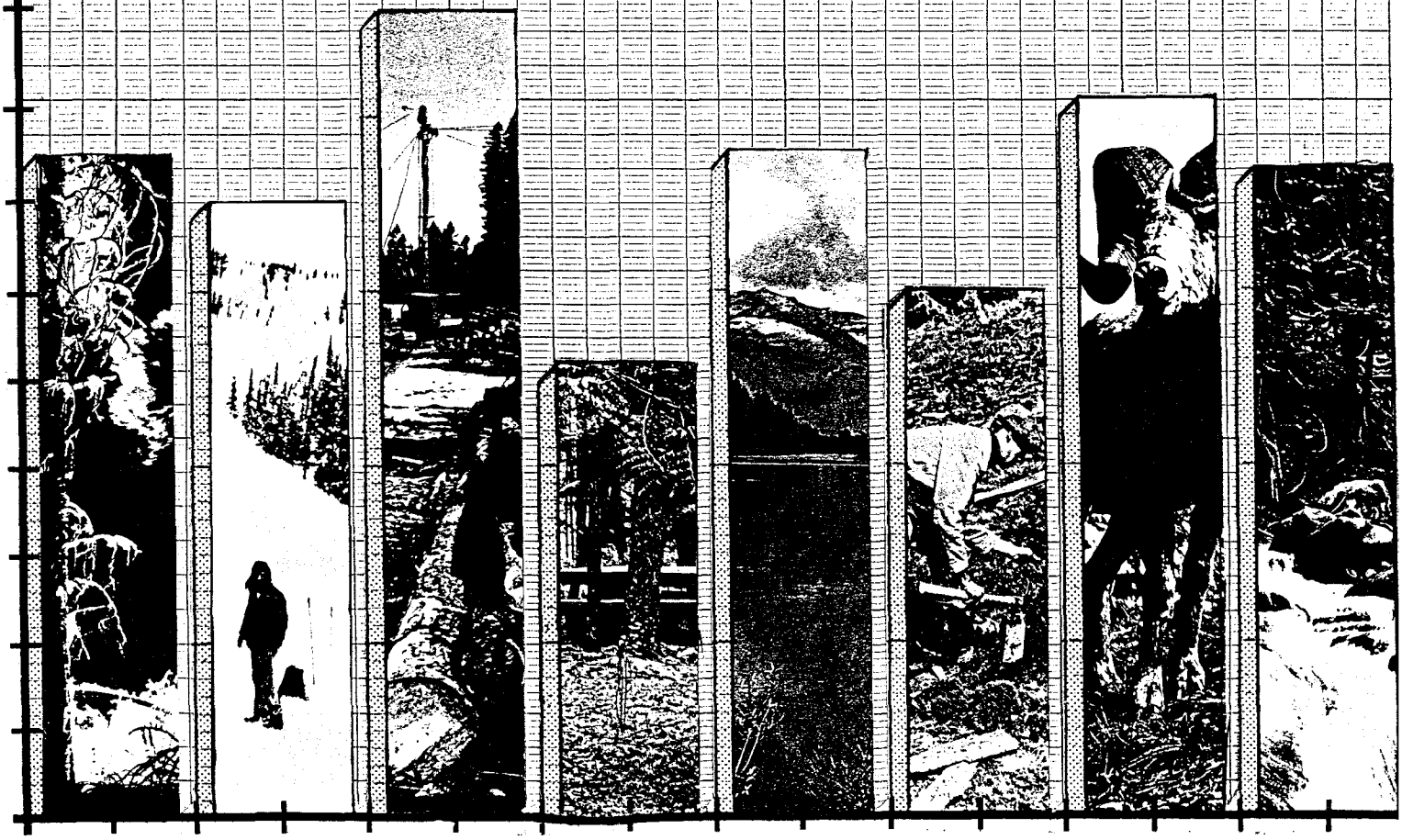
Kootenai National Forest

Forest Plan – Volume 2

United States
Department
of Agriculture

Forest Service

Kootenai
National Forest



KOOTENAI NATIONAL FOREST

FOREST PLAN

NORTHERN REGION

FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE

SEPTEMBER, 1987

VOLUME II

APPENDICES

KOOTENAI NATIONAL FOREST

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APPENDIX ONE

LAND CLASSIFICATION

Appendix 1

Land Classification

Classification		Acres
1.	Grand Total Kootenai NF land base	2,245,000
2.	Non-Forest (including water)	- 82,000
3.	Forest land	2,163,000
4.	Forest land withdrawn from timber production (unavailable)	- 35,000
5.	Forest land not capable of producing crops of industrial wood (not capable)	- 291,000
6.	Forest land physically unsuitable: irreversible damage likely to occur; not restockable within 5 years	- 49,000
7.	Forest Land - inadequate information*	- 0
8.	Subtotal: Tentatively suitable forest land	1,788,000
9.	Forest land not appropriate for timber production**	- 525,000
10.	Subtotal: Suitable Forest land	1,263,000
11.	Subtotal: Unsuitable forest land***	900,000

* Lands for which current information is inadequate to project responses to timber management. Usually applies to low site lands.

** Lands identified as not appropriate for timber production due to: (a) assignment to other resource uses to meet Forest plan objectives; (b) management requirements; and (c) not being cost effective in meeting Forest Plan objectives over the planning horizon.

*** Sum of items 4, 5, 6 and 9.

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APPENDIX TWO

VEGETATION MANAGEMENT PRACTICES

Appendix 2

VEGETATION MANAGEMENT PRACTICES

Introduction: All vegetation management practices on forested lands will be preceded by a silvicultural examination, which is an on-the-ground analysis of the area and a site-specific prescription written or reviewed by a certified silviculturist. The prescription process considers direction and objectives set forth in this Appendix, the Kootenai Forest Plan (Chapters II and III), site-specific factors, and a review of the applicable technical and scientific literature as well as practical experience. The prescription will detail the actual vegetative manipulation to be done on a case-by-case basis, and will include the silvicultural standards found in the Northern Regional Guide and Silvicultural Practices Handbook (FSH 2409.17).

The silvicultural prescription process is a concurrent activity with the interdisciplinary team process in preparing projects. Prescriptions are formulated within Kootenai Forest Plan guidance to achieve the specific objectives of the Management Areas involved (See Chapter III of the Kootenai Forest Plan). The full range of silvicultural systems are available for use on the Kootenai National Forest, which are individual tree selection to clearcutting and described in more detail below.

The selected vegetative management practices for individual sites will comply with management requirements listed in 36 CFR 219.27(b).

Refer to the Kootenai Forest Plan Final EIS references for complete discussions of silvicultural systems and their various environmental effects.

Clearcutting: as a silvicultural system will be employed to harvest timber under the Forest Plan, and is selected on the basis of physical and biological site factors, existing timber types, and overall economics. It will be selected only when it is determined to be the optimal sivicultural system.

Clearcutting allows considerable flexibility in determining the character and composition of future timber stands. The species, degree of stocking, etc., can be controlled with various silvicultural techniques. This is especially useful in situations where existing stands are occupied by less valuable and undesirable species, or the current species composition is at high risk for losses due to insects or disease.

Clearcutting may be the most effective harvest method to achieve certain desired multiple-use objectives of a stand. An example is a big-game winter range where clearcutting is the most successful system for maximizing growth of desirable forage and browse vegetation. But, clearcutting can be detrimental if applied to sites where physical conditions will change to extremes of heat and cold if the forest cover is totally removed. In these cases, regeneration efforts can be difficult and costly.

The clearcutting method is usually the most economical harvest system to use because all merchantable timber is removed and the volume and value per acre treated and accessed is maximized. Fuels treatment and subsequent cultural

treatments are also less costly than with other systems, since there is no residual stand to be protected.

The following are general descriptions of sites and situations when clear-cutting may be selected as the optimal harvesting method:

1. The moisture and temperature regimes of the site, following timber harvest and site preparation for artificial or natural regeneration, will be favorable for the regeneration of a desired species. In general, north and east aspects fit this category but conditions can vary by geographic location and slope position.

2. The existing stand is stocked with species that are not desired in the regenerated stand because of disease or insect susceptibility, or the physiological condition of the existing overstory is such that natural regeneration is unlikely to occur.

3. The change in forested appearance created by the harvest opening does not conflict with objectives for visual management.

4. Management objectives for the area can be better achieved by clearing all of the trees in one operation. An example is when increases in browse and forage for wildlife or domestic livestock are desired.

Clearcutting is most likely to be prescribed for habitat types in the western red cedar (Thuja plicata) series, western hemlock (tsuga heterophylla) series, on the cool/moist habitat types of the grand fir (Abies grandis) and the subalpine fir (Abies lasiocarpa) series. It will also be the predominant silvicultural system for regenerating lodgepole pine stands, especially stagnated lodgepole pine stands. Examples of these habitat types include:

Western red cedar/queencup beadlilly (Thuja plicata/Clintonia uniflora)
Western hemlock/queencup beadlilly (Tsuga heterophylla/Clintonia uniflora).
Grand fir/queencup beadlilly (Abies grandis/Clintonia uniflora)
Grand fir/twinflower (Abies grandis/Linnaea borealis)
Subalpine fir/queencup beadlilly (Abies lasiocarpa/Clintonia uniflora)

NOTE It is possible that a site-specific, on-the-ground analysis may identify situations where clear-cutting may be the optimal harvest method and those conditions do not meet the ones described in the above general descriptions. It is also possible that site-specific conditions and an on-the-ground analysis could determine that clear-cutting may not be the optimal harvest method for all the lands that fit these general descriptions.)

Seed Tree Cutting: will also be used to harvest timber under this Forest Plan. In this system the basic objective is to have the second crop of trees (natural regeneration) start on a site before all of the standing timber is removed.

Seed tree cutting is usually used in physical site conditions similar to those described above for clearcutting. The primary difference is that desirable seed trees exist on the site; and these seed trees, along with desirable trees in adjacent stands, provide the seed source for the next stand. The seed tree

system offers the opportunity to reduce regeneration costs and meet a higher visual quality objective.

Once regeneration is established, removal of the residual stand requires carefull harvest planning and implementation to protect the new crop of trees.

The following is a list of general factors that will be considered when determining whether or not the seed tree system will be applied to a particular area. A site-specific silvicultural prescription may consider additional factors and timber sale conditions.

1. The moisture and temperature regimes of the site, following timber harvest and site preparation for natural regeneration, will be favorable for regenerating the desired species. In general, north and east aspects fit this category but conditions can vary by geographic location and slope position.

2. The existing stand is stocked with species that are desired in the regenerated stand and the physiological condition of the trees is such that seed production and successful regeneration are likely to occur.

3. The seed trees are free of damaging agents (disease and/or insects) which will harm the planned understory before removal of the overstory.

4. The change in forested appearance created by the harvest opening does not conflict with objectives for visual management.

5. The phenotypic appearance of the seed trees indicate their progeny (seedlings) will be of a desirable genotype.

Seed tree cutting is most likely to be prescribed for habitat types similar to those mentioned above for clearcutting; which are western red cedar (Thuja plicata) series, western hemlock (Tsuga heterophylla) series, on the cool/moist habitat types of the grand fir (Abies grandis), and the subalpine fir (Abies lasiocarpa) series. It can also be used for regenerating lodgepole pine stands. Examples of these habitat types include:

Western red cedar/queencup beadlilly (Thuja plicata/Clintonia uniflora)
Western hemloch/queencup beadlilly (Tsuga heterophylla/Clintonia uniflora)
Grand fir/queencup beadlilly (Abies grandis/Clintonia uniflora)
Grand fir/twinflower (Abies grandis/Linnaea borealis)
Subalpine fir/queencup beadlilly (Abies lasiocarpa/Clintonia uniflors)

In prescribing seed tree harvest methods, consideration will be given to future harvests required including the feasibility of removing the residual overstory from the established stand of seedlings and the effectiveness of site preparation and slash treatment.

<u>Shelterwood</u>: is a silvicultural system that will also be used to harvest timber under the Kootenai Forest Plan. The basic objective is to have the second crop of tress (natural regeneration) started on a site before all of the standing timber is removed, similar to the Seed Tree system described above.

Shelterwood systems are used in situations where the physical site conditions created by clearcutting or seed tree cutting would be too harsh for tree regeneration or would not be favorable to the establishment and growth of the desired species. The residual stand provides protection from temperature extremes on the site and modifies the climatic factors in general. The shelterwood system offers the opportunity to reduce regeneration costs, if factors are suitable for establishing natural regeneration from the seed source provided by the residual stand.

Shelterwood systems can be the most effective means of achieving the visual quality objectives of Retention or Partial Retention. This is because a high percentage (40-50%) of the larger more commercially valuable trees are left standing after the initial harvest entry. This can result in a lower volume and value per acre removed from the site which usually increases the unit costs of access and harvest.

Once regeneration is established, removal of the residual stand requires careful harvest planning and implementation to protect the new crop of trees, similar to the Seed Tree system.

The following is a list of general factors that will be considered when determining whether or not the Shelterwood system will be applied to a specific site. A site-specific silvicultural prescription may consider additional factors and timber sale conditions.

1. The existing stand is stocked with species that are desired in the regenerated stand and the physiological condition of the trees is such that seed production and successful regeneration are likely to occur.

2. The moisture and temperature regimes on the site are such that without some shading and cover, conditions will become too harsh for successful tree regeneration. South and west aspects generally fit into this category, but conditions can vary by location.

3. Management objectives for the area can best be achieved by maintaining some tree cover on the site until regeneration is established.

4. The seed trees are free of damaging agents (disease and/or insects) which will harm the planned understory before removal of the overstory.

5. The change in forested appearance created by the harvest opening does not conflict with objectives for visual management.

6. The phenotypic appearance of the seed trees indicate their progeny (seedlings) will be of a desirable genotype.

Shelterwood harvesting is the most likely to be prescribed on the warmer/drier habitat types of the grand fir (Abies grandis) series and the Douglas fir (Pseudostuga menziesii) habitat types. Some examples of these habitat types include:

Douglas fir/pinegrass (Pseudotsuga menziesii/Calamagrostis rubescens)
Douglas fir/common snowberry (Pseudotsuga menziesii/symphoricarpos albus)
Douglas fir/ninebark (Pseudotsuga menziesii/Physiocarpus malvaceus)

In prescribing shelterwood harvest methods, consideration will be given to future harvests required. The feasibility of removing the residual overstory from an established stand of seedlings, effectiveness of site preparation/slash treatment, and options such as artificial shading shall be considered when prescribing shelterwood harvests.

Selection Harvests: such as individual tree and group selection methods may be applicable to certain combinations of timber management and other resource objectives identified by the land designations in the Forest Plan. The most probable situations for implementing these silvicultural systems would be in riparian areas and in areas with visual quality objectives of Retention.

The existing timber types, stand conditions and site characteristics are critical factors that will be evaluated when considering the applicability of uneven-aged systems. Stands with high percentages of low vigor trees with little seed producing potential and species highly susceptible to disease and insect damage are examples of situations where uneven-aged management may not meet overall objectives.

Intermediate Harvests: such as commercial thinnings will generally be prescribed only in stands that have not reached the culmination of mean annual increment. Salvage or sanitation harvest may be considered as intermediate treatments in stands that have already culminated in growth, but cannot be harvested and regenerated because of multiple-use constraints on scheduling (maintaining wildlife cover). This treatment may be considered in lodgepole pine stands that are rated high risk for mountain pine beetle infestation.

Timber Stand Improvement: such as pre-commercial thinning, clearing, and weeding treatments will be used on sapling-sized stands where stocking exceeds the level necessary or desirable to meet the future stand objectives. Thinnings will be designed to promote stand diversity, while maintaining stand growth and yield projections at levels prescribed in the management prescriptions.

Reforestation: will be done on all cutover sites planned for regeneration. Hand planting will be prescribed for areas where natural regeneration will not meet the target stand description. Hand planting may also be prescribed in seed tree and shelterwood units when natural regeneration appears to be inadequate to meet required stocking levels, or a species change is needed. Natural regeneration may be prescribed in clearcut, shelterwood, and seed tree systems where regeneration is likely to occur within 5 years.

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APPENDIX THREE

TIMBER PRODUCTIVITY CLASSIFICATION

Appendix 3

Timber Productivity Classification

Potential Growth* (cubic feet/acre/year)	Suitable Lands (acres)	Unsuitable Lands (acres)
Less than 20	0	744,000
20-49	64,000	39,000
50-84	470,000	44,000
85-119	581,000	58,000
120-164	148,000	15,000
165-224	0	0
225+	0	0
TOTALS	1,263,000	900,000

* Based on the potential biological growth of natural stands, with no consideration given to stocking or other intensive practices.

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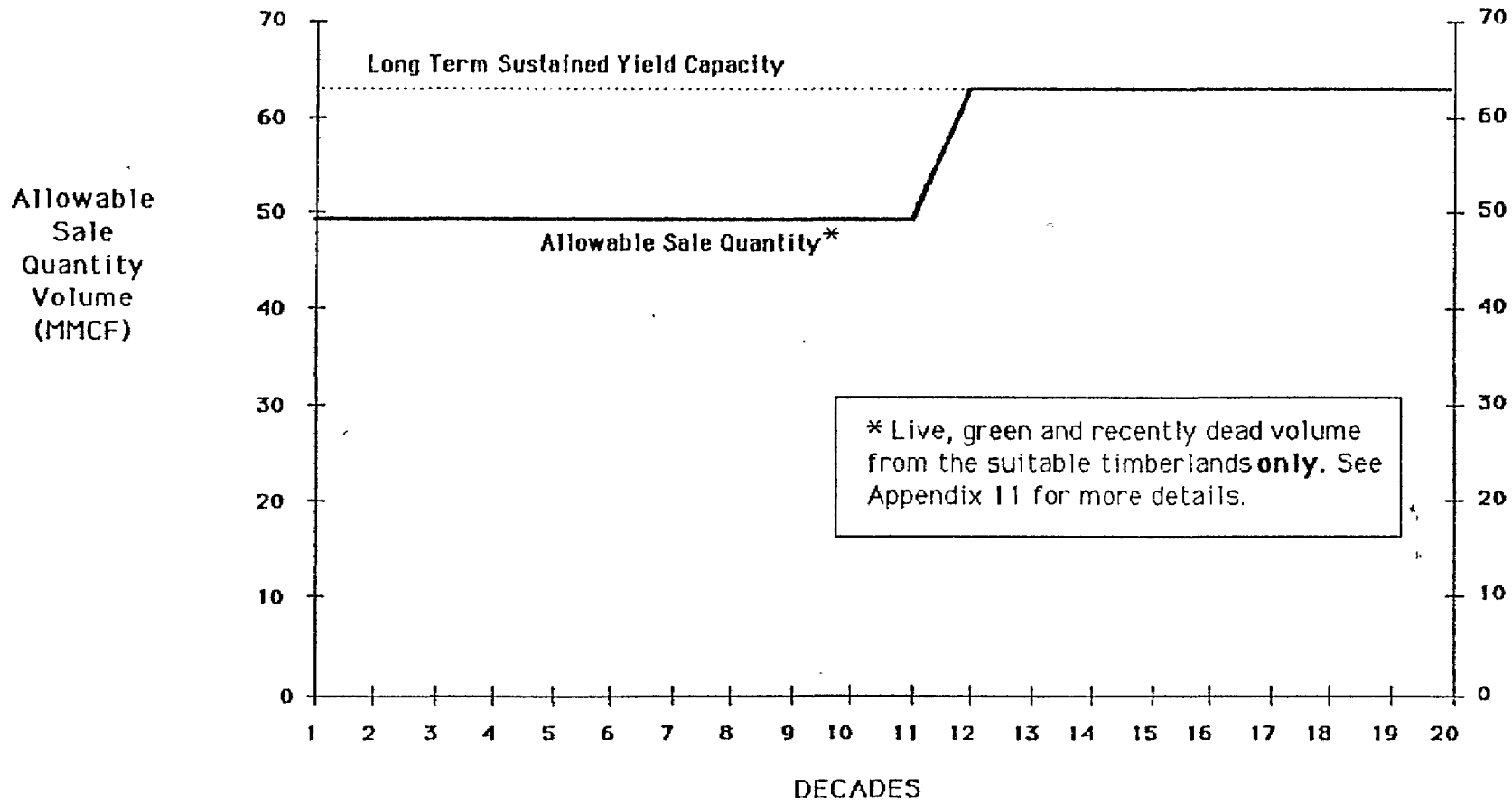
APPENDIX FIVE

