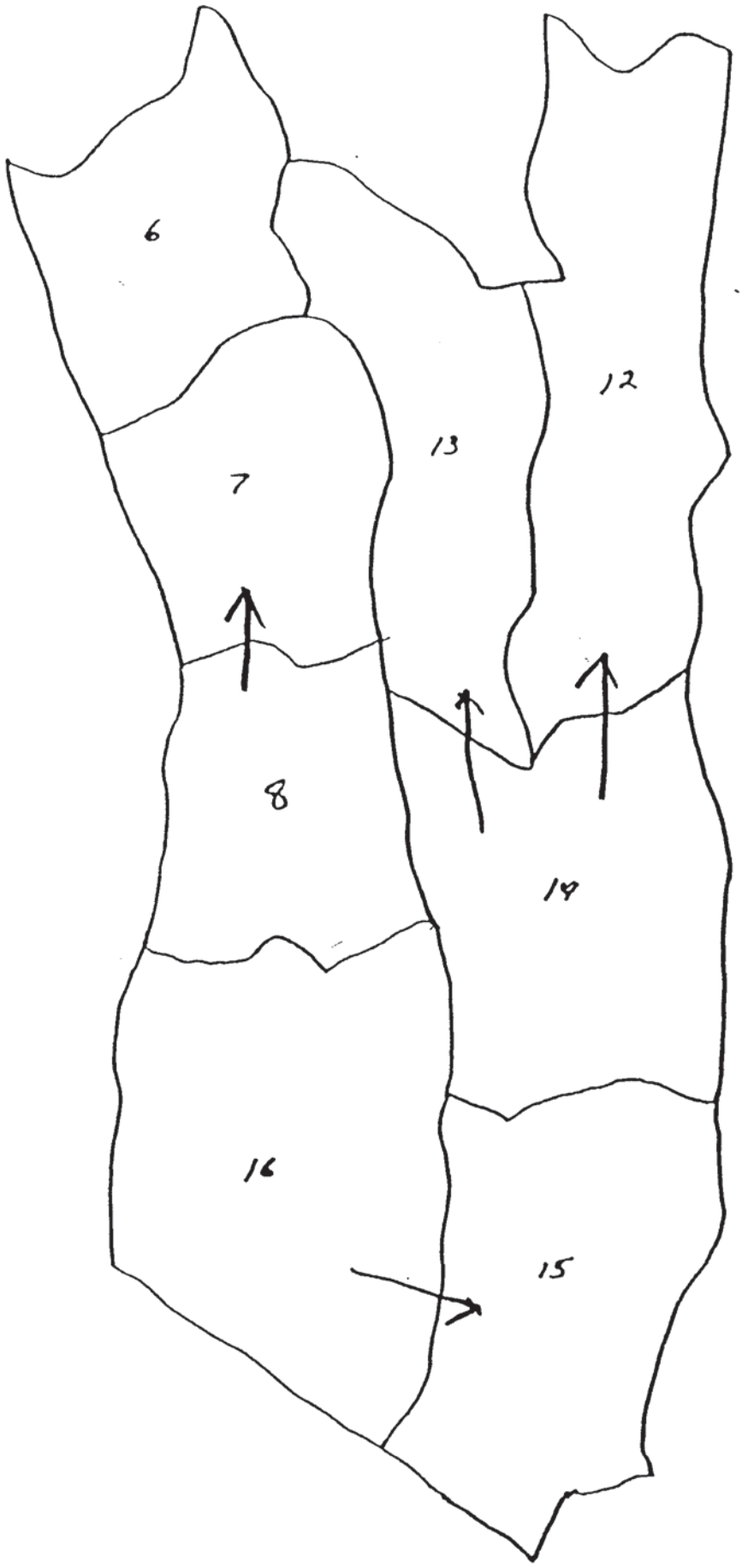


Figure 2. Bear management areas (BMA's) planned to provide secure areas adjacent to proposed Ritsenburg sale activities and other anticipated activities during 1991.