LONG-TERM SUSTAINED YIELD AND ALLOWABLE SALE QUANTITY

LONG-TERM SUSTAINED YIELD AND ALLOWABLE SALE QUANTITY*

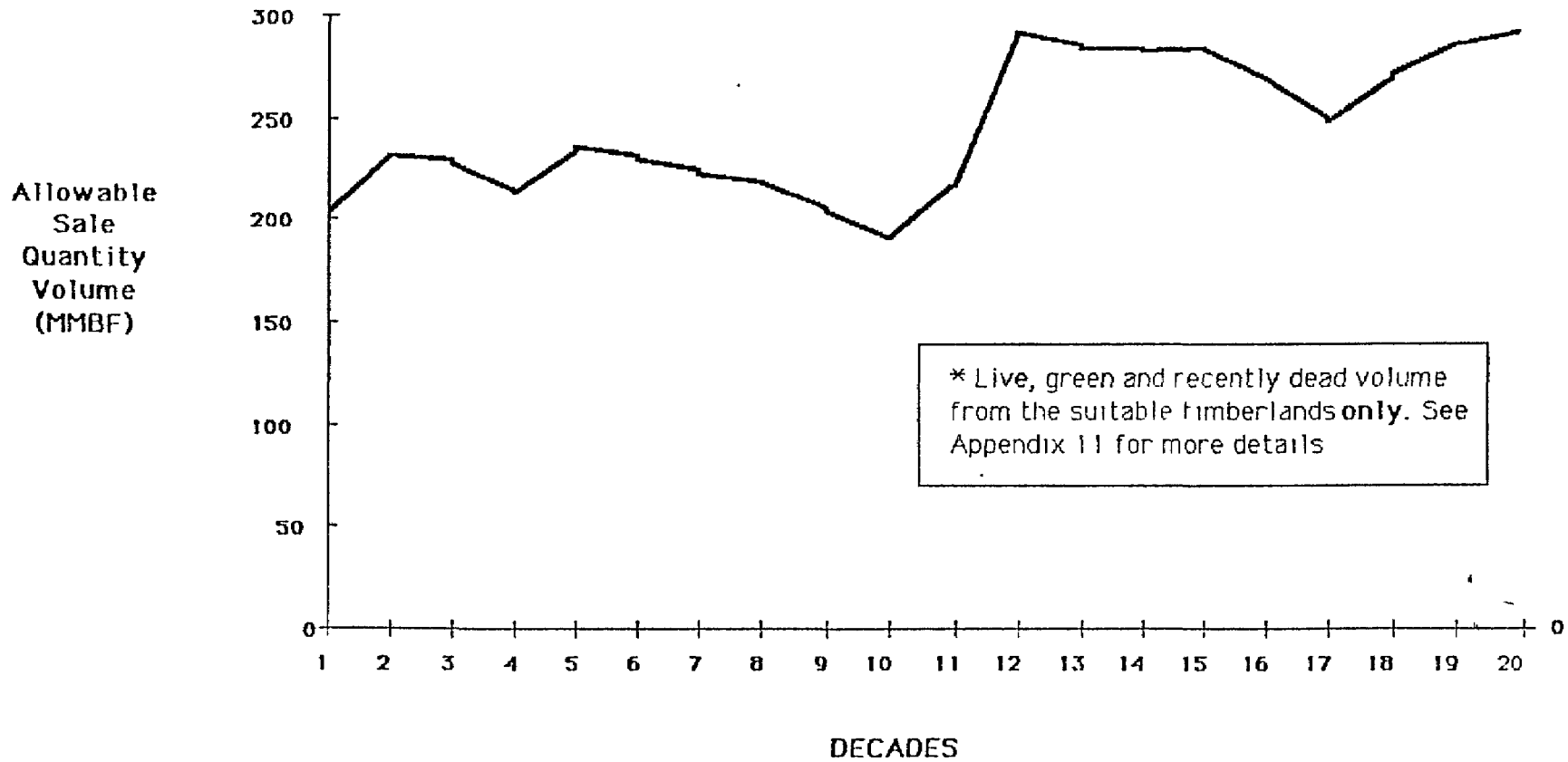
(Average Annual Volumes)



* Live, green and recently dead volume from the suitable timberlands **only**. See Appendix 11 for more details.

ALLOWABLE SALE QUANTITY*

(Average Annual Volumes)



* Live, green and recently dead volume from the suitable timberlands **only**. See Appendix 11 for more details

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APPENDIX SIX

PRESENT AND FUTURE

Appendix 6

Present and Future Forest Conditions

	Unit of Measure	Suitable Land	Unsuitable Land
Present forest:			
Growing stock	MMCF	3,187	1,763
	MMBF	13,130	7,261
Live cull	MMCF	N/A	N/A
	MMBF	N/A	N/A
Salvable dead	MMCF	17	N/A
	MMBF	50	N/A
Annual net growth	MMCF	19	N/A
	MMBF	116	N/A
Annual mortality	MMCF	13	6
	MMBF	49	21
Future forest (at 200 years):			
Growing stock	MMCF	2,957	
Annual net growth	MMCF	63	
Rotation age	Years	80 to 130	

Age class distribution acres (suitable lands)/1/

Age Class	Present Forest	Future Forest/2/
0 -10	4,000	104,000
20*	57,000	112,000
30	0	139,000
40	0	186,000
50	218,000	153,000
60*	356,000	115,000
70	0	122,000
80	0	102,000
90	0	97,000
100*	141,000	66,000
110	0	11,000
120	0	16,000
130*	190,000	19,000
140	0	13,000
150	0	3,000
160*	297,000	5,000
170	0	0
180	0	0
190	0	0
200+	0	0

* For modeling purposes average ages of existing stands were used as follows:

All Seedling/Sapling Stands	- 20 years
Poles & Immature Sawtimber (Mixed Conifer)	- 60 years
Poles & Immature Sawtimber (lodgepole pine)	- 50 years
Mature Sawtimber (Mixed Conifer I)	- 160 years
Mature Sawtimber (Mixed Conifer II)	- 130 years
High Risk Lodgepole Pine	- 100 years

Non-stocked stands are shown as age 0 to 10 years

/1/ Excludes old-growth timber management areas for dependent wildlife species

/2/ At 200 years

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APPENDIX SEVEN

PROJECTED BUDGET

Appendix 7

Projected Budget Required to Implement the Forest Plan
(Average Annual in Thousands of Dollars for First Decade)

Funding Item	Budget Activity	FY 78 Dollars*	(x1.57=) FY 86 Dollars
00	General Administration	1465	2300
01	Fire	530	850
02	Fuels	59	95
03-05	Timber	2648	4157
06,07	Range	59	92
08	Minerals	287	450
09	Recreation	561	880
10	Wildlife and Fish	648	1017
11	Soil, Air, Water	269	422
12	Facility Maintenance	145	228
13-15	Lands/Land Management	156	245
42,43	Lands-Status/Acquisition	96	150
16	Landline Location	285	447
17	Road Maintenance	764	1200
18	Trail Maintenance	115	181
19	Co-op Law Enforcement	12	19
20	Reforestation-Appropriated	871	1367
21	TSI-Appropriated	562	882
23	Tree Improvement	20	31
26-28	KV (Trust Fund)	1427	2241
29	CWFS-Other (Trust Fund)	348	547
30	Timber Salv. Sales (Perm. Fund)	275	432
31	Brush Disposal (Perm. Fund)	694	1090
32	Range Improvement	6	10
33	Recreation Construction	99	155
34	Facility Construction-FA&O	111	175
35	Engineering Construction Support	2360	3706
36	Const.-Capital Investment Roads	1801	2828
37	Trail Construction/Reconstruction	32	50
24,38	Timber Road Const. PC or Election	2399	3766
	Total	19,104	29,993

* FY 78 is the base year for costs used in Forest planning.

NOTE: Budget figures may differ slightly from those used in the EIS. They have been adjusted based upon professional judgement and special analyses by the Forest Management Team.

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APPENDIX EIGHT

GRIZZLY MANAGEMENT SITUATION

Appendix 8

GRIZZLY MANAGEMENT SITUATION GUIDELINES AND AUGMENTATION DISCUSSION

Kootenai National Forest

I. Introduction

This policy and guideline statement was developed for three major reasons;

1. to promote the unification of grizzly bear management in the Northern Region through a consistent set of guidelines applied by all Forests, and

2. to clearly establish a policy for the management of grizzly bears and their habitat on the Kootenai National Forest.

3. to pull together, in one document, the numerous guidance and procedural directions that have been in existence on the Kootenai but are located in many different documents. In this context, this set of guidelines contains little new information or direction.

As a federal entity, the Kootenai National Forest is clearly responsible for ensuring that any action funded, authorized or carried out be done in a manner which does not jeopardize the continued existence of grizzly bears or adversely modify their habitat. This responsibility under Section 7 of the Endangered Species Act is fulfilled through the development of biological evaluations or assessments which examine the proposed actions with respect to their potential for influencing grizzly bears or their habitat. If this objective analysis, conducted by qualified personnel (generally operational wildlife biologists), cannot clearly determine that the action will not affect grizzly bears or their habitat then formal consultation with the Fish and Wildlife Service will be initiated. This formal step provides for an interagency exchange of information and ideas and significantly strengthens the application of the Endangered Species Act.

Grizzly bears on the Kootenai occupy portions of two primary ecosystems. In the northeast portion of the Forest grizzly bears occupy about 3 percent of the Northern Continental Divide Ecosystem (NCDE), roughly 114,000 acres. In this area, though listed as a threatened species, grizzlies can be legally hunted. An apparent extension of this ecosystem southwest of Highway 93 contains an additional 90,000 acres within which grizzlies may not be hunted.

The other ecosystem on the Kootenai is the Cabinet-Yaak Ecosystem (CYE), of which the Kootenai manages about 70 percent or roughly 828,000 acres. Grizzly bears have not been legally hunted in this area since 1974 and only two mortalities of native bears have been known to occur since that date.

Grizzly bears were listed as a threatened species in 1975 and numerous actions have been taken since to stabilize their decline and to assist in recovery. Among these actions on the Kootenai are:

1. The delineation of essential habitat in coordination with other Forests in Region One.

2. The development and publication of guidelines for harvesting timber in grizzly bear habitat.

3. Participation in the development of the recovery plan.

4. The stratification of essential habitat into management situations specific to the Kootenai National Forest.

5. The development and implementation of a relocation plan in conjunction with other responsible agencies.

6. The development and application of habitat component mapping and cumulative effects analysis.

7. The inclusion of grizzly habitat and specific management prescriptions in Forest level planning.

Most of the management emphasis on the Kootenai has focused on habitat. Over most of the Forest an accurate data base has been developed down to the habitat component level. It is agreed by all responsible agencies that suitable habitat exists in the CYE but that a low density, small population of grizzlies is present. On the other hand, that portion of the NCDE that exists on the Kootenai supports a relatively high density of grizzlies and is intrinsically bound to populations of bears in the Flathead drainage, which have been relatively well studied in the past 10 years.

Initiation of a grizzly study in the Cabinets in 1983 was a first step in gaining information on grizzly bears native to the CYE. To date, three native bears have been trapped and radio-collared. Two grizzlies have also been captured and radio-collared in conjunction with a black bear study in the Yaak drainage area. Study of these bears will focus on habitat use, movement patterns, and home range sizes for native grizzly bears.

Data collected in the study will be used to update or modify current management guidance which is predominantly based on data extrapolated from other studies. The management guidance contained in this document is dynamic and will be updated as needed.

The precise population of grizzlies in the CYE will probably never be known. As the extent and accuracy of grizzly data develops, population estimates will be established using criteria identified in the Recovery Plan. Until better population information exists, management emphasis will focus on the maintenance of desirable conditions in occupied grizzly habitat. The target population density for the CYE identified in the Recovery Plan is 1:26 square miles which would result in a grizzly population on the Kootenai of about 45 bears.

In contrast, relatively good data exists for parts of the NCDE relative to the Kootenai's portion. It is felt the area supports a density of about 1:15 square miles or about 13 bears. Sightings and sign substantiate the presence of a good population of bears and the area is open to legal hunting for grizzlies. In general, it is felt the area supports a viable population of grizzlies.

II. Definitions

All Forests in the Northern Region (R-1) have been directed to stratify their grizzly habitat according to definitions in the "Interagency Grizzly Bear Guidelines" (formerly Yellowstone Guidelines). Through application of a common set of situation descriptions, all Forests will have a common basis from which to operate.

Prior to the use of the Interagency Guidelines, the Kootenai developed a habitat stratification similar in concept and has applied that mapping to management activities for the past six years. The Kootenai stratification emphasized habitat condition, season of use, and history of use. Mapping of the Kootenai situations was done at a much smaller scale than the Interagency Guideline situations and functions essentially as a substratification within those various situations. The Kootenai stratification has served well and will be absorbed into the current guidelines and defined as a "mode," or particular form of habitat within the various situations. Incorporation of the Interagency Guideline situation descriptions by the Kootenai will help achieve uniformity among Forests in R-1 but, recognition of the various "modes" within the situations will allow the Kootenai to retain an effective management tool. In addition, habitat component mapping will serve as another level of refinement as illustrated below:

Occupied Habitat (Recovery Plan)	Interagency Guidelines Situations	Kootenai Management Modes	Habitat Component Mapping

>----------Increasing Level of Resolution----------->

"Interagency Guideline" Descriptions

Management Situation 1

1. Population and Habitat Conditions: The area contains grizzly population centers (areas key to the survival of grizzlies where seasonal or year-long grizzly activity under natural, free-ranging conditions is common) and habitat components needed for the survival and recovery of the species or a segment of its population. The probability is very great that major federal activities or programs may affect (have direct or indirect relationships to the conservation and recovery of) the grizzly.

2. Management Direction: Grizzly habitat maintenance and improvement and grizzly/human conflict minimization will receive the highest management priority (FSM 2603). Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. Grizzly/human conflicts will be resolved in favor of grizzlies unless the bear involved is determined to be a nuisance. Nuisance bears may be controlled through either relocation or removal, but only if such control would result in a more natural, free-ranging grizzly population and all reasonable measures have been taken to protect the bear and/or its habitat (including area closures and/or activity curtailments).

Management Situation 2

1. Population and Habitat Conditions: Current information indicates that the area lacks distinct population centers; highly suitable habitat does not generally occur, although some grizzly habitat components exist and grizzlies may be present occasionally. Habitat resources in Management Situation 2 either are unnecessary for survival and recovery of the species, or the need has not yet been determined but habitat resources may be necessary. Certain management actions are necessary. The status of such areas is subject to review and change according to demonstrated grizzly population and habitat needs. Major Federal activities may affect the conservation of the grizzly bear primarily in that they may contribute toward (a) human-caused bear mortalities or (b) long-term displacement where the zone of influence could affect habitat use in Management Situation 1.

2. Management Direction: The grizzly bear is an important, but not the primary, use on the area. In some cases, habitat maintenance and improvement may be important management considerations. Minimization of grizzly-human conflict potential that could lead to human-caused mortalities is a high management priority. In this management situation, managers would accommodate demonstrated grizzly populations and/or grizzly habitat use in other land use activities if feasible, but not to the extent of exclusion of other uses. A feasible accommodation is one which is compatible with (does not make unobtainable) the major goals and/or objectives of other uses. Management will at least maintain those habitat conditions which resulted in the area being stratified Management Situation 2. When grizzly population and/or grizzly habitat use and other land use needs are mutually exclusive, the other land use needs may prevail in management considerations. In cases where the need of the habitat resources for recovery has not yet been determined, other land uses may prevail to the extent that they do not result in irretrievable/irreversible resource commitments which would preclude the possibility of eventual restratification to Management Situation 1. If grizzly population and/or habitat use represents demonstrated needs that are so great (necessary to the normal needs or survival of the species or a segment of its population) that they should prevail in management considerations, then the area should be reclassified under Management Situation 1. Managers would control nuisance grizzlies.

Management Situation 3

1. Population and Habitat Conditions: Grizzly presence is possible but infrequent. Developments, such as campgrounds, resorts or other high human use associated facilities, and human presence result in conditions which make grizzly presence untenable for humans and/or grizzlies. There is a high probability that major Federal activities or programs may affect the species conservation and recovery.

2. Management Direction: Grizzly habitat maintenance and improvement are not management considerations. Grizzly/human conflict minimization is a high priority management consideration. Grizzly bear presence and factors contributing to their presence will be actively discouraged. Any grizzly involved in a grizzly/human conflict will be controlled. Any grizzly frequenting an area will be controlled.

Kootenai Management Mode Descriptions

Each of the management situations may have substratifications, or modes, which reflect of the former Kootenai management situations. The four modes defined will assist primarily at the project level and be related to habitat conditions, habitat component information, and season of use. Decisions and policy will be influenced by the Yellowstone situation within which the modes fall. The modes are defined as follows:

Mode A - These areas contain population centers and a complexity of grizzly habitat components which provide essentially for yearlong needs, with the possible exception of spring range. Denning habitat is generally found in these areas. Generally, there is a history of bear occupancy and use that is well established through sightings or sign. These areas are often the most rugged, secluded, and remote areas on the Forest with a high component of nonforested or sparsely forested habitat.

Mode B - These areas are often proximate to Mode A areas but may have less complexity of grizzly habitat components, may lack denning habitat, and often have a high component of forested habitat. Habitat and cover types are often those which offer a high potential for enhancing bear foods through vegetative manipulation or which may currently provide grizzly foods. Generally some recognized and historical bear use has been documented.

Mode C - These are high value seasonal ranges upon which grizzly bears may depend for short, yet critical, periods of time. Most frequently these are spring and late fall ranges which meet pre- and post-denning needs. These areas are often at lower elevations and may be disjunct from Mode A or B areas.

Mode D - These areas generally provide little actual or potential for grizzly foods but serve predominantly as movement corridors, buffers, or connectors between areas of higher value and use. Cover needs are predominant and the ability for free movement through the area is a primary management consideration. Often there may be limited documentation of bear use.

III. Policy and Objectives

It is the policy of the Kootenai National Forest to conduct programs and activities in a manner which promotes the conservation of grizzly bears. This includes adherence to responsibilities outlined in Section 7 (ESA), and furtherance of the goals identified in the grizzly bear recovery plan. Inherent in this program will be coordination with all agencies responsible for grizzly management strategies. The following objective statements will assist in achieving this stated goal:

1. In partnership with cooperating agencies, strive to avoid human-induced mortalities on the Kootenai National Forest by;

   a. increasing public awareness of grizzly bear behavior and habitat needs and by informing and educating the general public in back country behavior in grizzly habitat.

   b. recognizing potentially hazardous situations and modifying management activities or public use to reduce conflicts.

2. On all Situation 1 acreage on the Kootenai, resolve conflicts in favor of grizzly bears and emphasize their welfare in management activities. Activities will be made compatible or they will be foregone.