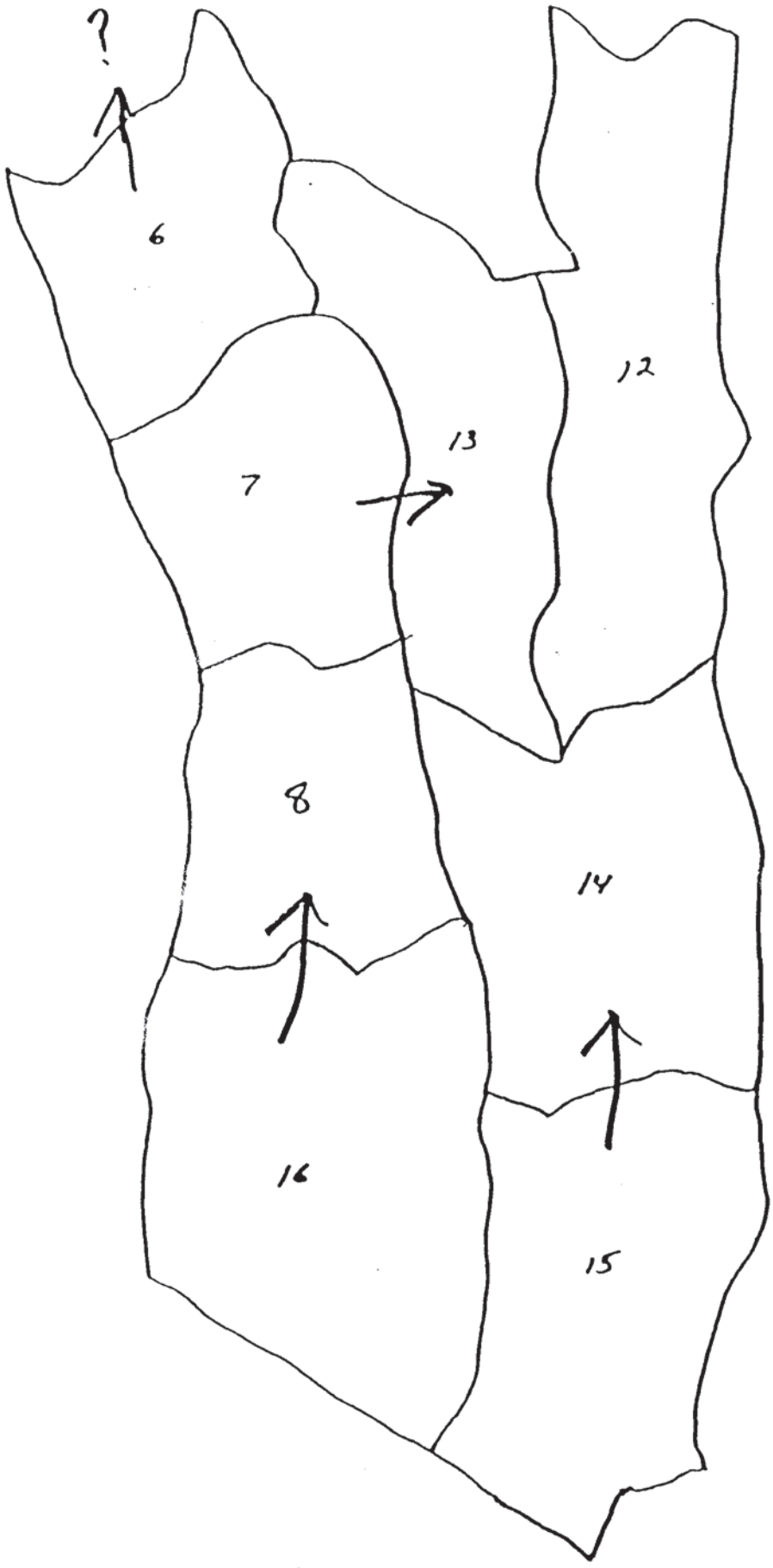


Figure 3. Bear management areas (BMA's) planned to provide secure areas adjacent to proposed Ritsenburg sale activities and other anticipated activities during 1992.

B. SALE LAYOUT AND DESIGN

Proposed sale layout and design has been developed in accordance with cover (guideline 4 sec. 2), edge and unit size guidelines (guideline 5, sec. 2) of the interim grizzly bear management standards and guidelines. Refer to the prescription for details regarding size of harvest units and to sale map for spatial distribution and shape of harvest units.

C. SEASONAL HABITAT AND FOOD AVAILABILITY

Stand-level inventory data were used to evaluate seasonal habitat values. Habitat values were assigned based on the interim grizzly bear guidelines using Figure 2, Table 1 and Table 2 of that document. The data base was searched and acres summed to generate data in Table 2.

Table 2. Summary of seasonal habitat availability on DSL lands and minimum acreage known available on other ownerships for analysis of proposed Ritsenburg timber sale.

	Bear management area					
Season of use:	06	07	08	13	14	16
Timbered acreage of seasonal bear habitat:						
Spring						
DSL	191	94	262	64	146	16
Other	0	0	16	0	195	0
3 Summer						
DSL	3,701	4,079	2,173	2,830	2,690	2,130
Other	0	0	2,604	0	2,842	6,773
Autumn						
DSL	2,410	2,663	1,391	2,374	1,836	539
Other	0	0	1,735	0	2,327	6,756
Non-timbered acreage of seasonal bear habitat:						
Spring						
DSL	0	16	59	3	0	69
Other	0	0	92	0	65	511
Summer						
DSL	0	16	57	0	0	57
Other	0	0	92	0	65	511
Autumn						
DSL	0	16	46	0	0	0
Other	0	0	0	0	0	47

Summer and fall habitats dominate in this area with limited amounts of forested spring habitat and nonforest acreage (Table 2). Areas planned to be used for security can provide adequate seasonal habitat during summer and fall. Spring habitat is more abundant in southern BMA's, but since no spring activities are planned in the Ritsenburg schedule, availability of spring range should not limit habitat options for grizzly bears.

Timber harvest units identified in the Ritsenburg area would occur in 3 habitat series: subalpine fir, grand fir and cedar. Proposed treatments include overstory removal, seed tree, shelter wood, commercial thinning, clear cuts and salvage harvests (see prescription for details). Two of these habitat series (grand fir and cedar) have the potential to produce grizzly bear foods in the early stages of succession (approximately a 10 year period). Approximately 88 acres of regeneration harvest treatment are proposed in the grand fir or cedar habitat series (43 acres in BMA 7 and 45 acres in BMA 8) which may temporarily increase availability of suitable spring habitat.

In addition, all three of these habitat series have potential for berry production which could provide a summer-fall food source. Harvest treatments that minimize soil disturbance could potentially increase production of huckleberry, buffaloberry and serviceberry. Limited salvage harvests identified in the proposal should not substantially affect berry production. The harvest prescription specifies a limited amount of soil disturbance which should minimize disturbance to berry-producing shrubs in the harvest units.

An exception to this plan for minimizing shrub disturbance is proposed for a one-half mile wide corridor along highway 93. The interim standards and guidelines identified this corridor as an area with an increased likelihood for bear-human conflict because of the volume of traffic and greater human density along the highway. Management policy along the corridor is to discourage the presence of grizzly bears and factors contributing to their presence (Interim Grizzly Bear Management Standards and Guidelines, Section IV). Toward this end, hazard reduction and site-preparation operations should not be designed to minimize potential impacts to berry-producing shrubs.