3. Management direction for Situation 2 was initially developed in an ecosystem over five times larger than the Cabinet-Yaak and with a population of over 200 grizzly bears (Yellowstone). In view of these differences and with the consultation of the Fish and Wildlife Service, the Kootenai has elected to avoid, as much as possible, mutually exclusive resource activities by placing all Situation 2 areas into compatible management emphasis (prescription). Thus, multiple use activities will be designed and coordinated in a manner which is compatible with grizzly bear behavior and habitat needs.

4. In Situation 3 areas manage to avoid attracting grizzly bears or creating situations which bring bears into contact with humans. Actively discourage grizzly presence in these areas.

5. In all situations, strive to develop a grizzly management program which maintains and enhances identified grizzly bear habitat, incorporates relevant research and management information into all applicable activities, and supports the conservation and recovery of the species.

		Acreages	
Ecosystem	Sit 1 (M Acres)	Sit 2 (M Acres)	Sit 3 (M Acres)
Cabinet-Yaak	628	200	.8
Northern Cont. Divide	116	90*	.4

*Extension SW of Highway 93

IV. Management Guidelines and Standards

The following guidelines and standards will provide for a more consistent interpretation and implementation of the Interagency Guidelines on the Kootenai:

Guidelines provide broad direction that should be strived for in all management activities but may be altered on the basis of site specific needs as determined in a biological evaluation. Standards provide specific direction in management areas. Forest Supervisor approval is mandatory for deviation from standards.

At least annually the Kootenai will confer with the Fish and Wildlife Service on any changes that are needed in standards and guidelines. Historically, the Kootenai has had frequent informal and formal consultations with the Fish and Wildlife Service. These guidelines may reduce the number of formal consultations needed but continuation of the informal consultations is important. The need for consultation will be determined on the basis of a biological evaluation, the development of which will be consistent with FSM 2670.

The grizzly bear recovery plan will be used as a reference document in identifying activities and steps that can be incorporated into Forest management to promote the recovery of the species.

Wildlife Management	Std	Guide	S1	S2	S3
1. Keep abreast of current research activities and data relating to grizzly bears and their habitat. Ensure that current, applicable data is incorporated in management activities. Initiate consultation with the Fish and Wildlife Service as necessary.	X		X	X	X
2. Utilize biological evaluations to determine project compatibility. On the basis of biological evaluations ensure that only projects which are compatible or which enhance grizzly habitat are initiated in Situation 1. Proposed projects or land uses in Situation 1 areas which are not compatible will be modified or foregone.	X		X		
3. On the basis of biological evaluations projects are made as fully compatible as possible, consistent with the other resource goals of the area. If a proposal causes an unresolvable conflict and the evaluation indicates that the activity will affect species survival and recovery (jeopardy) then the area should be reconsidered for Situation 1 status. If resolution of the conflict and resultant use of the area by grizzly bears does not constitute need for species survival and recovery then the project shall proceed as modified.	X			X	
4. Measures taken to protect, maintain or enhance grizzly bear habitat will be documented in biological evaluations and specified in project design. Project level environmental assessments or decision documents will clearly reflect consideration of grizzly habitat management recommendations.	X		X	X	X
5. Develop a public information and education program with the assistance of other responsible agencies. Emphasize bear habitat needs, bear behavior, minimization of grizzly/human conflicts, and the need for a comprehensive management program which will lead to recovery of the species.	X		X	X	X

	Std	Guide	S1	S2	S3
6. Develop a long range grizzly management program which includes at least the following: (1) identification of management information needs, (2) updating of grizzly habitat maps, (3) maintenance of sighting records and evidence of grizzly use and occupation, (4) refinement of situation mapping on the basis of changes in habitat suitability, population and distribution, (5) modification of standards and guidelines in management prescriptions on the basis of new data, (6) identification of direct habitat management activities which will protect or enhance grizzly habitat, and (7) identification of potential relocation or population augmentation areas.	X		X	X	X
6a. If the inventory in 6(6), above, identifies areas that can be enhanced, funding will be sought.	X		X	X	
7. Identify and strive to make unavailable food sources which may draw grizzly bears into potential conflict with humans. These food sources may include the carcasses of livestock or wildlife, garbage dumps, food caches in backcountry areas, or roadside seeding of succulent grasses and legumes. Cooperate with federal, state, county, and private entities in achieving this guideline.	X		X	X	X
8. Utilize a cumulative effects perspective in developing management guidelines and constraints at the project level.	X		X	X	
9. Monitor the application of these standards and guidelines to assure they are properly and effectively used. Modify standards and guidelines as needed and with the cooperation of the Fish and Wildlife Service.	X		X	X	X
Timber/Fire Management					
1. All proposed timber and fire management activities will be evaluated for their effects on grizzly bears and their habitat. A cumulative effects perspective will be used in the evaluation. Employment of habitat component information and grizzly use data will be part of the evaluation. Proposals will be evaluated with respect to how they affect grizzly bear management objectives on the Kootenai National Forest. Applicable contracts will include specific clauses to achieve management goals and objectives and, in Situation 1, a clause which provides for a suspension or temporary cessation of activities if such is needed to resolve a grizzly/human conflict situation. Both contractual stipulations and administration will be used to ensure that contractors cooperate in meeting grizzly management objectives.	X		X	X	

	Std	Guide	S1	S2	S3
2. Grizzly habitat may be improved through vegetative manipulation. Techniques which may cause improvement are silvicultural treatments, prescribed burning and sale area improvement activities,					
a. on the basis of a biological evaluation, grizzly habitat components will be identified and included in the consideration of the project. This may include protection or enhancement of a particular component and provision for their use by bears.	X		X	X	
b. Timing constraints, scheduling, maintenance of movement corridors, shortened contract periods, provision of displacement areas, and access management will be considered and implemented as needed in project design.	X		X	X	
c. Silvicultural treatment in some habitat types can significantly improve available bear foods. Identification of these habitat types and provision for the improvement of bear foods will be incorporated in project design consistent with other considerations such as;	X		X	X	
1. design of regeneration units should stress irregular edges where consistent with site preparation capabilities (e.g., prescribed fire).		X	X	X	
2. adequate cover, movement corridors, leave islands and spacing between units will be incorporated in project design to facilitate bear movement into and through project areas so that existing components and new food sources can be utilized.		X	X	X	
3. favor site preparation techniques which protect or enhance known bear foods. Use prescribed burning where dozer scarification results in the destruction or adverse modification of bear foods such as huckleberries.	X		X	X	
4. road locations will be placed to avoid the destruction of known habitat components unless the biological evaluation indicates the component loss is tolerable with respect to other results of the project.	X		X	X	
5. small sale activities will be coordinated with large sale activities and will be equally responsive to grizzly management goals and objectives and Kootenai standards and guidelines.	X		X	X	

	Std	Guide	S1	S2	S3
6. riparian zone treatments will follow policy established by the Forest Plan.	X		X	X	
d. Sale area improvement projects funded from timber sale receipts collected for post treatment activities (KV funds) should receive high priority where there is potential for improvement of grizzly habitat in sale areas. Such activities may include the following:	X		X	X	
1. revegetation with grasses and legumes in those areas where bears can safely feed and would benefit from increased foods (especially spring ranges)					
2. improvement or reestablishment of cover conditions in important feeding or movement areas					
3. implementation of road management where open road densities are at higher levels than desirable					
4. prescribed burning in those habitat situations where increased succulence or improved fruit production will result or grizzly foods will be improved or made available.					
e. Prescribed burning both as a direct habitat improvement technique and as a site preparation technique will be used to enhance grizzly habitat where vegetative or habitat type conditions indicate. Specific instances where prescribed burning is an important technique include;	X		X	X	
1. burning of identified shrub fields to enhance fruit production					
2. recognition of the value and incorporation of wildfire in wilderness and nonwilderness situations where fire has been an important factor in maintaining grizzly habitat.					
3. Roads associated with project proposals will be an integral part of the analysis conducted in the biological evaluation. This will include existing roads and new road proposals. Grizzly bear management and Kootenai grizzly objectives will be included in the development of area transportation plans or any similar comprehensive access planning document. Specific consideration will be given to the following:	X		X	X	

	Std	Guide	S1	S2	S3
a. Consistent with standards and guidelines in Plan prescriptions, open road densities will be reduced as determined in biological evaluations for project activities. Generally, this includes closure of all local roads and an average open road density not to exceed .75 mile/section.	X		X	X	
b. Road closures may be facilitated by physical barriers, gates, or other means as specified in biological evaluations. Timing and duration of closures will be identified in biological evaluations. Other options include: a dog-leg (sharp turn) in the first 100 yards of side roads, destroy the first 100 yards of closed roads (long-term), avoid loop roads, and use and remove temporary bridges.		X	X	X	X
c. Road design and standards should be those which minimize conflict with wildlife values yet meet safety and environmental considerations. Criteria generally include:		X	X	X	
1. minimum number of miles to achieve project objectives					
2. minimum clearing widths, low cuts and fills, and high diversity in vertical and horizontal alignment					
3. roads which "lay on the land"					
4. maximum use of local roads, minimize arterials and collectors.					
5. use snow roads where appropriate.					
4. Facilities such as camps or equipment storage areas will be located away from known grizzly use areas or identified habitat components. For those camps which are allowed in proximity to grizzly habitat there will be strict regulation of garbage, pets, and human waste to minimize grizzly/human conflict.	X		X	X	X
5. Development of Forest level fire management plans will include information about grizzly habitat and incorporation of prescribed fire where it can benefit grizzly habitat and not conflict with other resource values (e.g., municipal watersheds, old growth, regulated timberlands).	X		X	X	

	Std	Guide	S1	S2	S3	
Range Management						
1. All livestock use on allotments will be analyzed in a biological evaluation to determine the effect on grizzly habitat and the potential for conflict with grizzly bears. This evaluation will be accomplished as part of the preparation or revision of allotment management plans unless specific problems dictate immediate action.		X		X	X	
2. Grazing activities with the potential for conflict with grizzly management objectives will be modified to be compatible with grizzly habitat needs. Disposal of carcasses will be done in a manner which minimizes the potential for grizzly/human conflicts.		X		X	X	
3. Regional grizzly bear protection clauses will be included in annual permittee operating plans.		X		X	X	
Recreation Management						
1. The following examples of uses, developments, or activities will be evaluated to determine their compatibility with grizzly bear objectives;		X		X	X	X
a. proposed roads and trails (foot, trail, vehicle)						
b. proposed campgrounds, designated campsites, picnic areas, trail heads, visitor information facilities, and other structures or facilities for recreation and administrative use						
c. proposed special use resorts, cabins, base camp sites, outfitter stock grazing areas, and areas used for grazing by noncommercial recreation stock						
Any of the above which currently exist and which may be in conflict with grizzly management objectives should be evaluated in a cumulative effects/biological evaluation process.						
2. All recreation oriented environmental analyses will incorporate grizzly management objectives and specify measures or clauses necessary to meet them. All contracts, permits, and operating plans will include provisions specifically addressing Region 1 grizzly bear protection measures (2670 memo of 11/3/83).		X		X	X	X

	Std	Guide	S1	S2	S3
3. Attractants					
a. Garbage containers will be of a bear-proof design or existing facilities will be modified and made bear proof. Garbage pickup will be scheduled to minimize the potential of developing a bear attractant at container locations	X		X	X	X
b. Existing and proposed garbage dump sites will be evaluated to determine if problems exist. The Forest will coordinate with county officials in the location and management of dump sites and dumpsters.		X	X	X	X
c. Operators with special use permits will be required to make garbage unavailable to bears through the use of bear-proof containers and regular collection and offsite disposal in approved locations. Permit clauses or stipulations will reflect these standards.	X		X	X	X
d. Outfitter/guide permits will specify measures to be taken in terms of food storage, refuse disposal and wild meat storage. Work with Montana Department of Fish, Wildlife, and Parks on enforcement of the permit regulations.	X		X	X	X
e. Use of established nondeveloped campsites will be adjusted as necessary to prevent a buildup of odors or improperly handled garbage which could attract grizzlies.		X	X	X	X
f. An information brochure summarizing human conduct in grizzly country will be made available to the public. A supply of the brochure will be made available to local offices of the Montana Department of Fish, Wildlife, and Parks.		X	X	X	X
g. Trails, roads, and areas with histories of grizzly human encounters, or areas where grizzly use increases grizzly encounter potential, may be closed to human use either temporarily in Situation 1 and 2 or permanently in Situation 1 to reduce conflict potential.	X		X	X	
h. If backcountry recreational use is determined to exceed grizzly tolerance levels, some means of restriction or reduction of human use should be implemented (i.e., permit system or reevaluation of commercial use) to avoid displacement of grizzlies from suitable habitat.		X	X	X	

	Std	Guide	S1	S2	S3
i. Reduce grizzly mortality illegally occurring during big game hunting seasons by:		X	X	X	
1. Assisting Montana Department of Fish, Wildlife, and Parks in making information available to all hunters to assist them in distinguishing between black and grizzly bear.					
2. Assisting Montana Department of Fish, Wildlife, and Parks in issuing special warnings to hunters using areas frequented by grizzly bear.					
3. Recommending that black bear hunting regulations be modified as appropriate to reduce or avoid areas or time periods of significant conflicts.					
4. Road closures in key grizzly bear habitat.					
Land Adjustment					
1. All land adjustment proposals will be analyzed in a biological evaluation to determine the effect on grizzly bears and their habitat. On that basis;	X		X	X	
a. consummate exchanges which contribute habitat or improve the opportunity to manage grizzly bears toward recovery levels					
b. emphasize the acquisition of critical habitat components or important seasonal ranges (especially spring range)					
Minerals, Special Uses, and Watershed Management					
1. Proposed activities for a) minerals, oil and gas, microhydro, and geothermal exploration and development; b) special use permits such as powerlines, pipelines, and water developments; c) all uses which require no special use permit (FSM 2708) will be analyzed in a biological evaluation to determine their effect on grizzly bears and their habitat. In Situation 1 these activities will be made compatible with grizzly bear management objectives. In Situation 2 they will be made as compatible as possible consistent with other resource uses and statutory rights and implementation will be monitored if remaining conflicts are judged to be potentially important in a biological evaluation. If significant conflicts develop, further modification of activities or restratification of the habitat may be necessary.	X		X	X	X

	Std	Guide	S1	S2	S3
2. Oil and gas leasing on the Kootenai will be in accordance with current Kootenai EA's on the subject, Forest grizzly habitat stratification, and Forest management objectives.	X		X	X	
3. All operating plans and special use permits will reflect Forest grizzly bear objectives and contain appropriate clauses or stipulations needed to meet the objectives. Provisions specifically identified in Region 1 grizzly bear protection measures (2670 memo of 11/3/83) will be incorporated in all operating plans and permits. Of specific concern are at least the following:	X		X	X	X
a. Food, garbage and human waste will be handled in a manner which minimizes or eliminates them as bear attractants.	X		X	X	
b. Firearms and pets will not be allowed where the biological evaluation identifies them as problems.	X		X	X	
c. Temporary living facilities will be located away from known bear use areas, away from habitat components or not allowed as determined by a biological evaluation.	X		X	X	
d. Development of new access or access routes that are incompatible with Forest management objectives will be discouraged within legal bounds.	X		X	X	
e. Periods of operation will be modified to eliminate or minimize conflicts with grizzly bears as determined in a biological evaluation.	X		X	X	

V. Augmentation Discussion

Augmentation, basically an effort to increase the numbers of a species when used in a wildlife context, is a well accepted and routine wildlife management practice. Over the past 30 years on the Kootenai National Forest elk, bighorn sheep, mountain goats, fisher, and grizzly bears have been brought in to increase native populations. The augmentation of elk and bighorn sheep has been very successful while success with the other species has ranged from moderate to poor.

With specific regard to grizzly bears, seven different bears have been added to the Cabinet-Yaak grizzly population between 1979-1983 (none during the last four years). None of the seven bears are known to currently remain on the Forest. Those bears were moved under a relocation agreement pertaining to bears which were determined to be problems or nuisance bears in other locations. Participants in this effort included the Montana Department of Fish, Wildlife, and Parks, the Fish and Wildlife Service, other National Forests, and Glacier National Park. This relocation agreement helped expedite the movement of grizzly bears into areas where conflicts with humans could be reduced or eliminated. Grizzlies moved under this relocation agreement were not selected for either the greatest chance for survival or for their capability to best contribute to the population into which they were relocated. Rather, they got into various circumstances that necessitated their removal and were accepted into new locations on the basis of their potential as risks in further human/bear conflicts. Thus, relocation efforts are significantly different in their intent and in the candidate grizzly bears than what would occur in an augmentation effort.

While the population of grizzly bears in the Cabinet-Yaak ecosystem is unknown, there is solid evidence and agreement among managing agencies that the existing population is very low in number. The habitat for grizzlies in the Cabinet-Yaak ecosystem is capable of supporting additional grizzly bears, as evidenced by the historic population and the abundance and diversity of bear foods identified through component mapping. When sufficient habitat exists and a native population is at low numbers, augmentation becomes an option for increasing a species' numbers through placement of selected individuals of the most desirable sex and age into the best habitat conditions and at the most advantageous time. Because grizzly bears have such a naturally low rate of reproduction and the fact that when populations become very low in number they may not be capable of recovery on their own, augmentation of grizzly bears in the Cabinet-Yaak Ecosystem may, in fact, be necessary to ensure the survival of this population in the future. Left to their own, the Cabinet-Yaak grizzly bear population would likely not reach recovery and would remain extremely sensitive to any mortality or major habitat disturbances. Successful augmentation would give the population more resiliency toward mortality or habitat disturbance, as well as ensure their future survival. With or without augmentation the identified grizzly habitat on the Kootenai National Forest will be managed according to the guidance contained in this appendix.

The following are available and will be considered as augmentation alternatives:

1. No Action: Continue to manage the native population within the guidance identified in this plan.

2. Augmentation with grizzly bears acceptable under existing relocation agreements; basically a continuation of past relocation efforts as has occurred since 1977.

3. Augmentation with specific grizzly bears of a predetermined sex and age placed into specific habitat conditions at the most opportune times. Essentially the same type of augmentation practiced with other wildlife species.

4. Augmentation by means of cross fostering grizzly bear cubs with black bear mothers. This procedure has been successful with raptors and cranes and groundwork has been laid working with black bears.

5. A mix of alternatives 2,3, and 4 dictated by grizzly bear availability, knowledge of potential surrogate black bear mothers, and the condition and availability of nuisance bears.

VI. Applicable Documents

In addition to these policy, objective, standard, and guideline statements, there are numerous other documents which clarify and support the items addressed herein. They include, but are not limited to, the following:

1. Grizzly Bear Recovery Plan

2. Habitat Component Mapping/Cumulative Effects Process, Kootenai National Forest

3. Cabinet-Yaak Ecosystem Data Sheet

4. Region One Grizzly Action Plan

5. Region One Grizzly Bear Clauses

6. Kootenai National Forest Integrated Plan as revised

7. Prescriptions, standards, and guidelines in Kootenai Integrated Plan

8. Criteria for Nuisance Bears and Relocation of Grizzly Bears in the Cabinet-Yaak and Northern Continental Divide Ecosystems

9. Guidelines for Timber Harvest in Grizzly Bear Habitat

10. Interagency Grizzly Bear Guidelines

11. Charting the Course - The Forest Service Grizzly Bear Conservation Program

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX NINE

LANDOWNERSHIP AND ADJUSTMENTS

Appendix 9

Landownership and Land Adjustments

1. Introduction

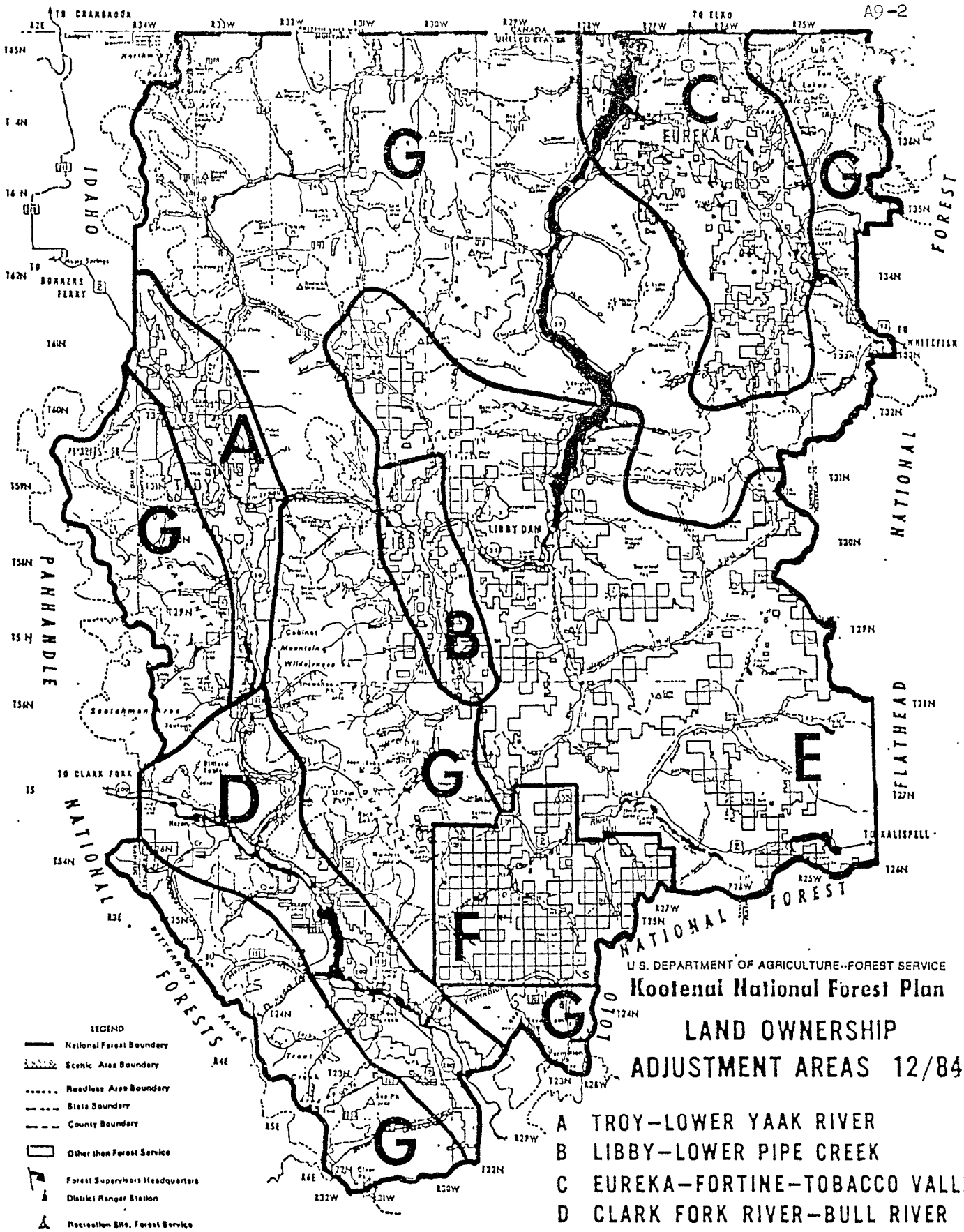
The landownership pattern on the Kootenai National Forest varies with location. The pattern can be characterized as (1) large blocks of uninterrupted, contiguous National Forest lands, (2) checkerboard situations with alternate sections of private and public lands, (3) isolated tracts of private lands surrounded by National Forest lands, (4) isolated tracts of National Forest lands surrounded by private lands, and (5) large blocks of lands owned by major corporate landowners.

The large blocks of major corporate lands and checkerboard situations are generally located in the southeastern quarter of the Forest. The largest concentration of noncorporate private lands is in the Eureka-Fortine area, the northeastern part of the Forest.

The other concentrations of private lands occur in the areas of Libby, Troy, Yaak River, Bull Lake valley, and the Clark Fork River valley.

Isolated tracts of private land surrounded by National Forest land occurs in various locations on the Forest. While there are other instances of National Forest lands surrounded by private lands, the majority of these situations are in the Eureka-Fortine area.

Checkerboard and isolated parcels of both public and private lands create problems of rights-of-way, trespass, title claims, encroachments, easements, cost-share roads, and other Forest management programs. At times, "management compatibility" problems can occur when adjacent lands are being managed for conflicting objectives, such as primitive recreation next to full timber production. Ownership adjustments and consolidation can correct some of these problem areas.



U.S. DEPARTMENT OF AGRICULTURE--FOREST SERVICE

Kootenai National Forest Plan

LAND OWNERSHIP ADJUSTMENT AREAS 12/84

A TROY—LOWER YAAK RIVER

B LIBBY—LOWER PIPE CREEK

C EUREKA—FORTINE—TOBACCO VALLEY

D CLARK FORK RIVER—BULL RIVER

E UPPER PIPE CREEK—FISHER RIVER—WOLF CREEK—PLEASANT VALLEY

F UPPER FISHER—VERMILLION—MCGINNIS

G REST OF THE FOREST

2. Landownership Adjustment Direction

BACKGROUND

Planning for landownership involves opportunities and responsibilities that extend beyond Forest Service generated activities on existing National Forest lands. Landownership adjustments must help meet resource management objectives and public needs. Decisions about landownership adjustments must be guided by the capability of the land to efficiently meet present and future demands for goods and services. These considerations were incorporated in the planning process.

The intent of the Landownership Plan program that follows is to display fewer land management objectives that are incompatible with those of other landowners. It is generally not desirable to propose and undertake a form of management on Forest lands that is in direct conflict with activities on adjacent private lands.

The Kootenai will provide for equitable consideration of private inholdings through development of:

1. Management options available for private land exchange or management of inholdings.

2. Access opportunities to private land for commodity extraction and uses, including recreation.

B. Landownership Adjustment Areas

The Forest has been broken into seven landownership adjustment areas with general landownership intentions set forth for each. The intentions are also a reflection of input from all corporate landowners, counties, the State of Montana, and numerous small and large landowners. The seven areas listed below are shown on the attached map, labeled Landownership Adjustment Areas. The tables of the specific lands listed as desirable for acquisition or disposal are shown beginning on page A9-9. All other lands are designated for retention.

1. Troy-Lower Yaak River, (Area A)

Ownership acquisitions will be pursued outside cities, towns, and developing areas such as active subdivisions. General intentions are to allow appropriate expansions of private holdings while elsewhere acquisitions chiefly will be aimed at improving public use for recreation and wildlife.

2. Libby-Lower Pipe Creek, (Area B)

Forest Service will generally not attempt any acquisitions in the area. Rather, the Forest will work with private landowners and Lincoln County to provide a suitable ownership pattern for private developments.

3. Eureka-Fortine-Tobacco Valley, (Area C)

In general, scattered smaller blocks of National Forest will be retained for public recreation and winter range for big-game wildlife and certain nongame species. Forest Service acquisitions will primarily be those which create more favorable access and/or use of public recreation opportunities and which provide critical wildlife habitat. A specific land adjustment program with the State of Montana will be pursued in T33N, R26W, (Upper Fortine Creek area) and next to the Stillwater State Forest to consolidate State holdings. Also, selected, isolated parcels of National Forest land in T35N and T36N, R26W, will only be disposed of to the State of Montana.

4. Clark Fork River-Bull River, (Area D)

National Forest land along the valley/National Forest edge will be available for disposal where not necessarily needed for management purposes. Acquisitions of private land will be aimed principally at picking up "opportunity" cases that will provide a direct benefit to the public (i.e., trail heads for access into the wilderness and which provide critical wildlife habitat along with access to timber for harvesting operations). The Bull River area will be the focus of efforts to acquire land in fee or through conservation easements that specifically benefit recreation, visual resources, and wildlife (especially grizzly bears).

5. Upper Pipe Creek-Fisher River-Wolf Creek-Pleasant Valley, (Area E)

These are "intermingled" lands with large corporate landowners and scattered small units of private land. Generally, the corporate landowners wish to consolidate their ownerships. The Kootenai will engage in land exchanges that have clear benefits to the public and provide better management options for the Forest Service. The Forest intends to dispose of National Forest lands in the Meadow Peak-Pleasant Valley and Fisher River and Snell Mountain areas and acquire lands in the upper Fisher River-Allen Peak areas for wildlife management (including grizzly bear), nonmotorized recreation, and old-growth timber purposes.

6. Upper Fisher-Vermilion-McGinnis, (Area F)

These are "checkerboard" lands with large corporate landowners. In the Upper Fisher area Plum Creek Timber Company would like to consolidate or totally divest themselves of their entire ownership. The Forest Service would be willing to acquire the lands in the checkerboard pattern because they would provide high public benefits in terms of hunting, recreation, wildlife, scenery, and watershed protection values. The area has mineral potential and acquisition/disposal opportunities will only be pursued where mineral development for public benefit is available. The logging costs in the area are prohibitive so limited loss of timber base lands is expected.

In the Sedlak Park to McGinnis Meadows areas Champion International is interested in some of the National Forest land. The Forest Service is willing to exchange certain parcels within about 3 miles of Raven Work Center but desires to retain the other National Forest lands.

7. Rest of Forest Not In "1" Through "6", (Area G)

Forest Service will attempt to acquire all private parcels in any Wilderness, Scenic Area, or other designated area. Outside those designated areas are scattered, generally isolated, small parcels of private land.

Exchanges and/or acquisitions will only be purused on an opportunity basis where ownership would enhance the Forest Service's ability to provide greater public use or goods.

C. General Guidance

1. Exchanges should be of a size to ensure administrative efficiency and cost-effectiveness in case processing.

2. Where possible stay within the Flathead, Lolo, Panhandle, and Kootenai Forests.

3. Try to keep Federal and non-Federal lands within the same County, where possible, otherwise attempt to design a subsequent exchange to balance the acres over the program.

4. Select projects with a low probability of developing adverse public reaction or controversy.

5. Concentrate on lands within key resource areas such as wilderness, scenic areas, essential wildlife habitat corridors, etc.

6. Give major concern to areas having high wildlife values such as grizzly habitat and critical big-game range.

7. Try to deal with proposals that will assist management by reducing or eliminating areas with cost-sharing, difficult access, land line problems, trespass, encroachment, or costly timber stand management problems.

8. Give high consideration to scenic areas and landscape view zones .

9. Consider all known mineral deposits and their impact on a changed ownership.

10. Give major emphasis to maintaining a stable timber supply to local mills. Consider the effect of changed ownership and/or reduced volumes of timber to specific local areas.

11. Give importance to trading like/kind lands (i.e., low timber volume, wildlife, primitive recreation lands for similar lands). When a parcel with a key noncommodity resourse is identified for acquisition by the forest, an attempt should be made to include it in a larger package to lessen the impact of exchanging noncommodity lands for timber lands on a project basis.

12. Provide recreation opportunities and access by enhancing the ability to develop a planned transportation system.

13. Help maintain hydrologic balance. Be responsive to fisheries needs and impacts.

14. Diligently pursue opportunities for exchange, purchase, or donation where such actions will be consistent with the intent of approved management prescriptions.

15. Look for opportunities to use Conservation Easements that acquire development rather than fee rights. If possible, try to obtain only those rights needed for National Forest management purposes and attempt to leave as much private land available as possible.

D. Specific Guidance by Landownership Pattern

The landownership patterns tend to fall into three basic groups. They are: (1) Checkerboard; (2) Intermingled; and (3) Other. For purposes of this Plan the following definitions will be used:

Checkerboard - Landownership pattern where National Forest System lands occur principally in alternate sections.

Intermingled - A variety of landownerships, including some small amounts of checkerboard and scattered patterns, where intermixed ownership occurs.

Other - Essentially solid blocks of National Forest land and designated areas such as Wilderness and Scenic Areas.

Checkerboard Pattern

As a general rule National Forest System lands intermingled in a checkerboard pattern with lands owned by large, private corporations may remain intact. Exceptions are in specific areas where landownership change is needed to respond to major public issues, management concerns, or to support resource management goals identified in the Forest Plan.

Intermingled and Other Patterns

Intermingled and other lands will be exchanged or purchased if they fit the following guidelines.

1. Legislative mandates.

2. Policy in the Forest Service Manual.

3. Landownership adjustments needed to meet community or other special needs when in the public interest.

4. Achieving a balance of resource uses from both public and private lands to best meet present and future local and national needs.

5. Protection and enhancement of the environment.

6. Administrative efficiency, including cost-effectiveness.

Specific Guidelines Applicable to all Landownership Patterns Will Be:

1. Classified wilderness--acquire all privately owned lands; do not dispose of National Forest System lands.

2. Recommended designated wilderness--National Forest System land will not be classified for disposal.
3. Inventoried roadless areas--acquisition or disposal of lands will depend on analysis in Forest Plan.

4. Congressionally classified and designated areas (other than wilderness) or administratively classified areas--achieve the ownership pattern necessary to preserve or enhance the values which established the classification in order to achieve the management objectives for the area.

5. National Forest System lands will not be disposed of when the action will significantly reduce the Northern Region commercial timberland base, or would adversely affect threatened or endangered species habitat.

LAND ADJUSTMENT ACRES - TOTALS BY ADJUSTMENT AREA

AREA	DESIRABLE TO BE ACQUIRED	DESIRABLE TO BE DISPOSED
A.	11,306.00*	3,149.50
B.	840.00*	5,599.00
C.	13,760.75	11,063.00
D.	16,737.00*	906.00
E.	9,665.00*	47,740.00
F.	30,251.00*	128.00
G.	8,429.00*	336.00
TOTAL	90,998.75*	68,921.50

* Additional lands may become desirable to acquire if Congress recommends any Wild and Scenic Rivers from among the available candidates (See Appendix 22).

Specific Tables of Proposed Lands Desirable to be Acquired or Disposed of by Landownership Adjustment Area and the Reasons

The following are code letters defining the reasons for desiring disposal or acquisition of the lands shown in the following tables.

Note that these lands are all National Forest in character. However, some lands are significantly more suitable than others and land trades can be used to dispose of less characteristic lands for those that provide greater public benefits.

REASONS DESIRABLE FOR DISPOSAL

TYPE OF REASON	CODE LETTER
Isolated Parcels	A
Low in Character as National Forest Lands	B
Management Problem	C
Trespass/Encroachment/Title Claim Problems	D
Improve Public Benefits By Being in State Ownership	S

REASONS FOR ACQUISITION

Area for Recreation Sites	A
Consolidation of National Forest Land	B
Water-Oriented Frontage	C
Isolated Private Parcel	D
Big-Game Habitat	E
Threatened or Endangered Species Habitat	F
Provide Public Access	G
Improve Timber Production	H
Essential Fish or Bird Habitat	I
Provide Substantially Improved Public/Mgmt. Usage	J
Mitigation or Protection of Cultural Resources	K
Primitive and/or Dispersed Recreation	L
Eliminate Costly Title Claims, Water Rights, Trespass, or Other Legal Problems	M
Provide More Cost-Effective Management Capability	N

NOTE: Certain National Forest lands will only be disposed of to the State of Montana. The reason is that the identified resource values on these parcels must be protected or be specifically managed and this requirement can be met by disposing of certain lands to the State but at the same time giving the State and the public an ownership pattern that is more manageable. These lands will have the code "S" on the lists that follow.

LANDS DESIRABLE TO BE ACQUIRED - AREA A

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
33	34	2	Por. W1/2W1/2	40	B, D, J
33	34	3	Por. E1/2	210	B, D, J, C
33	34	4	SE1/4SE1/4	40	B, D, J
33	34	9	NE1/4NE1/4	30	B, D, J
33	34	10	All Pvt.	140	B, D, J
33	34	11	All Pvt.	180	B, D, J, C
33	34	15	S1/2SW1/4	80	B, D, J
33	34	20	Por. W1/2W1/2	80	B, D, J
33	34	22	N1/2NW1/4	80	B, D, J, E
33	34	28	HES 748	160	B, D, J, E
33	34	33	All	640	B, D, E, H,I,N
33	33	20	HES 1127	50	B, D, J, E
33	33	29	HES 1193	23	B, D, J, E
33	33	31	HES 414	160	B, D, J, C
33	33	32 33	HES 419, HES 1161	70	B, D, J, C
32	34	3	W1/2NW1/4	80	B, D, J, C
32	34	12	All Pvt.	240	B, D, J, C
32	34	13	All Pvt.	480	B, D, J, C, E
32	34	14	Por. NE1/4	40	B, D, J
32	33	5,6 7,8	HES 731, HES 738	221	B, D, J, C, E
31	34	2	All Pvt.	120	B, D, J
31	34	2	All Pvt.	130	B, D, J
31	34	5	N1/2NW1/4	80	B, D, J, N
31	34	6	E1/2	320	B, D, J, N
31	34	7	Por. E1/2	160	B, D, J, N

LANDS DESIRABLE TO BE ACQUIRED - AREA A (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
31	34	8	W1/2NW1/4	80	B, D, J, N
31	34	11	All Pvt.	170	B, D, J
31	34	14	SW1/4NW1/4,NW1/4SW1/4	80	B, D, J
31	34	15	E1/2SE1/4	80	B, D, J
31	34	16	All	640	B, D, J, E
31	34	17	All Pvt.	200	B, D, J
31	34	18	E1/2E1/2SE1/4	40	B, D, J
31	34	19, 20 29	All Pvt.	80	B, D, J, F
31	34	22	S1/2SE1/4	80	B, D, J, N
31	34	23	SW1/4SW1/4	40	B, D, J, N
31	33	4	Por. NW1/4	70	B, D, J, C
31	33	8	Por. SE1/4	120	B, D, J
31	33	13	S1/2	320	B, J
31	33	15	Lots 1,2 N1/2	330	B, D, E
31	33	23	NW1/4	160	B, D, J
30	34	10	All Pvt.	40	B, D, J, F
30	34	11	All Pvt.	30	B, D, J, F
30	34	14	All Pvt.	62	B, D, J, F
30	34	15	All Pvt.	80	B, D, J
30	34	22	All Pvt.	10	B, D, J
30	34	23	All Pvt.	200	B, D, J
30	34	24	All Pvt.	360	C, E, F, I, N
30	34	25	N1/2NW1/4	80	C, E, F, I, N
30	34	26	All Pvt.	280	C, E, F, I, N
30	34	27	All Pvt.	280	C, E, F, I, N

LANDS DESIRABLE TO BE ACQUIRED - AREA A (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
30	34	34	All Pvt.	80	C, E, F
30	34	35	All Pvt.	120	C, E, F, N
30	34	36	All	640	B, J
29	34	14	All	640	B, D, J
29	34	35	All Pvt. E 1/2	150	B, D, E, F
29	34	36	All Pvt. SW1/4	65	B, D, E, F
29	33	19	All	549	B, C, D, J
29	33	29	SW1/4	210	B, C, D, J
29	33	9	All	640	B, J, N
29	33	21	E1/2, NE1/4NW1/4	360	B, J, N
28	33	4	All Pvt.	156	A, B, C, D, J
28	33	6	All Pvt.	260	A, B, C, D