Other steps could also be taken to minimize potential for bear-human conflicts. Seed mixtures for reclamation of disturbed sites within the 1/2-mile corridor and within other areas with potential for increased mortality risk should utilize grass and forb species that are not highly preferred by bears. Disturbed sites in other areas should be reclaimed with more palatable seed mixtures.

Guidelines relating to unit size, silvicultural systems, post-harvest treatments and seeding (Interim guidelines Sec. II, 5-8) should be implemented where appropriate to enhance compatibility of this proposal with grizzly bear habitat needs.

D. COVER

The proposed treatments would also decrease hiding cover. Hiding cover is currently available across at least 96 and 72% of BMA's 7 and 8 respectively. Cover values in all adjacent BMA's fall within this range (Table 3).

Table 3. Current and anticipated future hiding cover values as affected by the proposed Ritsenburg sale and all anticipated timber harvest activities in adjacent BMA's.

	Bear management area					
Cover minimums	06	07	08	13	14	16
Current						
DSL acres	4,320	5,524	2,245	6,449	4,604	2,343
Other acres	0	0	1,927	0	1,715	7,267
Total	4,320	5,524	4,172	6,449	6,319	9,610
% cover						
DSL ownership	92	96	82	94	87	77
All ownership	78	96	72	94	74	87
Projected future						
DSL acres	4,255	5,056	2,181	6,449	4,500	2,343
Other acres	0	0	1,927	0	1,715	?
Total	4,255	5,056	4,108	6,449	6,215	?
% cover						
DSL ownership	91	88	79	94	85	77
All ownership	77	88	71	94	73	?

Anticipated harvests from the Ritsenburg proposal and other DSL planned activities would reduce cover as indicated in Table 3. In addition, Plum Creek harvests will further reduce cover availability in BMA 16 by an unknown amount. The U.S. Forest Service administers some of BMA 14 but they plan no timber sales west of the Whitefish divide within the designated grizzly bear recovery area.

Planned timber harvests result in no more than an 8% reduction of cover in any one BMA (Table 3). Cover guidelines (Interim guidelines Sec. II-4) should be implemented where appropriate to enhance compatibility of this proposal with grizzly bear needs.

E. ROAD DENSITY

Open road density would be reduced as a result of this proposal while total road density would increase. The sale contract would require the purchaser to install various gates, berms or other barriers, closing roads to public access as part of the first phase of sale operations. Installation of closures should be prioritized in BMA's required as adjacent security areas for active timber sales (see scheduling section).

For the purposes of this analysis, open roads refer to any travelway upon which a four-wheeled passenger vehicle can be reasonably driven that are open to public travel. Road densities were calculated for each BMA. Road density was derived by calculating average miles of road per section for the area within each BMA. Open road densities in BMA's bordered on the west by highway 93 (6, 7, 8 and 16) were calculated only for that portion of each BMA outside the one-half mile corridor. This was done to separate effects of open road density within portions of the bear management unit designated as suitable habitat for bears and with lower potential for bear-human conflicts, from those areas within the 1/2-mile corridor. Within the corridor, roads should remain open and foraging habitats should not be encouraged to deter use of this area by bears. Hiding cover should be managed in the corridor to provide increased security for bears that move into or through this area to reduce bear conflict and mortality risk.

Open road densities currently range from 2.1 to 3.2 miles/section in the 6 analysis areas (Table 4). Following harvest activities they would be decreased to 1 mile/section or less. Total road density would increase no more than 0.3 miles per section. At the current time, DSL has no direct source of funding to implement road closures without this sale.

Table 4. Current and anticipated future road densities as affected by the proposed Ritsenburg sale and all anticipated timber harvest activities in adjacent BMA's.

Road density (miles/section)	Bear management area 06	07	08	13	14	16
Open[a]						
Current	2.1	3.1	2.2	3.2	1.3	2.4
During	0.7	3.5[b]	2.3[b]	1.0	1.4[b]	1.1
Post-sale	0.7	1.0	0.9	1.0	1.0	0.9
All roads						
Current	3.2	3.8	5.6	3.6	2.5	2.7
Post-sale	3.3	4.1	5.7	3.6	2.6	?

[a] Open roads refer to all roads open to travel by the general public excluding a 1/2 mile corridor along highway 93 (in BMA's 6, 7, 8 and 16).
[b] When road density standards exceed 1 mile/section as a result of timber harvest, adjacent security areas will be provided with road densities not to exceed 1 mile/section (see scheduling section of this analysis).

Road designs should implement Interim guidelines when appropriate (guideline II-3) to enhance compatibility of this proposal with grizzly bear security needs.

F. CUMULATIVE EFFECTS CONSIDERATIONS

Interim grizzly bear management standards and guidelines call for a cumulative effects analysis to assess:

1) the inherent suitability of the habitat to provide food and cover to support bears and modifications to the habitat that affect forage and cover.

2) the effects of disturbance associated with uses or activities on a bear's ability to use an area (displacement).

3) the potential for bear/human conflicts, the potential for habituating bears to man, and the degree of risk for man-caused bear mortality.

Inherent suitability of the habitat to provide food and cover was addressed in earlier sections of this review.

Displacement of bears from active BMA's could occur given the nature and extent of the proposals reviewed previously. However, by providing adjacent security areas, winter logging and limiting the Ritsenburg harvest activities to one or two season in each BMA, the potential displacement would be short-term and thus insignificant.

Decreasing cover, improving condition of existing roads and increasing total miles of road could affect the potential for bear-human conflicts and increase mortality risk. In addition, improved road access could facilitate future timber harvests in this area. However, all aspects of this proposal meet DSL's interim grizzly bear management standards and guidelines which have been reviewed and approved by both Montana Department of Fish, Wildlife and Parks and U. S. Fish and Wildlife Service. In addition, proposed road closures will increase grizzly bear habitat security over existing conditions. Recently developed data bases will also allow monitoring of hiding cover and road densities across the entire bear management unit in the future.