KNF LANDS AVAILABLE TO BE DISPOSED - AREA A

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
34	34	29	W1/2SW1/4	80	A, B, C
34	34	32	SW1/4SW1/4	40	A, B, C
33	34	5	Por. W1/2	249	A, B, C
33	34	17	Por. SW1/4SE1/4	15	A, B, C
33	34	20	Por. NW1/4NE1/4	30	A, B, C
32	34	20	N1/2NE1/4	80	A, B, C
32	34	24	Por. NE1/4	120	A, B, C
32	34	26	Por. NW1/4	120	A, B, C
32	34	36	All F.S.	240	A, B, C, S
32	33	30	Por. S1/2	155	A, B, C
31	34	1	All N.F.	200	A, B, C
31	34	2	E1/2NE1/4 E. of Hwy.	113	A, B, C
31	34	25	Por. NE1/4NW1/4	30	A, B, C
31	34	35	Por. E1/2	230	A, B, C,
31	33	6	All N.F.	360	A, C, D, S
31	33	20	All F.S.	320	A, B, C
31	33	22	W1/2W1/2	160	A, B, C
31	33	30	Por. S1/2	120	A, B, C
31	34	1	Por. NW1/4NW/4	15	A, B, C
30	34	2	Por. NE1/4NE1/4	10	A, B, C
30	33	4	E1/2SE1/4	80	A, B, C
30	33	6	Por. N1/2NW1/4SE1/4	280	A, B, C
30	33	19	NW1/4NW1/4	40	A, B, C
30	33	32	NE1/4NE1/4	40	A, B, C
29	33	8	Por. E1/2E1/2	22.5	A, B, C

LANDS DESIRABLE TO BE ACQUIRED - AREA B

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
29	31	10	All Pvt.	200	B, J, D
29	31	36	All State	640	B, J, D

KNF LANDS AVAILABLE TO BE DISPOSED - AREA B

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
31	31	26	Por.SW1/4	100	B, C, D
31	31	27	All	640	B, C, D
31	31	28	All	640	B, C, D
31	31	30	All F.S.	100	B, C, D
31	31	31	All F.S.	115	B, C, D
31	31	33	All F.S.	120	B, C, D
31	31	34	Por. N1/2N1/4, Por. SE1/4SE1/4	160	B, C, D
31	31	35	All F.S.	84	B, C, D
30	31	6	All F.S.	213	B, C, D
30	31	7	All F.S.	223	B, C, D
30	31	8	S1/2NE1/4,S1/2	400	B, C, D
30	31	9	NW1/4	160	B, C, D
30	31	15	SW1/4	160	B, C, D
30	31	17	SW1/4, W1/2SE1/4	240	B, C, D
30	31	18	All F.S.	190	B, C, D
30	31	22	SE1/4NE1/4	40	B, C, D
30	31	23	SW1/4NW1/4	40	B, C, D
30	31	25	E1/2NE1/4,NE1/4SE1/4	120	B, C, D
30	31	34	W1/2SW1/4, SW1/4NW1/4	120	B, C, D
29	31	1	All F.S.	180	B, C, D
29	31	3	NW1/4NW1/4	40	B ,C ,D
29	31	12	E1/2E1/2,NW1/4NE1/4	198	B, C, D
29	31	13	NE1/4NE1/4	40	B, C, D
29	30	18	All F.S.	160	B, C, D
29	30	19	E1/2SE1/4	80	B, C, D

KNF LANDS AVAILABLE TO BE DISPOSED - AREA B (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
29	30	30	All F.S.	310	B, C, D
29	30	31	All F.S.	151	B, C, D
29	30	32	E1/2SW1/4	80	B, C, D
28	30	5	Lot 1, SE1/4NE1/4	75	B, C, D
28	30	10	All but E1/2E1/2	420	B, C, D

LANDS DESIRABLE TO BE ACQUIRED - AREA C

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
37	28	1	Por.	50	B, E, F, J
37	28	2	Por.	160	B, E, F, J
37	28	16	All State	640	A, B, E, F
37	28	27	E1/2	320	B, D, E, N
37	28	28	All Pvt.	200	B, D, E, N
37	28	29	All Pvt.	100	B, D, E, N
37	28	33	NE1/4	160	B, D, E, F, I, J
37	27	3	All Pvt.	320	B, E,
37	27	4	All Pvt.	320	B, E,
37	27	5	All Pvt.	200	B, E, F, J
37	27	6	All Pvt.	50	B, E, F, G, J
37	27	16	All State	640	A, B, E
37	27	20	Por. W1/2	230	B, E, F, J
37	27	29	Por. SW1/4	160	B, E, F, J
37	27	31	Por. SE1/4	120	B, E, F, G, J
37	27	32	Por. W1/2	290	B, E, F, G, J
37	26	8	All Pvt.	240	B, E, F,
37	26	20	SE1/4SE1/4	40	B, E, F
37	26	23, 24	All Pvt.	34.75	B, D, E
36	28	4	All Pvt.	40	B, E
36	28	12	All Pvt.	80	B, E
36	28	33	All Pvt.	160	B, D, J
36	28	34	All Pvt.	40	B, D, J
36	28	36	All	640	B, D, J

LANDS DESIRABLE TO BE ACQUIRED - AREA C (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
36	27	6	Lots 4,5, SE1/4NW1/4	104	B, D, E, J, N
36	27	7	All Pvt.	80	B, D, J
36	27	26	N1/2SE1/4, S1/2NE1/4	160	B, D, J
36	27	27	S1/2NW1/4	70	B,D,J,
36	27	28	Pvt. to SW Shoreline	160	B, D, E, N
36	27	30	All Pvt.	120	B, D, J
36	27	31	All Pvt.	240	B, D, J
36	27	32	All Pvt.	520	B, D, J
36	27	33	SW1/4	160	B, D, J
36	27	34	All Pvt.	120	B, D, J
36	27	36	All State	640	B, D, J
36	26	4	All Pvt. in E1/2	160	B, D, E, N
36	26	13	All Pvt.	265	B, J, D, N
36	25	30	SW1/4SW1/4	40	B, J, D, N
36	25	31	N1/2NW1/4	80	B, J, D, N
36	25	33	All Pvt.	160	B, J, D, N
35	28	3	All Pvt.	56	B, D, E, J
35	27	1	All Pvt.	13	B, D, E, F, G, J
35	27	2	All Pvt.	144	B, D, E, F, G, J
35	27	4	SE1/4NE1/4, SE1/4NW1/4	80	B, D, E, M, N
35	27	9	Por. E1/2	40	B, D, E, M, N
35	27	10	All Pvt.	400	B, D, E, F, G, J
35	27	13	All Pvt.	200	B, E, F, G, J
35	27	25	NE1/4	160	B, D, E, H, J

LANDS DESIRABLE TO BE ACQUIRED - AREA C (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
35	27	29	NW1/4SW1/4	40	B, D, E, H, J
35	27	30	Por. E1/2	80	B, D, E, H, J
35	26	6	All Pvt. N W1/2	40	B, J
35	26	7	E1/2SW1/4, W1/2SE1/4, SE1/4SE1/4	200	B, J
35	26	18	NE1/4, E1/2NW1/4, SW1/4NW1/4	280	B, J
35	26	19	SW1/4NW1/4	40	B, J
35	25	4	All Pvt.	160	B, J, F
35	25	5	All Pvt.	120	B, J, F
35	25	6	All Pvt.	10	B, J, F
35	25	7	All Pvt.	120	B, J, F
34	27	12	E1/2SE1/4	80	B, E, J
34	27	13	E1/2NE1/4	80	B, E, J
34	26	2	All Pvt.	280	B, C, D, E, M, N
34	26	11	E1/2W1/2, S1/2NW1/4, NW1/4SW1/4	280	B, D, E, M, N
34	26	12	SW1/4SW1/4	40	B, E, J
34	26	13	S1/2S1/2, N1/2SW1/4	240	B, E, J
34	26	14	SW1/4SE1/4, SE1/4SW1/4	80	B, E, J
34	26	20	E1/2NW1/4, SW1/4NW1/4, SE1/4SW1/4	200	B, E, J
34	26	21	Por. S1/2	160	B, E, J
34	26	23	NE1/4NE1/4, W1/2NE1/4, E1/2NW1/4, SW1/4NW1/4, SW1/4SW1/4	280	B, E, J
34	26	24	N1/2NE1/4	80	B, D, E. M, N

LANDS DESIRABLE TO BE ACQUIRED - AREA C (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
34	26	26	Por.NW1/4	120	B, E, J
34	26	27	All Pvt.	160	B, E, J
34	26	28	Por. N1/2	200	B, E, J, M, N
34	26	29	All Pvt.	320	B, D, E, J, M, N
33	26	5	All Pvt.	120	B, E, J
33	26	6	Por.S1/2	204	B, E, J
33	26	7	W1/2W1/2,NE1/4NE1/4	200	B, E, J
33	26	8	NW1/4NW1/4	40	B, E, J
33	25	6	All Pvt.	160	D, E, I, J

KNF LANDS AVAILABLE TO BE DISPOSED - AREA C

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
37	26	7	SW1/4SE1/4 State Only	40	A, B, C, D
37	26	33	S1/2SW1/4	80	A, B, C
36	28	12	W1/2 SW1/4	80	A, B, C
36	28	13	NW1/4NW1/4	40	A, B, C
36	28	14	NE1/4NE1/4	40	A, B, C
36	27	18	All F.S.	40	A, B, C
36	27	22	SW1/4SE1/4	40	A, B, C
36	27	23	Por. E1/2	200	B, C, D
36	27	27	NW1/4NE1/4	40	B, C, D
36	26	15	All F.S.	280	A, B, C, D, S
36	26	17	All F.S.	80	A, B, C, D, S
36	26	20	All F.S.	240	A, B, C, D, S
36	26	23	All F.S.	360	A, B, C, D, S
36	26	27	SW1/4SE1/4	40	A, B, C, D, S
36	26	28	All F.S.	240	A, B, C, D, S
36	26	33	All F.S.	400	A, B, C, D, S
36	26	34	All F.S.	120	A, B, C, D, S
35	27	5	E1/2SE1/4	80	A, B, C
35	27	6	All F.S.	170	A, B, C
35	27	7	All F.S.	318	A, B, C
35	27	8	All F.S.	230	A, B, C
35	27	9	W1/2SW1/4	80	A, B, C
35	27	18	E1/2SE1/4, SW1/4SW1/4	120	A, B, C

KNF LANDS AVAILABLE TO BE DISPOSED - AREA C (continued)

Twp.	Rge	Sec	Subdivision	Acs.	Reasons
35	27	19	S1/2S1/2	140	A, B, C
35	26	2	All F.S.	160	A, B, C, D, S
35	26	3	All F.S.	320	A, B, C, D, S
35	26	4	All F.S.	240	A, B, C, D, S
35	26	5	All F.S.	160	A, B, C, D, S
35	26	10	All F.S.	40	A, B, C, D, S
35	26	11	All F.S.	240	A, B, C, D, S
35	26	13	All F.S.	160	A, B, C, D, S
35	26	17	All F.S.	400	A, B, C, D, S
35	26	20	S1/2SW1/4	80	A, B, C, D, S
35	26	25	SW1/4NE1/4,SE1/4NW1/4	80	A, B, C, D, S
35	26	29	NW1/4	160	A, B, C, S
35	25	29	All Except N1/2NE1/4	95	A, B, C, S
35	25	32	NW1/4NE1/4NW1/4	5	A, B, C, S
34	26	4	All F.S.	80	A, B, C
34	26	7	All F.S.	200	A, B, C
34	26	10	SE1/4SW1/4	40	A, B, C, D, S
34	26	31	NE1/4, SE1/4SE1/4	200	A, B, C,
34	26	32	W1/2, N1/2NE1/4	400	A, B, C,
34	26	33	All F.S.	400	A, B, C, D
34	25	6	Por. SE1/4NW1/4	30	A, B, C,
33	26	1	All F.S.	280	A, B, C
33	26	2	NW1/4W1/4	40	A, B, C, D
33	26	3	All F.S.	200	A, B, C, D

KNF LANDS AVAILABLE TO BE DISPOSED - AREA C (continued)

Twp .	Rge	Sec	Subdivision	Acs.	Reasons
33	26	9	All	640	A, B, C, D
33	26	10	All F.S.	520	A, B, C
33	26	12	Por. E1/2	240	A, B, C
33	26	13	SW1/4NW1/4,NW1/4SW1/4	80	A, B, C
33	26	14	SE1/4NE1/4,NE1/4SE1/4	80	A, B, C
33	26	15	All F.S.	360	A, B, C
33	26	19	Por. SW1/4SE1/4	15	A, B, C
33	26	21	NE1/4NE1/4,SE1/4SE1/4	80	A, B, C,
33	26	22	All F.S.	360	A, B, C
33	26	23	E1/2SE1/4	80	A, B, C
33	26	24	W1/2W1/2	160	A, B, C
33	26	25	NE1/4NE1/4,NW1/4NW1/4	80	A, B, C
33	26	26	SE1/4NE1/4,SE1/4SW1/4,SW1/4SE1/4	120	A, B, C
33	26	27	All F.S.	240	A, B, C
33	26	28	E1/2NE1/4, NE1/4SE1/4	160	A, B, C
33	26	34	All F.S.	160	A, B, C
33	26	35	All F.S.	280	A, B, C

LANDS DESIRABLE TO BE ACQUIRED - AREA D

Twp	Rge.	Sec.	Subdivision	Acs.	Reason
28	33	15	All	640	B, D, J, F, I
28	33	16	Por.E1/2	320	B, D, J, F, I
28	33	17	All Pvt.	560	E, F, I
28	33	21	All Pvt.	320	E, F, I,
28	33	28	All Pvt.	280	E, F, I
28	33	29	All Pvt.	240	E, F, I
28	33	32	Por.E1/2SE1/4	60	B, D, J, F
28	33	33	Por.W1/2SW1/4	100	B, D, J
27	32	5	All Pvt.	160	B, D, J, F
27	32	7	All Pvt.	300	B, D, J, F
27	32	18	All Pvt.	368	B, D, J, F
27	32	19	All Pvt.	320	B, D, J, F
27	32	20	All Pvt.	120	B, D, J, F
27	33	4	All Pvt.	140	B, F, I, J
27	33	5	Por.NE1/4NE1/4	122	B, F, I, J
27	33	9	All Pvt.	105	B, F, I, J
27	33	10	All Pvt.	278	C, E, F, I, J
27	33	11	All Pvt.	280	C, E, F, I, J
27	33	12	All Pvt.	265	C, I, J, F
27	33	24	All Pvt.	160	C, I, J, F
27	33	25	All Pvt.	200	C, F, E
27	33	6	All Pvt.	210	C, E, F, I
27	33	34	All Pvt.	120	C, E, F, J, I
27	33	35	All Pvt.	78	C, E, F, I, J

LANDS DESIRABLE TO BE ACQUIRED - AREA D (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
27	34	3 10	All Mineral Surveys	154	B, D, G, E, J,I,N
27	34	9	S1/2SW1/4	80	B, D, J, F
27	34	16	NW1/4NW1/4	40	B, D, J, F
27	34	17	NE1/4NE1/4	40	B, D, J, F
27	34	18	NW1/4	160	J, I, N, F
27	34	22	Por. N1/2	140	B, D, J, I, N, I
26	34	7	All	640	B, D, E, G, J,I,N
26	34	14	Por.N1/2N1/2	120	B, D, J
26	34	15	All Pvt.	560	B, D, E, G, J,I,N
26	34	16	All State	200	E
26	34	19	All Pvt.	160	B, D, E, G,J,I,N
26	33	8	Por.SE1/4	90	B, D, E, J
26	33	27	Por. S1/2SE1/4	80	B, D, E, J
26	33	33	All Pvt.	100	B, D, E,J, I, N
26	33	34	All Pvt.	320	B, D, E, J
26	32	5	All	640	B, D, E, F, G,H,J
26	32	8	All Pvt.	400	B, D, J, F
26	32	10	E1/2SW1/4	80	B, D, H, J, I
26	32	11	NW1/4NW1/4	40	H, J, I, N
26	32	16	E1/2, E1/4SW1/4	400	B, D, E, J, H, F
26	32	22	E1/2E1/2, SW1/4SE1/4	200	B, D, E, H, J, I
26	32	23	All	640	B, D, E, H, J, I
26	32	26	N1/2NW1/4	80	B, D, E, H, J

LANDS DESIRABLE TO BE ACQUIRED

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
26	32	18	All Pvt.	130	B, D
26	32	35	All	640	B, D, E, H, J, F
26	32	36	All	640	B, D, E, H, J, F
26	31	31	All	640	B, D, E, H, J, N
25	32	6	All Pvt.	160	B, D, E, H, J, N
25	32	7	All Pvt.	160	B, D, E, H, J, N
25	32	8	All Pvt.	320	B, D, E, H, J, N
25	32	9	All Pvt.	609	B, D, E, H, J, I
25	32	36	All	640	B, D, E, J, N
25	31	17	All Pvt.	160	B, C, D, G
25	31	21	W1/2	320	B, D, E, J, N
25	31	33	N1/2NE1/4, NE1/4NW1/4	120	B, D, E, J, N
24	32	14	All Pvt.	80	B, C, D,
24	32	16	All Pvt.	80	B, C, D, J, I
24	32	17	All Pvt.	40	B, C, D, J, I
24	32	25	All Pvt.	100	B, C, D, J, I
24	32	27	All Pvt.	60	B, C, D, J, I
24	32	36	All Pvt.	40	B, C, D, J, I
24	31	11	All Pvt.	10	B, S, I, J
24	31	12	All Pvt.	40	B, D, I, J
24	31	13	All Pvt.	23	B, D, J, F
24	31	14	All Pvt.	39	B, D, I, J, E
23	31	11	E1/2NW1/4,N1/2SE1/4,Lots 2,6,7	201	B, D, J
22	30	7	All Pvt.	40	B, C, D, J, I
22	30	17	Por.N1/2	80	B, D, J

LANDS DESIRABLE TO BE ACQUIRED - AREA D (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
22	30	18	N1/2N1/2	170	B, D, E, J, N
22	31	13	All Pvt.	80	B, D, E, J, N

KNF LANDS AVAILABLE TO BE DISPOSED - AREA D

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
28	33	10	All F.S.	100	A, B, C,
27	35	13	Por. S1/2	80	A, B, C, F
26	32	30	Por.SW1/4SW1/4	17	A, B, C
25	32	11	E1/2SE1/4	80	B, C, D, F
25	32	13	NW1/4NE1/4	40	A, B, C
25	32	14	All F.S.	4	A, B, C
25	32	26	SW1/4NE1/4, NW1/4SE1/4	80	A, B, C
25	32	35	NW1/4NW1/4	40	A, B, C
25	31	18	S1/2SW1/4	80	A, B, C
25	31	20	Por. SW1/4	105	A, B, C
24	32	12	SW1/4SE1/4	40	A, B, C
24	31	33	S1/2SW1/4	80	A, B, C
22	30	5	NE1/4SE1/4	40	A, B, C
26	34	12	E1/2SE1/4, SW1/4SE1/4	120	A, B, C

LANDS DESIRABLE TO BE ACQUIRED - AREA E

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
34	31	31	All	640	B, J, H, N
33	31	19	All	640	B, D, J, N
32	29	9	S1/2SE1/4	80	B, J, H, N
32	29	10	S1/2SW1/4	80	B, J,
32	29	19	S1/2,NW1/4	480	B, J, H,
32	29	21	All Pvt.	140	B, J, H, N
32	29	22	All Pvt.	350	B, J, H
32	29	34	All Pvt.	45	B, D
32	29	28	All Pvt.	110	B, J, H
32	29	29	All	640	B, J, H,N
32	29	31	All	640	B, J, I, H, N
32	29	33	All	640	B, J, H
32	28	16	All Pvt.	120	B, J, H
31	29	5	All	640	B, J, H
31	29	7	All	640	B, J, H
31	29	8	All Pvt.	115	B, J, H
31	29	12	All State	200	B, D, E, J
31	29	17	All	640	B, J, H, N
31	29	21	All Pvt.	240	B, J, M, H
30	30	11	All BN	520	B, E, J, M, N
30	30	16	All State	640	B, D, J, N
30	30	36	All State	320	B, D, J, N
30	29	5	All Pvt.	240	B, J, E
30	29	17	Lot 4	25	B, D, J, N

LANDS DESIRABLE TO BE ACQUIRED - AREA E (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
30	27	7	All	640	B, J, E, M, N
30	27	31	All Pvt.	200	B, J, H

KNF LANDS AVAILABLE TO BE DISPOSED - AREA E

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
30	30	26	All F.S.	510	A, C
30	29	22	All F.S.	80	A, C
30	29	26	All F.S.	640	A, C
30	29	34	All F.S.	480	A, C
30	29	36	All F,S.	640	A, C
30	28	30	All F.S.	640	A, C
30	28	31	All F.S.	640	A, C
30	28	32	All F.S.	640	A, C
30	27	24	S1/2NE1/4,NW1/4,S1/2	560	A, C, D
30	27	25	NW1/4NW1/4,NW1/4NE1/4	80	B, C, D
30	26	20	All	640	A, C
30	26	28	All F.S.	346	A, C
30	26	30	All F.S.	483	A, C
30	26	34	N1/2	320	A, C
29	30	24	All	640	A, C
29	30	26	All	640	A, C
29	30	34	All	640	A, C
29	30	36	All	640	A, C
29	29	1	All	640	A, C, D
29	29	2	All	640	A, C, D
29	29	4	SE1/4SE1/4	40	A, C
29	29	10	E1/2SE1/4,SW1/4SE1/4	120	A, C
29	29	12	All	640	A, C
29	29	14	All F.S.	480	A, C

KNF LANDS AVAILABLE TO BE DISPOSED - AREA E (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
29	29	18	LOT 4	31	A, C
29	29	20	SW1/4	160	A, C
29	29	22	Por. E1/2	240	A, C
29	29	26	W1/2E1/2,NW1/4	320	A, C
29	29	28	N1/2NW1/4	80	A, C
29	29	30	All	640	A, C
29	29	32	All	440	A, C
29	28	4	All	640	A, C
29	28	6	All	640	A, C
29	28	28	All	640	A, C
29	28	32	All	640	A, C
29	27	14	NE1/4,E1/2NW1/4	240	A, C
29	27	15	All F.S.	120	A, C
29	27	17	All F.S.	160	A, C
29	27	26	All	640	B, C, D
29	26	4	Por.E1/2	160	A, C
29	26	8	NE1/4NE1/4	40	A, C
29	26	20	NE1/4NE1/4,S1/2SE1/4	120	A, C
28	29	3	NE1/4NW1/4, Por.SW1/4	160	A, C
28	29	4	All	640	A, C
28	29	6	All	640	A, C
28	29	30	All F.S.	451	A, C
28	29	33	SW1/4SW1/4	40	A, C
28	28	3	All	640	B, C, D

KNF LANDS AVAILABLE TO BE DISPOSED - AREA E (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
28	28	4	All	640	B, C, D
28	28	6	All F.S.	131	A, C
28	28	8	All	640	B, C, D
28	28	9	E1/2	320	B, C, D
28	28	10	All	640	B, C, D
28	28	11	Por.W1/2	200	B, C, D
28	28	14	All	640	B, C, D
28	28	15	All	640	B, C, D
28	28	20	All	640	B, C, D
28	28	21	E1/2	320	B, C, D
28	28	22	All	640	B, C, D
28	28	23	All	640	B, C, D
28	28	26	N1/2,Por.S1/2	400	B, C, D
28	28	28	All	640	B, C, D
28	28	30	All	640	B, C, D
28	28	32	S1/2	320	B, C, D
28	271/2	26	N1/2	320	A, C
28	27	31	All	640	A, C
28	27	32	All	640	A, C, D
28	27	34	S1/2N1/2,S1/2	480	A, C
27	30	11	NE1/4SE1/4	40	A, C
27	30	12	NW1/4SW1/4	40	A, C
27	30	13	All F.S.	320	A, C
27	30	24	S1/2NE1/4,N1/2NW1/4	160	A, C

KNF LANDS AVAILABLE TO BE DISPOSED - AREA E (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
27	29	8	NW1/4NW1/4	40	A, C
27	29	15	All	612	A, C
27	29	18	W1/2NE1/4,N1/2SW1/4	153	A, C, D
27	28	4	All, N. OF McKillop Rd.	920	A, C, D
27	28	5	All, N. OF McKillop Rd.	750	A, C, D
27	28	6	All.F.S.	80	A, C, D
27	27	2	All F.S.	744	A, C, D
27	27	10	All	640	A, C, D
27	27	12	All	640	A, C
27	27	14	All	640	A, C
27	27	24	All	640	A, C, D
27	26	6	All F.S.	440	A, C
27	26	14	Por.E1/2	280	A, C
27	26	18	All	640	A, C, D
27	26	20	All	640	A, C, D
27	26	22	SE1/4SW1/4	40	B, C, D
27	26	24	All.F.S.	480	A, C, D
27	26	26	All F.S.	320	A, C, D
27	26	28	N1/2,W1/2 SW1/4,S1/2SE1/4	480	A, C, D
27	26	30	All F.S.	314	A, C
27	26	32	All	640	A, C
27	26	34	All	640	A, C, D
27	25	30	All	560	A, C

KNF LANDS AVAILABLE TO BE DISPOSED - AREA E (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
26	26	2	All F.S.	360	B, C, D
26	26	10	All	640	B, C, D
26	26	12	All.	640	B, C, D
26	26	14	All	640	B, C, D
26	26	16	All	640	B, C, D
26	26	22	All F.S. in KNF	585	B, C, D
26	26	28	E1/2NE1/4	80	A, C
26	26	34	Por.NW1/4	280	A, C, D
26	25	7	All F.S.	200	A, C, D
26	25	8	All.F.S.	440	A, C, D
26	25	14	All F.S.	160	A, C, D
26	25	18	All	620	A C, D
26	25	20	All F.S. in KNF	320	A, C, D
26	25	22	All F.S. in KNF	620	A, C
26	25	28	All F.S. in KNF	80	A, C

LANDS DESIRABLE TO BE ACQUIRED - AREA F

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
26	30	5	All Pvt.	320	B, E, G, J, M, F
26	30	9	All	640	B, E, G, J, M, F
26	30	11	All	640	B, E, G, J, M, F
26	30	13	All	640	B, E, G, J, M, F
26	30	15	All	640	B, E, G, J, M, F
26	30	17	All	640	B, E, G, J, M, F
26	30	21	All	640	B, J, I, F
26	30	23	All	640	B, J, I, F
26	30	24	Por. NE1/4	80	B, J, I, F
26	30	25	All	640	B, J, I, F
26	30	27	All	640	B, J, I, F
26	30	29	All	640	B, J, I, F
26	30	31	All.	845	B, J, I, F
26	30	33	All North of the Road	800	B, J, I, F
26	30	34	All Pvt. North of the Road	20	B, J, I, F
26	30	35	All North of the Road	200	B, J, I, F
26	29	7	All	640	B, J, I, F
26	29	18	Por. SE1/4	140	B, J, I, F
26	29	31	All	640	B, J, I, F
26	29	36	All State	320	B, D, J, N
25	30	1	All	640	B, J, I, F
25	30	3	All	640	B, J, I, F
25	30	7	All	476	B, J, I, F
25	30	11	All	640	B, J, I, F

LANDS DESIRABLE TO BE ACQUIRED - AREA F (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
25	30	13	W1/2	320	B, J, I, F
25	30	15	E1/2	320	B, J, I, F
25	30	16	Por. SE1/4	30	B, J, I, F
25	30	17	All BN	240	B, J, I, F
25	30	19	All	640	B, J, I, F
25	30	21	POR. NE 1/4	40	B, J, I, F
25	30	22	Por. NW1/4	30	B, J, I, F
25	30	23	All	640	B, J, I, F
25	30	25	All	640	B, J, I, F
25	30	27	All	640	B, J, I, F
25	30	29	All	640	B, J, I, F
25	30	31	All	640	B, J, I, F
25	30	33	All	640	B, J, I, F
25	30	34	All Pvt.	130	B, J, I, F
25	30	35	All	640	B, J, I, F
25	29	2	S 1/2NW1/4	80	B, J, I, F
25	29	2	SE 1/4 SE1/4	40	B, J, I, F
25	29	3	All	640	B, J, I, F
25	29	4	Por. NE1/4	100	B, J, I, F
25	29	5	All	640	B, J, I, F
25	29	7	E 1/2	320	B, J, I, F
25	25	9	All	640	B, J, I, F
25	29	11	All	640	B, J, I, F
25	29	12	W1/4	160	B, J, I, F

LANDS DESIRABLE TO BE ACQUIRED - AREA F (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reason
25	29	13	All	640	B, J, I, F
25	29	15	All	640	B, J, I, F
25	29	17	All	640	B, J, I, F
25	29	19	All	640	B, J, I, F
25	29	21	All	640	B, J, I, F
25	29	23	All	640	B, J, I, F
25	29	25	All	640	B, J, I, F
25	29	27	All	640	B, J, I, F
25	29	29	All	640	B, J, I, F
25	29	31	All	640	B, J, I, F
25	29	33	All	640	B, J, I, F
25	29	35	All	640	B, J, I, F
25	28	16	All Pvt.	600	B, J, I, F

KNF LANDS AVAILABLE TO BE DISPOSED - AREA F

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
26	29	10	All F.S.	128	A, C

LANDS DESIRABLE TO BE ACQUIRED - AREA G

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
37	31	10	All Pvt.	300	B, D
37	31	15	All Pvt.	240	B, D
37	31	22	NE1/4,NE1/4 N of Road	80	B, D
37	30	35	All Pvt.	150	B, D
37	26	13, 14	All Pvt.	60	B, J, I, D
37	26	22, 23, 24	All Pvt.	70	B, J, I, D
36	31	32	All Pvt.	160	B, C, D, E, G, J
36	30	3	All Pvt.	160	B, C, D, G, J, E
35	33	2	All Pvt.	180	B, C, D, E, G, J
35	33	3	All Pvt.	50	B, C, D, E, G, J
35	33	30	All Pvt.	100	B, D, H, I
35	32	35	All Pvt.	143	B, C, D, E, G, J
35	32	36	All Pvt.	13	B, C, D, E, G, J
35	31	5	All Pvt.	100	B, C, D, E, G, J
35	31	6	All Pvt.	40	B, C, D, E, G, J
34	32	2	All Pvt.	128	B, D, H, I
34	32	11	SW1/4SW1/4	40	B, C, D, E, G, J
34	32	31	All Pvt.	160	B, D
34	25	36	All State	420	B, C, D, E, G, J
33	28	7	All Pvt.	52	B, C, D, E, G, J
33	27	27	All Pvt.	160	B, C, D, E, G, J
33	27	28	All Pvt.	90	B, C, D, E, G, J
33	27	33	All Pvt.	50	B, C, D, E, G, J
33	25	25	All Pvt.	79	B, D, H, I

LANDS DESIRABLE TO BE ACQUIRED - AREA G (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
33	25	26	All Pvt.	132	B, D
33	25	34	All Pvt.	47	B, C, D, E, G, J
33	25	35	All Pvt.	113	B, C, D, E, G, J
33	24	8	All Pvt.	205	B, C, D, E, G, J
33	24	9	All Pvt.	492	B, C, D, E, G, J
33	24	16	All Pvt. in NE1/4	48	B, D, H, I
32	28	14	All Pvt.	20	B, C, D, E, G, J
32	27	4	All Pvt.	25	B, C, D, E, G, J
32	27	9	All Pvt.	145	B, C, D, E, G, J
32	26	20 29, 30	All Pvt.	10	B, C, D, E, G, J
32	25	5	All Pvt.	39	B, C, D, E, G, J
31	32	16	All Pvt.	80	B, D, E, F
31	32	17	All Pvt.	60	B, D, E, F
30	31	31, 32	All Pvt.	160	B, C, D, E, G, J
29	31	5, 6	All Pvt.	470	B, D, F
29	31	16	All State	640	B, D, F
29	31	20	All Pvt.	350	B, D, F,
29	31	21	All Pvt.	360	B, C, D, E, G, J, N
29	31	29	All Pvt.	80	B, C, D, E,G, J
29	31	32	All Pvt.	150	B, C, D, E, G,J
29	31	33	All Pvt.	150	B, C, D, E, G, J
28	31	3	All Pvt.	290	B, C, D, E, G, J
28	31	4	All Pvt.	100	B, C, D, E, G, J
28	31	6,7	All Pvt.	160	B, C, D, E, G, J
28	31	13	All Pvt.	150	B, D, G, H

LANDS DESIRABLE TO BE ACQUIRED - AREA G (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
28	31	14	All Pvt.	80	B, C, D, E, G, J
28	31	24	All Pvt.	100	B, C, D, E, G, J
28	31	25	All Pvt.	160	B, C, D, E, G, J
28	31	24, 30 31, 32	All Pvt.	140	B, C, D, E, G, J
28	31	36	All Pvt.	480	B, C, D, E, G, J
28	30	18	All Pvt.	20	B, C, D, E, G, J
28	30	19	All Pvt.	100	B, D, G, H
28	30	30	All Pvt.	160	B, C, D, E, G, J
28	30	31	All Pvt.	160	B, C, D, E, G, J
27	31	1	All Pvt.	300	B, C, D, E, G, J
27	31	2	All Pvt.	150	B, C, D, E, G, J
27	31	11	All Pvt.	210	B, C, D, E, G, J
27	31	12	All Pvt.	80	B, C, D, E, G, J
27	31	15	All Pvt.	90	B, C, D, E, G, J
27	31	28, 33	All Pvt.	41	B, C, D, E, G, J
27	31	35	All Pvt.	67	B, C, D, E, G, J
27	31	36	All Pvt.	14	B, D, G, H
27	30	19, 29, 30	All Pvt.	60	B, C, D, E, G, J
26	34	28	All Pvt.	160	B, C, D, E, G, J
26	31	1	All Pvt.	155	B, C, D, E, G, J
26	31	2	All Pvt.	165	B, C, D, E, G, J
26	31	12	All Pvt.	46	B, C, D, E, G, J
26	30	18	All Pvt.	38	B, C, D, E, G, J
26	30	30	All Pvt.	83	B, C, D, E, G, J
25	33	5	All Pvt.	200	B, C, D, E, G, J

LANDS DESIRABLE TO BE ACQUIRED - AREA G (continued)

Twp.	Rge.	Sec.	Subdivision	Acs.	Reasons
25	33	25, 36	All Pvt.	80	B, C, D, E, G, J
25	32	31	All Pvt.	214	B, C, D, E, G, J
24	30	15, 16	All Pvt.	50	B, C, D, E, G, J
22	32	17	All Pvt.	100	B, C, D, E, G, J
22	32	20	All Pvt.	100	B, C, D, E, G, J
22	32	21	All Pvt.	150	B, C, D, E, G, J

KNF LANDS AVAILABLE TO BE DISPOSED - AREA G

lTwp.	Rge.	Sec.	Subdivision	Acs.	Reason
34	24	31	Lots 4,5 and 6	45	A, C
36	31	2	Lots 4 and 5	42	D
37	31	25	Lots 7 and 9	194	D
37	31	36	Lots 4, 5, 7, 8, E1/2SW1/4	55	D

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TEN

OIL AND GAS STIPULATIONS

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
222 North 32nd Street
P.O. Box 36800
Billings, Montana 59107

_____
(Serial Number)

STIPULATIONS FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF DEPARTMENT OF AGRICULTURE

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/prospecting permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of the Interior, (2) uses of all existing improvements, such as Forest development roads, within and outside the area licensed, permitted or leased by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed

to

at

Who is the authorized representative of the Secretary of Agriculture.

Any or all of the following stipulations may apply to this lease and may be made less restrictive depending upon the actual onground conditions. The Forest Service (FS) should be contacted for details regarding the restrictive nature of these stipulations.

ESTHETICS — To maintain esthetic values, all surface-disturbing activities, semipermanent and permanent facilities may require special design including location, painting and camouflage to blend with the natural surroundings and meet the intent of the visual quality objectives of the FS.

EROSION CONTROL — Surface disturbing activities may be prohibited during muddy and/or wet soil periods. This limitation does not apply to operation and maintenance of producing wells using authorized roads.

CONTROLLED OR LIMITED SURFACE USE — This stipulation may be modified by special stipulations which are hereto attached or when specifically approved in writing by BLM, with the concurrence of the FS. Distances and/or time periods may be made less restrictive depending on the actual onground conditions. The prospective lessee should contact the FS for more specific locations and information regarding the restrictive nature of this stipulation.

The lessee/operator is given notice that the lands within this lease may include special areas and that such areas may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Any surface use or occupancy within such special areas will be strictly controlled or, if absolutely necessary, excluded. Use or occupancy will be restricted only when BLM and/or the FS demonstrates that the restriction is necessary for the protection of such special areas and existing or planned uses; however, reasonable lease occupancy will not be precluded unless specified in additional stipulations attached hereto. Appropriate modifications to imposed restrictions will be made for the maintenance and operations of producing oil and gas wells.

After the FS has been advised of specific proposed surface use or occupancy on the leased lands, and on request of the lessee/operator, the FS will furnish further data on any special areas. Such restrictions may include limitations or exclusion of activities which occur within:

500 feet from perennial and ephemeral water courses and bodies, springs, flood plains, riparian areas, and water supplies;

500 feet from roads and trails, buildings and structures, sites eligible for or designated as National Register Sites or Research Natural Areas, visually sensitive areas and recreation areas including those managed for primitive recreation values;

Essential habitat of State and Federal sensitive species including wildlife, raptors, fish and plants, and crucial wildlife ranges including but not limited to: winter range from December 1 to May 15; birthing to reproduction areas (e.g., calving, fawning) from April 15 to June 30; migration routes from November 1 to December 31; spawning sites from May 1 to July 1 or appropriate from September 1 to March 30; grouse strutting grounds and nesting areas within ½ mile; and within ½ mile of raptor nests from February 1 to July 31;

Seasonal road closures, roads for special uses, specified roads during heavy traffic periods and on areas having restrictive offroad designation;

On steep slopes (over 30 to 60 percent), on slopes or soils which have a high potential for-or are currently experiencing mass movement (slumps, slides, flows) or which are extremely erodable.

Date	Lessee's Signature

NOTICE

CULTURAL AND PALEONTOLOGICAL RESOURCES — The FS is responsible for assuring that the leased lands are examined to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the FS,. shall:

1. Contact the FS to determine if a site specific cultural resource inventory is required. If a survey is required, then:

2. Engage the services of a cultural resource specialist acceptable to the FS to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the FS for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface disturbing operation is submitted.

3. Implement mitigation measures required by the FS and BLM to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing, salvage, and recordation or other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.

The lessee or operator shall immediately bring to the attention of the FS and BLM any cultural or paleontological resources or any other objects of scientific interest discovered as a result of surface operations under this lease, and shall leave such discoveries intact until directed to proceed by FS and BLM.

ENDANGERED OR THREATENED SPECIES — The FS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.

The lessee/operator may, unless notified by the FS that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the FS. An acceptable report must be provided to the FS identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats.

In order to minimize impacts on endangered or threatened species or their habitat, special conditions, such as unitization prior to approval of operations, and/or other limitations to spread surface-disturbing activities over time and space may be required prior to approval and commencement of any operations on the lease.

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX ELEVEN

TIMBER SALE SCHEDULE

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE

Introduction: This Appendix contains a Timber Sale Implementation Schedule which is not a decision in the Forest Plan. It provides public information as required by the Forest Service Manual 1922.5 and is subject to updates based upon budget, market conditions or other considerations. The public will be notified, at least annually, of changes to this implementation schedule.