III. FITZSIMMONS PORTION

A. SCHEDULING WITH OTHER PROPOSED ACTIVITIES

There are no known harvest activities scheduled to occur in BMA's adjacent to 2, 3 and 4 or on surrounding areas of the Flathead or Kootenia National Forests that would affect this proposal. The Kootenia National Forest has proposed a timber sale adjacent to BMA 5 beginning in 1992. Fitzsimmons activities would be limited to harvest units identified in Figure 4, associated road construction and improvement in BMA 5, road reconstruction in BMA 9 and gravel pit construction in BMA 9. All activities are proposed for summer

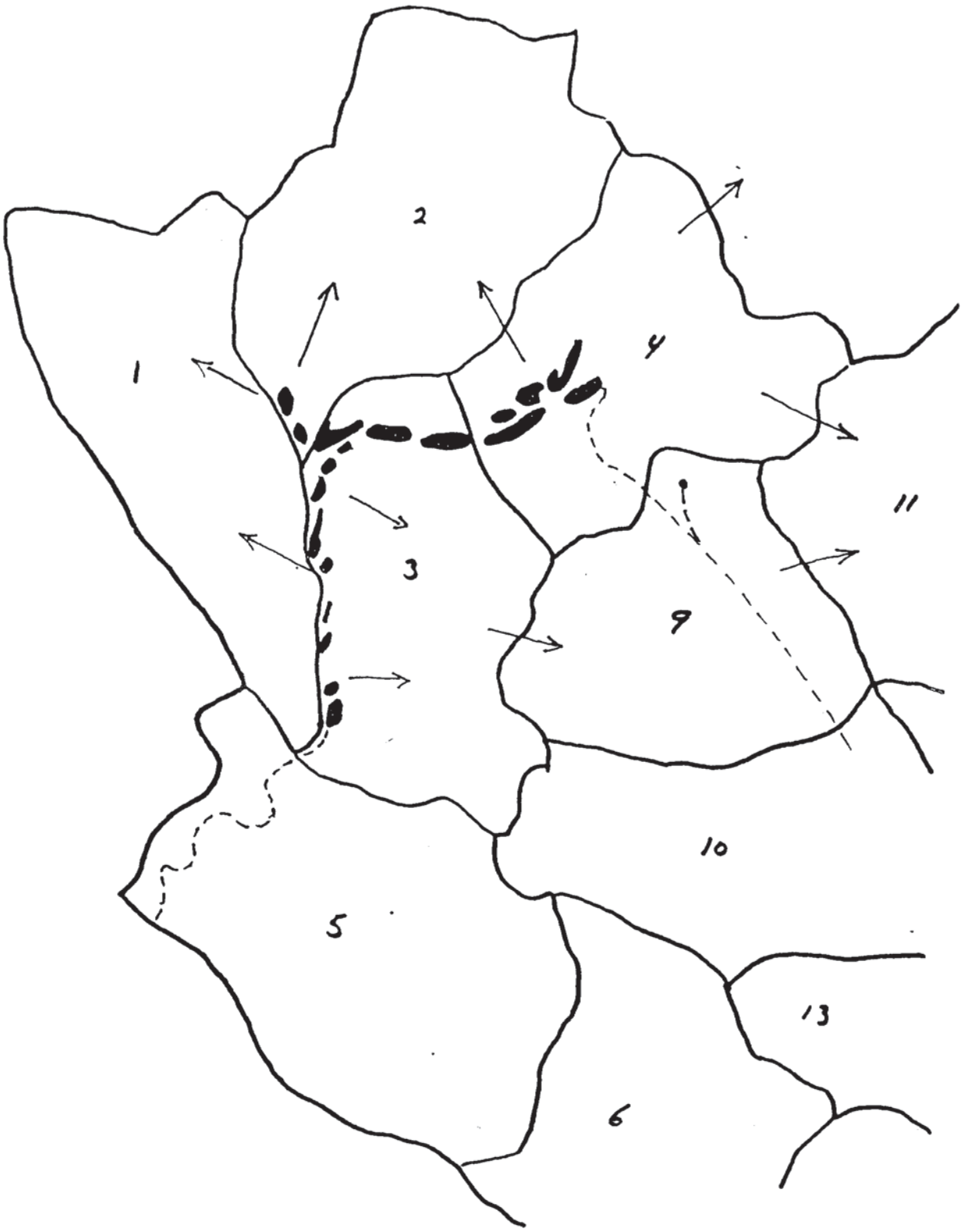


Figure 4. Bear management areas (BMA's) and proposed harvest units evaluated for the Fitzsimmons portion of the proposed Ritsenburg-Fitzsimmons timber sale in the Stillwater State Forest.

BMA's planned to provide secure areas adjacent to the proposed Fitzsimmons sale activities during 1991 - 1992.

and fall. During 1991, road construction is proposed for BMA's 3, 4 and 5 with logging in BMA 3. Road reconstruction and gravel pit construction in BMA 9 are scheduled for 1991. During 1992, both road construction and logging are scheduled for BMA's 2, 3 and 4. During proposed activities, BMA 1 and adjacent forest service lands outside the Stillwater Bear Management Unit would all provide security with the exception of the Murphy Lake BMA northwest of Stillwater BMA 5. Also, most of BMA's 2, 3, 4 and 9 would remain secure in terms of human activities and road densities.

B. SALE LAYOUT AND DESIGN

Sale layout and design should be developed in accordance with cover (guideline 4 sec. 2) and edge and unit size guidelines (guideline 5, sec. 2) of the interim grizzly bear management standards and guidelines.