IMPLEMENTATION SCHEDULE BY CATEGORY OF HARVEST
(VOLUMES IN MMBF)

		Non-interchangable 2/			
Year	Regulated 1/	Dead LPP 3/	Other Dead 4/	Unregulated 5/	Total Volume
1988	213	33	5	5	256
1989	195	18	4	3	220
1990	185	20	5	3	213

1/ Regulated - Live green and recently dead timber from suitable timberlands (MA's 11, 12, 14, 15, 16, and 17).

2/ Non-interchangeable - Older dead timber from suitable timberlands which includes the categories 3/ and 4/ below.

3/ Dead LPP - Dead lodgepole pine timber from suitable timberlands (MA's 11, 12, 14, 15, 16, and 17).

4/ Other Dead - Other dead timber from suitable timberlands (MA's 11, 12, 14, 15, 16, and 17).

5/ Unregulated - All timber from unsuitable lands where harvest is permitted (MA's 3, 5, 6, 10, 18, 19, 20 and 23).

The first decade average volume offered for sale is expected to be as follows:

SUITABLE LANDS (MA's 11, 12, 14, 15, 16, 17)		UNSUITABLE LANDS (MA's 3, 5, 6, 10, 18, 19, 20, 23)	
Regulated:	202 MMBF	Unregulated:	6 MMBF
Dead LPP:	20 MMBF		
Other Dead:	5 MMBF		
Subtotal (ASQ)	227 MMBF	Subtotal	6 MMBF

Total Planned Sell: 233 MMBF

Some of the "Other Dead" volume includes pulp and other materials which timber purchasers may elect to remove under supplemental agreements. The quantity of this "Other Dead" volume can vary a great deal depending upon available markets for these products. The removal of dead lodgepole pine timber is usually required and included in timber sale quantities.

EXPLANATION OF ABBREVIATIONS ON THE THREE-YEAR TIMBER SALE SCHEDULE TABLES:

The headings used on the following tables are as follows:

SALE NAME:	Self explanatory
D:	Ranger District number
FY:	Fiscal Year sale is expected to be advertised
BB:	1 = Buyback; 2 = Reoffer; 3 = Default; 4 = Partial Buyback
T_R:	Land Survey Township and Range where the sale is located
SECTION:	Public Land Survey Sections where the sale is located
EA:	An "X" indicates that NEPA requirements have been satisfied either as a result of a determination that the project was categorically excluded from documentation or through completion of an Environmental Analysis (EA) or Environmental Impact Statement (EIS).
MA:	Management Areas involved in the sale.
ACRES:	Estimated acres to be harvested.
VOLUME:	Estimated timber volume to be harvested and the non-interchangeable component of that total, shown in parentheses, both in MMBF
RD C:	Estimated miles of new road construction.
RD R:	Estimated miles of road reconstruction.
CUT TYPE:	CC = Clear Cut OSR = Overstory removal ST = Seed Tree SW = Shelterwood SAN = Sanitation SAL = Salvage IT = Intermediate (Commercial Thin)
TRAC:	Sale percent expected to be yarded using tractors
CAB:	Sale percent expected to be yarded using cables (jammers)
SKY:	Sale percent to be skyline yarded (* = helicopter).

The following Three-Year Timber Sale Schedule contains significant volumes of timber that was previously returned to the Kootenai Forest under the Timber Payment Modification Act (Timber Buyback). In addition, the emphasis for the next several years is to harvest dead and dying lodgepole pine to minimize the current losses. The lodgepole pine salvage is utilizing the existing road network as much as possible. For these reasons and because Capital Investment roads are not included in this 3-year schedule, the total road construction mileages shown in the Three-Year Timber Sale Schedule for 1988-1990 will differ from the total road construction quantities shown in Table II-1 in Chapter II of the Forest Plan. It is estimated that the total road construction mileages shown in these two different Tables will be more similar in the latter part of the Forest Plan period.

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Lower Larry	1	88		33 30	14-16 23 24		12	425	8.0 (1.0)	8.6	0.0	CC ST		100	
Sow	1	88	1	33 30	4 9		12	60	1.3 (0.0)	0.0	3.0	CC ST	100		
Lost Soul	1	88		33 30	23-26		12	605	9.8 (1.2)	3.2	5.0	CC ST	85	15	
Lost Soul (con't)	1	88		33 29	28-30										
Burro Creek	1	88	4	36 29	10 13-15 23 24		12	60	2.9 (0.2)	2.2	0.8	CC ST	70	30	
Flat McGuire	1	88		34 28	8-10 15-17		15	178	2.3 (0.2)	1.8	0.0	CC ST		100	
Donkey Oatey	1	88	1	36 29	15-17 20-22		12	222	7.1 (0.9)	0.0	8.0	CC ST	70	30	
Falls Creek	1	88	1	35 28	19-21		12	128	2.7 (0.0)	0.0	7.0	CC ST	100		
West Cadette	1	88		35 28	7 8 17 18		12	404	4.8 (0.0)	2.0	0.0		80	20	
P. 7990 A	1	88	1	33 28	13 14		12	21	0.5 (0.0)	0.0	0.0	CC ST	100		
P. 426	1	88	1	33 28	12 13		12	28	0.8 (0.0)	0.0	0.0	CC ST	100		
P. 425	1	88	1	33 28	11 14	X	12	32	0.9 (0.0)	0.0	0.0	CC ST	100		
Ziggy	1	88	1	33 29	25-27 36		16	78	1.2 (0.0)	0.0	3.0	CC ST	100		
Ziggy (con't)	1	88	1	33 28	30										
Upper Pink	1	88		34 27	4 9		15	68	0.8 (0.0)	0.8	0.0	ST	100		
Rocky Bug	1	88	1	34 28	30-33		15	103	1.8 (0.2)	0.0	4.0	CC	100		
Rocky Bug (con't)	1	88	1	33 28	5										
South Hill #1	1	88		33 30	4		12	75	0.9 (0.0)	0.8	0.7	CC ST	100		
South Hill #1 (con't)	1	88		32 30	32										
Tweedy Bird	1	88	1	34 28	31 32		15	161	2.4 (0.2)	0.0	3.0	CC	100		
Tweedy Bird (con't)	1	88	1	33 28	4 5										
Totals (Rexford 1988)								2,648	48.2 (3.9)	19.4	31.5				
Last Fast	2	88		36 29		X	15	350	7.5 (1.9)	0.0	0.0	CC	40	60	
Lime	2	88		37 29		X	14	100	8.0 (2.8)	4.0	2.0	CC	60	40	
Lime (con't)	2	88					12	450							
Lower Basin	2	88		36 30		X	12	700	15.0 (5.3)	0.0	19.1	CC	35	65	
Lower Basin (con't)	2	88		37 30											
Luau	2	88		36 30		X	14	35	4.0 (1.5)	2.0	4.0	CC	90	10	
Luau (con't)	2	88					12	140							
Pork Basin	2	88		36 30		X	12	350	7.0 (1.8)	2.3	4.0	CC	70	30	
North Turner Cr PC	2	88		36 30		X	12	460	10.4 (3.4)	2.5	0.0	CC	85	15	
North Turner (con't)				36 31											
North Turner (con't)															
Small Sales	2	88					12	0	6.0 (1.2)	0.0	0.0				
Small Sales (con't)	2	88					14								
Totals (Yaak 1988)								2,585	57.9 (18.9)	10.8	29.1				

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Lower Swamp	3	88	1	33 27	25-27 35 36	X	15	300	3.2 (0.0)	0.0	0.0	ST IT	100		
Ketowke	3	88		33 24	29-31	X	12	190	3.0 (0.4)	0.8	1.8	CC ST	70	30	
Ketowke (con't)	3	88		33 25	25										
Harvey Creek	3	88		33 25	25 35 36		12	630	6.0 (0.0)	1.0	0.0	CC ST	100		
Harvey Creek (con't)	3	88		32 25	2 3 10 11										
Cliff Creek	3	88	4	33 27	19 20 29 30	X	12	420	5.5 (0.0)	0.0	0.0	CC ST	100		
Davis Basin	3	88		32 27	12-14 23-26		12	500	7.0 (0.9)	0.0	0.0	CC ST	100		
Small Sales	3	88	4				14	50	13.3 (1.2)	0.0	0.0	CC ST	95	5	
Small Sales (con't)	3	88					12	800				SAN SAL			
Small Sales (con't)	3	88					15	600				IT OSR			
Totals (Fortine 1988)								3,490	38.0 (2.5)	1.8	1.8				
China Sheep	4	88		31 33	10	X	10	143	8.8 (1.3)	1.4	17.4	CC SW ST	30	5	65
China Sheep (con't)	4	88		31 32			11	23							
China Sheep (con't)	4	88		32 33			12	210							
China Sheep (con't)	4	88		32 32			18	9							
South Pony	4	88		30 34	20-22		11	78	4.6 (0.4)	0.5	0.5	CC SW	70		30
South Pony (con't)	4	88					12	109							
Long Goat	4	88		29 3		X	12	280	7.2 (0.0)	1.5	3.0	CC	30		70
Madge Creek	4	88		30 33		X	11	74	1.8 (0.0)	0.0	0.0	CC OSR SW	40	50	10
Madge Creek (con't)	4	88		29 33			17	52							
Small Sales	4	88					11	100	5.0 (0.0)	0.0	0.0	CC ST OSR+	100		
Small Sales (con't)	4	88					12	200				SW			
Small Sales (con't)	4	88					14	100							
Totals (Troy 1988)								1,378	27.4 (1.7)	3.4	20.9				
Bigfootpe	5	88		33 32	16 20 21 28 29		15	600	17.1 (0.4)	0.0	0.0	CC ST	40	60	
Small Sales	5	88					15	200	6.8 (0.4)	0.0	0.0				
Small Sales (con't)	5	88					16	100		0.0	0.0				
Small Sales (con't)	5	88					11	100		0.0	0.0				
Small Sales (con't)	5	88					12	100		0.0	0.0				
Totals (Libby 1988)								1,100	24.5 (0.8)	0.0	0.0				

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Homesteader	6	88		26 28	24	X	15	680	11.8 (1.0)	7.0	0.0	ST	60	40	
Homesteader (con't)	6	88					18	35		0.0	0.0				
Head of Five Mile	6	88		32 27	20		15	275	3.3 (1.7)	4.5	0.0	ST CC	80	20	
Sanders Face	6	88		29 25	18		12	500	5.2 (1.8)	4.0	1.5	ST	100		
Sanders Face (con't)	6	88					18	120		0.0	0.0				
Alexander	6	88		31 30	24		12	450	4.5 (1.0)	9.0	8.0	ST CC	60	40	
Alexander (con't)	6	88					11	250		0.0	0.0				
Lost Street	6	88		33 30	36		12	154	3.2 (0.0)	1.6	2.0	CC ST	85	15	
Lost Street (con't)	6	88					15	63		0.0	0.0				
N. Fork Five Mile	6	88		32 27	7	X	12	250	2.0 (1.0)	3.5	0.0	CC ST	60	40	
South Dunn	6	88		30 28	21		12	425	3.5 (0.0)	7.0	0.0	CC ST	100		
Canyon Creek	6	88		30 28	4		15	300	3.0 (1.2)	3.0	1.0	ST	90	10	
Small Sales	6	88					12	1,500	10.5 (2.0)	6.0	6.0		70	30	
Small Sales (con't)	6	88					15	0		0.0	0.0				
Totals (Fisher River 1988)								5,002	47.0 (9.7)	29.6	18.5				
McNeely	7	88		27 33	4 5	X	12	286	6.8 (0.0)	6.9	4.7	CC ST	53	7	40
Old Soldier	7	88		26 32	7 18	X	14	60	0.7 (0.0)	0.5	0.0	CC ST	10		90
S.W. Pilgrim	7	88		25 33	31	X	12	352	4.2 (0.0)	3.9	3.5	CC ST	30	14	56
Small Sales	7	88						0	1.0 (0.0)	0.0	0.0				
Totals (Cabinet 1988)								698	12.7 (0.0)	11.3	8.2				

	ACRES	VOLUME	RD C	RD R
1988 GRAND TOTAL (All Districts)	16142	241.7 (25.0)	82.8	78.0

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Boar	1	89	1	33 20	5 8 9		12	92	1.9 (0.0)	0.0	6.0	CC ST	100		
Huckleberry	1	89	1	33 28	24 25 35 36		12	550	13.0 (0.0)	15.0	5.0	CC ST	80	20	
Huckleberry (con't)	1	89	1				19	50							
Huckleberry (con't)	1	89	1				24	20							
Pinkham Drudgery	1	89	1	33 28	10 11		12	78	3.0 (0.2)	0.0	2.0	CC	100		
Tweedy Bug	1	89	1	34 28	30-33		12	123	3.5 (0.0)	0.0	3.0	CC ST	100		
Tweedy Bug (con't)	1	89	1	33 28	5										
Lion Cable	1	89	1	35 28	22 27 28 33		12	153	2.8 (0.0)	0.0	0.0	CC	80	20	
Lion Cable (con't)	1	89	1				19								
Pinto 7231	1	89	1	34 30	12 13		15	82	2.7 (0.1)	0.0	0.0	CC ST	100		
Bruin Creek	1	89	1	33 30	8 16		12	234	6.4 (0.1)	0.0	12.0	CC ST	100		
Totals (Rexford 1989)								1,382	33.3 (0.4)	15.0	28.0				
Mud Creek	2	89	1	37 31			11	100	15.0 (1.5)	0.0	0.0	CC ST SW	90	10	
Mud Creek (con't)	2	89	1	37 32			12	350							
Mud Creek (con't)	2	89	1				14	250							
Solo Joe	2	89		36 30			12	400	8.0 (1.3)	3.0	3.0	ST CC	60	40	
Solo Joe (con't)	2	89		36 31											
Solo Joe (con't)	2	89		37 30											
Upper Basin	2	89		36 30			14	150	16.1 (1.6)	0.0	5.6	CC SW	50	50	
Upper Basin (con't)	2	89					12	600							
Small Sales	2	89					12	0	12.0 (9.0)	0.0	0.0				
Small Sales (con't)	2	89					14								
Totals (Yaak 1989)								1,850	51.1 (13.4)	3.0	8.6				

THREE YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Advent Ridge	3	89	1	32 25	5-8 16-21	X	12	600	4.0 (0.0)	1.0	0.0	CC ST SN S	100		
Skillet South	3	89		32 26	23-27	X	12	150	3.0 (0.1)	0.7	0.0	CC ST	100		
Blessed Ridge	3	89	4	32 25	3-5 8-11 15 16 21	X	12	500	5.0 (0.4)	3.5	0.8	CC ST	100		
Middle Swamp	3	89	1	33 27	27 33-35	X	15	340	5.0 (0.4)	0.0	0.0	CC ST IT	100		
Lake Creek	3	89	4	32 27	2 3 9-11	X	12	300	3.0 (0.0)	1.5	0.0	CC ST	100		
Small Sales	3	89	4				11	100	14.0 (0.8)	0.0	0.0	CC ST	100		
Small Sales (con't)	3	89					12	600				SAN SAL			
Small Sales (con't)	3	89					14	50				OSR			
Small Sales (con't)	3	89					15	650				IT			
Totals (Fortine 1989)								3,290	34.0 (1.7)	6.7	0.8				
Lookout Below	4	89		29 34	1 2 11	X	11	60	4.4 (0.0)	0.9	0.0	CC SW OSR	40	60	
Lkout Below (con't)	4	89		29 33	6		12	141							
Ferrel Creek	4	89		33 33	6 7		10	125	6.0 (0.0)	2.7	0.0	CC SW	40		60
Ferrel Crk (con't)	4	89		33 34	12 13		11	125							
Ferrel Crk (con't)	4	89					12	125							
North Fork Keeler	4	89		30 34	5 8 16 17 21 22	X	12	370	6.8 (0.0)	2.8	0.6	CC	10	10	80
N FK Keeler (con't)	4	89					24	2							
Small Sales	4	89					12	200	3.9 (0.0)	0.0	0.0	CC ST SW +	50	50	
Small Sales (con't)	4	89					16	100				SAN			
Totals (Troy 1989)								1,248	21.1 (0.0)	6.4	0.6				
West Pipe	5	89		32 31	1 12 13		15	514	15.0 (0.1)	25.0	2.0	CC ST	50	50	
Noisy Blue	5	89	4	32 30	5 6 8 9 16		15	200	5.0 (0.0)	0.0	0.0	CC ST	100		
Small Sales	5	89					15	200	5.0 (0.0)	0.0	0.0				
Small Sales (con't)	5	89					16	100							
Small Sales (con't)	5	89					11	100							
Small Sales (con't)	5	89					12	100							
Totals (Libby 1989)								1,214	25.0 (0.0)	25.0	2.0				

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
True Grit	6	89		25 29	2		14	340	3.4 (0.0)	13.8	1.2	ST	50	50	
True Grit (con't)	6	89					15								
True Grit (con't)	6	89					11						50	50	
True Grit (con't)	6	89					18						50	50	
Warland Creek	6	89		32 28	35		12	600	10.0 (2.0)	12.0	3.0	CC	90	10	
Warland Crk (con't)	6	89					11	200							
Cody Alder	6	89		30 29	26		15	500	2.5 (0.7)	4.0	3.0	ST	50	50	
Cody Alder (con't)	6	89					16	100							
Cody Alder (con't)	6	89					18	100							
Smoke Creek	6	89		27 29	11		15	250	4.0 (0.0)	6.0	1.0	CC ST	50	50	
Smoke Creek (con't)	6	89					11	100							
Smoke Creek (con't)	6	89					18	50							
Lightning Peak	6	89		29 28	28		15	175	2.5 (0.7)	5.5	1.0	ST	50	50	
Lightng Pk (con't)	6	89					11	100							
Davis Creek	6	89		26 27	18		15	400	7.2 (0.0)	9.5	3.0	ST	90	10	
Davis Creek (con't)	6	89					11	200							
Ant Out II	6	89	1	32 28	22		17	30	1.0 (0.0)	0.0	0.0	CC		100	
Ant Out II (con't)	6	89	1				16	30							
Ant Out II (con't)	6	89	1				15	15							
Small Sales	6	89					12	1,200	12.5 (3.5)	7.0	8.0		80	20	
Small Sales (con't)	6	89					15								
Totals (Fisher River 1989)								4,390	43.1 (6.6)	57.8	12.2				
Jack's Gulch	7	89		26 34	20 30		12	450	5.0 (0.0)	6.9	2.0	CC ST	30	20	50
Dry Gulch Dixie	7	89		22 32	10 14	X	12	315	3.8 (0.0)	6.1	1.8	CC ST	35	20	45
Snake Face	7	89		28 32	29		14	150	1.5 (0.0)	0.0	8.5	CC ST	100		
Sims Creek	7	89		25 30	24 36		14	50	0.5 (0.0)	0.0	1.0	CC ST	100		
Small Sales	7	89						0	1.2 (0.0)	0.0	0.0				
Totals (Cabinet 1989)								965	12.0 (0.0)	13.0	13.3				

	ACRES	VOLUME	RD C	RD R
1989 GRAND TOTAL (All Districts)	14259	218.3 (21.9)	137.9	73.2