Proposed harvest units are arranged along a road that is scheduled to remain open. Guideline 3c, Section II of the interim grizzly bear management standards and guidelines recommends retaining as much cover as possible along both sides of the road and to use topography, unit design and cover to interrupt the line of sight from roads into cutting units and across the landscape. These options are not possible in most of the proposed cutting units because the valley bottom location provides limited opportunities for screening by unit design. Only 3 proposed cutting units are not visible from open roads; 4 units are partially screened by topography or brush and 12 units are fully visible from open roads. Planned harvests would provide visibility along 3.5 miles of open road, or 32% of all open roads in BMA's 2, 3 and 4. Two of 12 exposed units would provide visibility 600 feet or greater; 9 of 12 units 300 feet or more. This indicates that additional steps should be taken to meet the intent of Guideline 3c Section II to interrupt the line-of-sight from open roads into cutting units. Such actions may include providing additional screening or increasing habitat security through road closures until cover is restored.

Key section

C. SEASONAL HABITAT AND FOOD AVAILABILITY

Seasonal habitat availability in the Fitzsimmons area is similar to that described in the Ritsenburg discussion earlier. Summer and fall habitats dominate with limited amounts of spring habitat (Table 5).

Only 2 cutting units (16 acres) are proposed in a habitat type (cedar series) with potential to produce spring bear foods, so insignificant amounts of spring habitat would result from this proposal. Harvests over 334 acres could influence the potential for berry production. Steps described in the corresponding Ritsenburg section to minimize increased berry production and to seed with unpalatable seed mixtures should be applied here to minimize increases in habitat suitability across the sale area because it may increase mortality risks to bears if habitat quality was improved along open roads.

Guidelines to minimize potential risks of bear-human conflicts should be followed in all units for this portion of the sale.

Table 5. Summary of seasonal habitat availability on DSL lands for analysis of proposed Fitzsimmons timber sale.

	Bear management area				
Season of use:	01	02	03	04	09
Timbered DSL acreage of seasonal bear habitat:					
Spring	4	0	0	0	0
Summer	1,547	1,261	2,103	849	1,080
Autumn	1,628	1,669	2,348	1,351	1,457
Non-timbered DSL acreage of seasonal bear habitat:					
Spring	70	23	13	177	101
Summer	47	53	63	184	0
Autumn	37	23	7	166	0

D. COVER

Proposed timber harvests would reduce hiding cover as indicated in Table 6. Availability of hiding cover currently ranges from 73 to 96% on DSL land (Table 6). Other ownerships probably offer similar cover values. Even if no additional cover was available outside of DSL ownership, cover percentages would still range from 50 to 75%. Maximum cover reduction (183 acres) would

Table 6. Current and anticipated future hiding cover values as affected by the proposed Fitzsimmons sale.

	Bear management area				
Cover values	01	02	03	04	09
Current acreage	2,270	3,808	3,979	3,652	3,545
% cover over:					
DSL ownership	96	96	82	84	73
All ownership	50	58	75	68	72
Projected future acreage	2,270	3,763	3,795	3,538	3,545
% cover over:					
DSL ownership	96	95	78	81	73
All ownership	50	57	72	66	72

occur in BMA 3 and would result in a 4% reduction of cover on DSL lands and a 3% reduction across the BMA. Cover reductions in other BMA's range from 0 to 2% (Table 6). Cover guidelines (Interim guidelines Sec. II-4) should be implemented where appropriate to enhance compatibility of this proposal with grizzly bear needs.

E. ROAD DENSITY

Open road densities would remain unchanged as a result of this proposal. Open road densities currently range from 0.5 to 0.9 miles per section (Table 7). Open road densities would increase in BMA's 3 and 4 during the sale but road closures following the sale would allow open road densities to remain unchanged. Traffic volume may increase as a result of road improvements being planned in association with this proposed sale.

Total road densities across all ownerships currently range from 0.6 to 1.9 miles per section within the analysis area. Total road densities would increase by 0.1 miles per section in BMA's 3 and 4 (Table 7).

Table 7. Current and anticipated future road densities as affected by the proposed Fitzsimmons sale.

Road density (miles/section)	Bear management area 01	02	03	04	09
Open					
Current	0.9	0.8	0.6	0.6	0.5
During	0.9	0.8	0.7	0.7	0.5
Post-sale	0.9	0.8	0.6	0.6	0.5
All roads					
Current	0.9	0.9	0.6	0.9	1.9
Post-sale	0.9	0.9	0.7	1.0	1.9

F. CUMULATIVE EFFECTS CONSIDERATIONS

Forage production should not be encouraged in Fitzsimmons cutting units because of cover reduction along the main open road. This is necessary to minimize potential risks of mortality associated with increased visibility and potential increased volume of traffic on the improved road.

Direct disturbance and potential displacement does not appear to be an important issue in this proposal because: nearly all activities are proposed along an open road, open road densities will remain at or below 0.8 miles/section during the sale, and large tracts of land beyond the road remain secure with no activities proposed.

Potential bear-human conflicts resulting from increased visibility along an improved, open road seems to be the most important issue of the Fitzsimmons proposal. The potential for bear-human conflicts and mortality risk are increased by decreased cover, improved condition of existing roads and increased total miles of road resulting from this proposal.

IV. DETERMINATION OF EFFECTS

The proposed action is not likely to affect gray wolves because; the Montana Department of Fish, Wildlife and Parks has provided input regarding big game considerations, the sale units are probably more than 1 mile from any den site, and any sale contract would include language to protect denning sites should they be identified at a later date.

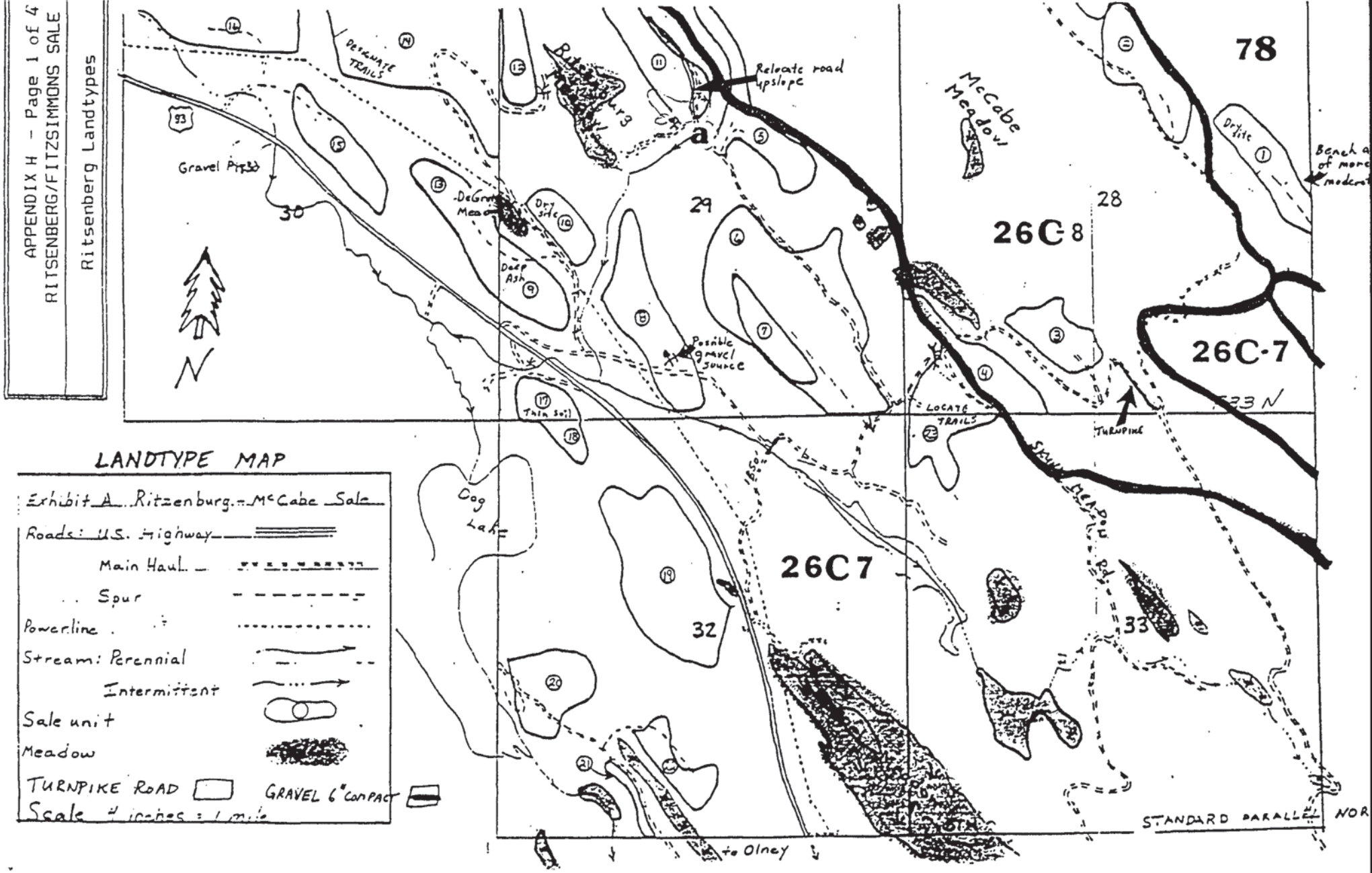
This proposal is also unlikely to affect bald eagles because; it affects only a portion of their suspected home range, potential perch trees should be maintained near meadows or wet areas, and harvest activities should be restricted as necessary to maintain available foraging areas.

The proposed action could increase the risk of grizzly bear mortality by increasing forage production, decreasing cover and increasing total miles of road. However, the Ritsenburg portion of the sale meets or exceeds the intent of all interim grizzly bear standards and guidelines indicating that concerns regarding mortality risk have been adequately addressed. The Fitzsimmons portion of the sale has met all guidelines but lack of vegetative screening along the main road would result in some increased vulnerability of grizzly bears and other game species. Options to minimize this risk include provision of screening along the open roads or closing the road to public access during spring and fall bear hunting seasons (April 15-May 31 and September 1-December 1). * Key Sentence

* **NOTE TO REVIEWERS - Scheduling as outlined in this review should be advanced one year due to delays in completion of this EA. (ie 1991 events would actually occur in 1992, etc.). The relationships still hold true, only the dates are changed.**

APPENDIX H - Page 1 of 4
RITSENBERG/FITZSIMMONS SALE

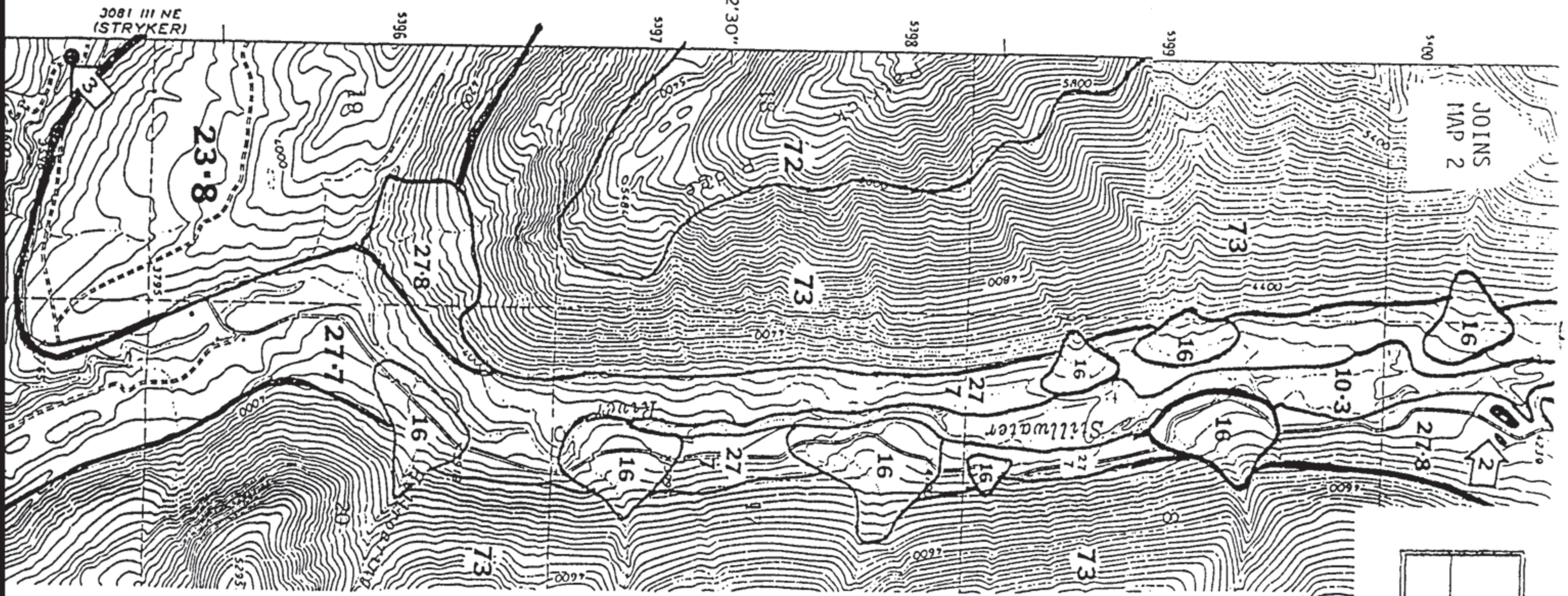
Ritsenberg Landtypes



Ritsenberg Landtypes

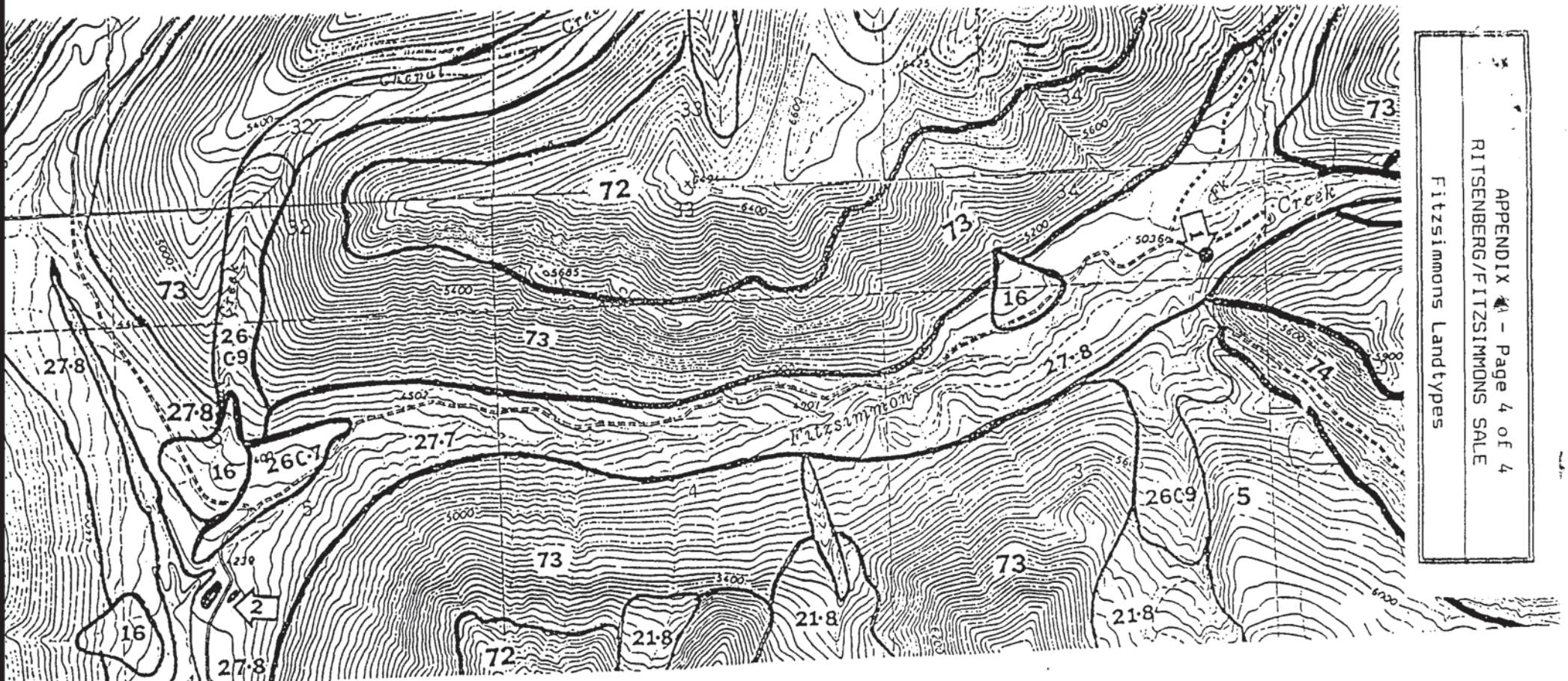
MAP UNITS		SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT & COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE-SURFACE)
12	ORGANIC SOILS	POORLY	SEVERE	SEVERE	POOR	SLIGHT
	MEADOWS AND BOGS, THESE AREAS WILL BE AVOIDED DURING HARVEST					
26-C-7	DEEP GLACIAL TILL ON 0-20% SLOPES	WELL DRAINED	MODERATE	MODERATE HIGH IF WET	GOOD	MODERATE
	DEEP PRODUCTIVE SOILS, CHECK SOIL MOISTURE PRIOR TO OPERATIONS					
26-C-8	DEEP GLACIAL TILL ON 20-40% SLOPES	WELL DRAINED	MODERATE	MODERATE	GOOD	MODERATE
	DEEP PRODUCTIVE SOIL. BETTER DRAINAGE AND LONGER SEASON OF USE THAN 26-C-7 SLOPES. TOPSOIL DEPTH IS VERY IMPORTANT, AVOID DISPLACEMENT					
78	GLACIAL TROUGHWALL SLOPES OVER 60%	WELL DRAINED	ROCK STEEP	HIGH DISPLACEMENT	FAIR DROUGHTY	MODERATE
	SHALLOW SOILS ON STEEP SLOPES, INCLUDED BENCHES AND FOOTSLOPES HAVE DEEPER SOILS AND SOME MORE MODERATE SLOPES. CABLE LOGGING RECOMMENDED FOR SLOPES OVER 45%.					

Fitzsimmons Landtypes



P UNITS	SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT & COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE-SURFACE)	NOTES
-3 ALLUVIAL SOILS THESE AREAS WILL BE AVOIDED DURING HARVEST	WELL/POOR	MOD-SEVERE	SEVERE	GOOD	ALONG	SEASONAL HIGH WATER TABLE, LOW STRENGTH SILTS AND SANDS
ALLUVIAL FANS ON 15-30% SLOPES	WELL DRAINED	LOW/MOD.	MODERATE	FAIR	SLIGHT	SHALLOW SURFACE SOILS, DISPLACEMENT MAIN CONCERN. TOPSOIL DEPTH IS VERY IMPORTANT, GOOD ROAD MATERIAL, POSSIBLE GRAVEL SOURCE DEPENDING ON SITE.
-C-7 DEEP GLACIAL TILL ON 0-20% SLOPES	WELL DRAINED	MODERATE	MODERATE SEV. WHEN WET	GOOD	MODERATE	DEEP PRODUCTIVE SOIL. CHECK SOIL MOISTURE. FITZSIMMONS BRIDGE SITE HAS ABOVE AVG. CLAY, REVEGETATE PROMPTLY.
-7 -8 GLACIAL OUTWASH " " 20-40% SLP.	WELL DRAINED.	LOW	MODERATE	FAIR	MODERATE	DEEP GRAVELS. POTENTIAL GRAVEL SOURCE LONG SEASON OF USE TAKE CARE TO AVOID SOIL DISPLACEMENT
ALPINE RIDGES AND CIRQUE HEADWALLS	NOT IN HARVEST AREA					
GLACIAL TROUGHWALL SLOPES OVER 60%	WELL DRAINED	ROCKY STEEP	HIGH DISPLACEMENT	FAIR DROUGHTY	MODERATE	STEEP SLOPES, ROCKY SOILS WITH COMMON ROCK OUTCROPS

SHALLOW SOILS ON STEEP SLOPES. BENCHES AND FOOTSLOPES INCLUDED IN MAP UNIT HAVE DEEPER SOILS AND SOME MORE MODERATE SLOPES. CABLE LOGGING RECOMMENDED FOR SLOPES OVER 45%.



MAP UNITS		SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT & COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE-SURFACE)	NOTES
10-3	ALLUVIAL SOILS THESE AREAS WILL BE AVOIDED DURING HARVEST	WELL/POOR	MOD-SEVERE	SEVERE	GOOD	ALONG	SEASONAL HIGH WATER TABLE, LOW STRENGTH SILTS AND SANDS
16	ALLUVIAL FANS ON 15-30% SLOPES	WELL DRAINED	LOW/MOD.	MODERATE	FAIR	SLIGHT	SHALLOW SURFACE SOILS, DISPLACEMENT MAIN CONCERN. TOPSOIL DEPTH IS VERY IMPORTANT, GOOD ROAD MATERIAL, POSSIBLE GRAVEL SOURCE DEPENDING ON SITE.
26-C-7	DEEP GLACIAL TILL ON 0-20% SLOPES	WELL DRAINED	MODERATE	MODERATE SEV. WHEN WET	GOOD	MODERATE	DEEP PRODUCTIVE SOIL. CHECK SOIL MOISTURE. FITZSIMMONS BRIDGE SITE HAS ABOVE AVG. CLAY, REVEGETATE PROMPTLY.
28-7 28-8	GLACIAL OUTWASH " " 20-40% SLP.	WELL DRAINED.	LOW	MODERATE	FAIR	MODERATE	DEEP GRAVELS. POTIENTIAL GRAVEL SOURCE LONG SEASON OF USE TAKE CARE TO AVOID SOIL DISPLACEMENT
72	ALPINE RIDGES AND CIRQUE HEADWALLS	NOT IN HARVEST AREA					
73	GLACIAL TROUGHWALL SLOPES OVER 60%	WELL DRAINED	ROCKY STEEP	HIGH DISPLACEMENT	FAIR DROUGHTY	MODERATE	STEEP SLOPES, ROCKY SOILS WITH COMMON ROCK OUTCROPS

SHALLOW SOILS ON STEEP SLOPES. BENCHES AND FOOTSLOPES INCLUDED IN MAP UNIT HAVE DEEPER SOILS AND SOME MORE MODERATE SLOPES. CABLE LOGGING RECOMMENDED FOR SLOPES OVER 45%.