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Donkey I	1	90	1	36 29	16 17 21		12	82	1.7 (0.1)	0.0	3.0	CC ST	100		
Donkey II	1	90	1	36 29	9 10		12	14	2.4 (0.2)	0.0	0.0		45	55	
Donkey II (con't)	1	90	1				19	89							
Steep 255	1	90	1	34 30	7		15	32	0.7 (0.0)	0.0	0.0	CC ST	100		
Pinto Bean	1	90	1	34 30	2		15	15	0.2 (0.0)	0.0	0.0	ST	100		
Sutton Lion	1	90	1	35 28	35		15	61	0.9 (0.0)	0.0	0.0	ST	100		
Sutton Lion (con't)	1	90	1	34 28	2										
Cub	1	90	1	33 30	4		12	53	1.2 (0.0)	0.0	2.0	CC ST	100		
W. Lightning	1	90	1	35 28	13 24 25		15	208	2.8 (0.0)	0.0	7.0	CC ST IT	100		
W. Lightning (con't)	1	90	1	35 27	19 20 28 30										
Apple Pie	1	90	1	35 28	13 24 25		15	507	1.7 (0.0)	0.0	0.0	ST IT	100		
Apple Pie (con't)	1	90	1	35 27	19 20 28-30										
South Pinto	1	90	4	34 29	10 11 14 15 22-24		15	260	9.0 (0.0)	5.5	2.0	CC ST	85	15	
Pinto 255 Q	1	90	1	34 29	6		15	71	1.5 (0.0)	0.0	0.0	CC ST	100		
Pinto 255 Q (con't)	1	90	1	34 30	1										
Pinto 255 T	1	90	1	34 29	18		15	31	0.4 (0.0)	0.0	0.0	ST	100		
Pinto 255 R	1	90	1	34 30	1		15	46	0.7 (0.0)	0.0	0.0	ST	100		
Upper Dodge	1	90	1	36 29	2 3		15	123	1.7 (0.0)	0.0	0.0	CC ST	60	40	
Sutton Show	1	90	1	35 28	34		15	18	0.4 (0.0)	0.0	0.0	CC ST	100		
Helmer Sutton	1	90	1	35 28	34		15	19	0.2 (0.0)	0.0	0.0	ST	100		
Mr. Tweed	1	90	1	34 28	32-34		15	200	4.8 (0.4)	0.0	5.0	CC	100		
Mr. Tweed (con't)	1	90	1	33 28	3		12								
Brier Patch	1	90	1	33 28	7 13 18		12	70	2.3 (0.2)	0.0	7.0	CC ST	35	65	
P 429	1	90	1	33 28	11		12	39	1.9 (0.0)	0.0	0.0	CC ST	53	47	
Mid South	1	90	1	34 30	29 32		15	90	1.4 (0.0)	1.2	0.0	CC ST	100		
Totals (Rexford 1990)								2,028	35.9 (0.9)	6.7	26.0				
Fowler	2	90		35 31			12	200	5.0 (0.5)	2.0	4.0	CC ST SW	70	30	
Fowler (con't)	2	90					14	50							
French OSR	2	90		37 32			12	1,300	7.0 (0.0)	0.0	3.0	OSR	100		
Mushroom	2	90		37 33			14	350	12.6 (0.0)	3.2	16.8	CC SW ST	90	10	
Porky II	2	90		36 29		X	12	400	8.0 (4.0)	3.0	3.0		60	40	
Porky II (con't)	2	90		36 30											
Small Sales	2	90					12	0	18.4 (9.0)	0.0	0.0				
Small Sales (con't)	2	90					14								
Totals (Yaak 1990)								2,300	51.0 (13.5)	8.2	26.8				

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME		RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Deep South	3	90		35 25	15 16 20-22 28 33	X	11	750	5.0	(0.0)	10.6	1.5	CC ST	100		
Deep South (con't)	3	90		34 25	3-5 9 10 14 23 24		17	100					IT			
Upper Lime	3	90		34 25	31-33	X	15	300	3.5	(0.0)	1.0	1.0	CC ST	100		
Upper Lime (con't)	3	90		33 25	4-9 16-18 20 21											
Silver Ridge	3	90		33 27	21 22 27 28		12	200	4.0	(0.0)	0.5	0.0	CC ST	100		
Silver Rdg (con't)	3	90					15	120								
Silver East	3	90		33 27	11 15 16		15	180	3.0	(0.2)	0.8	0.0	CC ST	100		
Small Sales	3	90					11	100	16.5	(1.7)	0.0	0.0	CC ST	100		
Small Sales (con't)	3	90					12	700					SAN SAL			
Small Sales (con't)	3	90					14	50					OSR			
Small Sales (con't)	3	90					15	800					IT			
Totals (Fortine 1990)								3,300	32.0	(1.9)	12.9	2.5				
Ruby Revisited	4	90		32 35	13 24 25 26	X	12	240	4.4	(0.0)	2.9	0.3	CC	50	50	
YK II	4	90		33 33		X	11	220	6.4	(0.0)	3.5	0.0	CC SW OSR	50		50
YK II (con't)	4	90		32 34			12	210								
High Hare	4	90		32 33	15 21 22 28 29	X	14	103	4.4	(0.0)	0.6	1.9	CC OSR	40	20	40
High Hare (con't)	4	90					16	78								
Small Sales	4	90					11	100	5.0	(0.0)	0.0	0.0	CC ST SAN	50	50	
Small Sales (con't)	4	90					12	400								
Totals (Troy 1990)								1,351	20.2	(0.0)	7.0	2.2				
Prospect Parmenter	5	90		29 31	6		11	400	6.0	(0.0)	7.0	0.0	CC ST OSR	50	50	
Prospect Parm (con't)	5	90		30 31	6 7 17-19 28 33		12	275								
Prospect Parm (con't)	5	90		30 32	1-3 12 13 24 25 36											
Prospect Parm (con't)	5	90		31 32	25 34-36											
Flower Cedar	5	90	1				14	300	6.0	(0.0)	0.0	0.0	CC ST OSR	50		50
Flower Cedar (con't)	5	90	1				16									
Small Sales	5	90					15	300	8.0	(0.0)	0.0	0.0				
Small Sales (con't)	5	90					16	200								
Small Sales (con't)	5	90					11	200								
Small Sales (con't)	5	90					12	100								
Totals (Libby 1990)								1,775	20.0	(0.0)	7.0	0.0				

THREE-YEAR TIMBER SALE IMPLEMENTATION SCHEDULE, 1988 through 1990 (continued)

SALE NAME	D	FY	BB	T_R	SECTION	EA	MA	ACRES	VOLUME	RD C	RD R	CUT TYPE	TRAC	CAB	SKY
Upper Cripple Horse	6	90		31 28	23		15	175	4.0 (1.5)	4.0	0.0	CC ST	60	40	
Upper Crp Hrs (con't)	6	90					12	200							
Fawn Creek	6	90		29 29	30		15	300	5.0 (0.0)	5.0	3.0	CC ST	50	50	
Fawn Creek (con't).	6	90					11	100							
Fawn Creek (con't)	6	90					18	100							
Cripple Horse Heli.	6	90		31 28	10		16	300	3.0 (0.0)	0.0	0.0	CC			100*
Davis Mt P.C.	6	90		32 27	35		15	400	6.0 (1.8)	5.0	2.0	ST	90	10	
Raven	6	90		27 29	34		16	200	3.5 (0.0)	5.0	3.0	CC ST	50	50	
Raven (con't)	6	90			34		11	150							
Raven (con't)	6	90			34		12	150							
Brush Pecolet	6	90		28 29	4		15	300	3.0 (1.0)	5.0	3.0	CC ST	20	80	
Brush Pecolet (con't)	6	90					18	100							
East Raritan	6	90		26 29	22		15	400	2.0 (0.0)	1.0	2.0	SAL	100		
N. Fork Canyon	6	90		31 28	20		12	100	1.0 (0.0)	2.0	0.0	CC	100		
Shepard Mt.	6	90		30 26	9		12	120	1.5 (0.5)	1.4	0.9	CC	100		
North McKillup	6	90		28 29	35		12	120	1.0 (0.4)	2.0	1.5	CC ST	50	50	
Small Sales	6	90					12	800	10.0 (3.2)	3.0	3.0		80	20	
Small Sales (con't)	6	90					15								
Totals (Fisher River 1990)								4,015	40.0 (8.4)	33.4	18.4				
Washtub	7	90		27 32	31 32		14	175	2.0 (0.1)	2.8	0.0	CC ST	50	50	
Wilton-Granite	7	90		24 32	33 34		12	350	6.5 (0.0)	14.4	6.9	CC ST	10	30	60
Powerview	7	90		25 31	10 16		23	150	2.0 (0.2)	6.1	6.3	CC ST	5	30	65
Powerview (con't)	7	90					11	150							
Canyon Berry	7	90		24 31	10-12		14	90	1.0 (0.0)	1.5	6.4	CC ST	10	30	60
Canyn Bry (con't)	7	90					18	55							
Small Fry	7	90		24 32	25 26 36	X	11	123	1.5 (0.0)	3.9	1.3	CC ST	80		20
Small Sales	7	90						0	0.7 (0.0)	0.0	0.0				
Totals (Cabinet 1990)								1,093	13.7 (0.3)	28.7	20.9				

	ACRES	VOLUME	RD C	RD R
1990 GRAND TOTAL (All Districts)	16551	213.3 (22.0)	103.9	98.8

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWELVE

INDICATOR SPECIES

Appendix 12

INDICATOR SPECIES

About 280 different species of wildlife occupy the Kootenai National Forest. Addressing the habitat needs of these species individually is a monumental task, but grouping these species into groups with similar habitat preferences provides a workable approach. Species were placed in one of ten groups, depending on their habitat preferences for feeding and reproduction. This is a similar approach to that explained in Agricultural Handbook 553 (1979). For each of these groups a particular species was identified as an indicator species, to act as a barometer of change in that particular habitat. In most cases, a bird and a mammal were identified to increase the chances for accurate monitoring.

Selecting an indicator species is difficult. The potential candidates should be selective in their habitat needs, capable of being monitored, and numerous enough so they can be monitored in sufficient quantity. Ideally they should be species about which a great deal is known. The key criteria used in the selection of the final indicator species on the Kootenai National Forest was: (1) The species can be easily monitoried, and (2) The species is susceptible to changes resulting from management activities. For more information on the selection of the indicator species, see Chapter III in the Final EIS.

The following is the list of indicator species that will be monitored on the Kootenai National Forest:

Threatened and Endangered Species	Habitat Dependency
Grizzly bear	general forest
Grey Wolf	general forest
Bald Eagle	rivers and lakes
Peregrine Falcon	cliffs

Species Hunted, Fished and Trapped	Habitat Dependency
Elk	general forest
Whitetail Deer	general forest
Mountain Goat	alpine

Other Species	Habitat Dependency
Pileated Woodpecker	Snags, old-growth timber

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX THIRTEEN

WITHDRAWAL CRITERIA

Appendix 13
WITHDRAWALS

This section pertains to administrative withdrawals which are generally used to protect small, high-value sites from mineral activity. It does not pertain to legislative withdrawals enacted by Congress for such specially designated lands as wilderness. Under the terms of the Federal Land Management Policy Act, the Kootenai must complete a review of all withdrawals on the Forest by 1991. This Appendix summarizes how the Forest intends to accomplish that task.

1. Evaluation Criteria

a. Withdrawals will be used only for "locatable" minerals subject to appropriation under the mining laws. Withdrawal will not be used for "leasable" minerals such as oil and gas because the Forest has the ability to prevent lease activity in any given area. Means for accomplishing this include such things as use of "No Surface Occupancy" stipulations and denial of lease offers.

b. Withdrawals will be retained or new withdrawals requested to preserve unique resource areas where no reasonable alternative to withdrawal will provide adequate protection and the area will not survive without undue damage or impacts caused by mineral development. (Research Natural Areas are an example of this.)

c. Mineral withdrawal will generally not be sought for Kootenai Forest land actually used and occupied by the Forest, as established by structures, other physical improvements, or the use of the land, in such a way to put a person on notice that the land is occupied. Such use "appropriates" the land.

d. Withdrawal will be used to protect certain high-value Federal improvements where relocation or replacement is impractical. "Impractical" means that there would be an added cost or inconvenience to the Forest Service which could not be adequately compensated for in a mineral Plan of Operations. Ranger Stations would fall in this category.

e. Areas under special use permits to non-Federal agencies or private persons are not considered "appropriated". Permittees will be notified that their use is not protected from mineral development if such use is in an area that is not withdrawn. A mineral withdrawal may be proposed at the discretion of the Forest Supervisor but the permittee will normally be expected to fund preparation of a mineral report and other material necessary to process the withdrawal.

f. For areas that are currently withdrawn where retention of the withdrawal is proposed, an evaluation will be conducted to determine whether the area withdrawn is too small or too extensive.

e. Mineral potential will be given consideration in all withdrawal reviews. High or low potential will not automatically result in a decision to withdraw or not but this information will be considered along with the other criteria. Generally, the need to pursue withdrawals will be seen as less strong in areas of low potential.

2. Processing and Program Review

a. Determination of need for the withdrawal will be based on the criteria above.

b. Each withdrawal case will be processed using the requirements outlined in Section 204 of FLPMA (P.L. 94-579) and 43 CFR 2310.

c. Timing priorities for each of the cases will be established so that cases involving a potential management conflict because of the current withdrawal status of the area will be handled first. Cases in areas where legislative withdrawal is anticipated will be treated last as there may be no need to protect these sites with an administrative withdrawal.

The tentative schedule for withdrawal review on the Forest is as follows:

YEAR		CASES	NO.
1987	1.	Sites where current withdrawal status may directly conflict with ongoing programs or projects.	15
	2.	General recreation, administrative, and Ranger Station sites on Rexford and Yaak Ranger Districts.	13
		YEAR TOTAL:	28
1988	1.	General recreation, administrative, and Ranger Station sites on Fortine, Troy, and Libby Ranger Districts.	36
		YEAR TOTAL:	36
1989	1.	General recreation, administrative, and Ranger Station sites on Fisher River and Cabinet Districts.	18
	2.	Interational Boundary Strip	1
	3.	Libby Dam Project	1
		YEAR TOTAL:	20
1990	1.	Lookout towers. (Withdrawal analysis likely to be affected by Forest tower management plan to be developed.)	22
	2.	Additional sites within areas currently expected to be withdrawn legislatively if such action hasn't taken place.	1
	3.	Additional sites within areas Forest is trying to exchange out of if such exchanges haven't taken place.	3
	4.	Other areas such as recreation areas, etc.	6
		YEAR TOTAL:	32

(Note: Withdrawal review of Research Natural Areas may have to be deferred from 1987 until a later date as it is uncertain when RNA's will be approved. Cases from following years would be moved forward to 1987 accordingly.)

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX FOURTEEN

INVENTORY OF WITHDRAWALS

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M034538	Big Creek Recreation Area	Revoke	All NPSL in the S1/2 S1/2NW1/4SW1/4, Sec. 2	34N	29W	9.00	1	1987
	Big Creek Research Natural Area	Proposed	Secs. 2 & 3	34N	29W	190.00	1	1987
M1188	Black Butte Lookout	Revoke	NE1/4SW1/4SW1/4, Sec. 20	36N	27W	10.00	1	1990
M067221	Camp 32 Recreation Area	Retraet Proposal	S1/2NW1/4SW1/4 & N1/2NE1/4SW1/4SW1/4, Sec. 35	36N	28W	25.00	1	1987
	International Boundary Strip USA-Canada	Revoke	Secs. 4-6	37N	24W	18.20	1, 2 & 3	1989
			Secs. 1-6	37N	25W	43.68		
			Secs. 1-6	37N	26W	41.86		
			Secs. 2-6	37N	28W	25.48		
			Secs. 1-6	37N	29W	43.68		
			Secs. 1-6	37N	30W	43.68		
			Secs. 1-6	37N	31W	43.68		
			Secs. 1-6	37N	32W	43.68		
			Secs. 1-6	37N	33W	43.68		
			Sec. 1	37N	34W	2.52		
						350.14 Total		
M-072057	Libby Dam Project	Retain/ Revoke	Along Reservoir between FDR and Highway 37	Various	Various	43,263.21	1 & 6	1989
	McGuire Mtn Lookout	Defer	S1/2S1/2, Sec. 22; N1/2N1/2, Sec. 27	33N	28W	10.00	1	1990
M45197	Mud Lake Lookout	Revoke	NE1/4NE1/4, Sec. 25	36N	28W	40.00	1	1990

KOOTENAI INVENTORY OF WITHDRAWALS

(Exis|ing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
	Peck Gulch Recreation Site *Already withdrawn under Libby Dam project.	Proposed	SE1/4NE1/4, NE1/4SE1/4, Sec. 11	34N	29W	80.00	1	1987
M1188	Pinkham Mountain Lookout	Revoke	NE1/4NW1/4NE1/4, Sec. 9	33N	27W	10.00	1	1990
M42159	Rexford Ranger Station	Revoke	NW1/4NE1/4, Sec. 29	36N	28W	40.00	1	1987
	Rexford Ranger Station	Proposed	SW1/4NW1/4 & NW1/4SW1/4, Sec. 11	36N	27W	29.06	1	1987
	Rexford Bench Recreation Site	Proposed	Sec. 19 E1/2NE1/4, E1/2NW1/4, E1/2SE1/4NE1/4, Sec. 12	36N	28W	180.00	1	1987
	Robinson Mtn Lookout	Defer	SW1/4SW1/4, Sec. 17	37N	29W	10.00	1	1990
	Tobacco Plains Boat Ramp	Proposed	NW1/4SW1/4NW1/4, SE1/4NW1/4NW1/4, Sec. 20; SE1/4NE1/4NE1/4, NE1/4SE1/4NE1/4, Sec. 19	37N	27W	40.00	1	1987
M1188	Webb Mountain Lookout	Revoke	NE1/4NW1/4NW1/4, Sec. 10	35N	29W	10.00	1	1990
M1188	Baldy Mountain Lookout	Revoke	NE1/4NW1/4, Sec. 6	35N	33W	10.00	2	1990
M034538	Caribou Creek Recreation Area	Retain	Sec. 21 Sec. 22 Sec. 28	37N	30W	12.65	2	1987

KOOTENAI INVENTORY OF WITHDRAWALS

(Exis]ing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M1188	Garver Mountain Lookout	Defer	SE1/4SW1/4NE1/4, Sec. 32	37N	32W	10.00	2	1990
	Hoskins Lake Research Natural Area	Proposed	Secs. 8 & 17	36N	31W	300.00	2	1987
M1188	Mount Henry Lookout	Revoke	NE1/4NW1/4 SW1/4, Sec. 17	36N	30W	10.00	2	1990
	Olson Flat Administrative Site	Revoke	SW1/4SW1/4NW1/4, Sec. 3	35N	32W	45.00	2	1987
M034538	Pete Creek Recreation Area	Revoke	S1/2NE1/4NE1/4, Sec. 5	35N	32W	20.00	2	1987
	Pete Creek Meadows Research Natural Area	Proposed	Secs. 13 & 24	37N	33W	120.00	2	1987
M034538	Red Top Creek Recreation Area	Revoke	S1/2E1/2NE1/4NE1/4, Sec. 31	35N	33W	20.00	2	1987
	Sylvanite Ranger Station	Retain	Sec. 9 Sec. 10	34N	33W	94.30	2	1987
M014987	Sylvanite Administrative Site	Retain	Sec. 9 Sec. 10	34N	33W	90.00	2	1987
M060295	Upper Ford Work Center Admin. Site	Retain	Lot 7, Sec. 6; Lot 1, Sec. 7	36N	31W	69.13	2	1987
	West Fork Yaak Falls	Proposed	NW1/4, Sec. 32	37N	31W	80.00	2	1987
M13651	Whitetail Campground Expansion	Revoke	Sec. 6 Sec. 1 Sec. 31 Sec. 36	35N 35N 36N 36N	32W 33W 32W 33W	Total 86.41	2	1987

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M034538	Whitetail Creek Recreation Area	Revoke	N1/2N1/2SE1/4, Sec. 1	35N	33W	40.00	2	1987
M44296	Ant Flat Administrative Site	Retain	SE1/4, Sec. 7	34N	25W	80.00	3	1988
M1188	Big Therriault Lake Rec. Area	Retain	SE1/4SW1,4 Sec. 29	37N	25W	30.00	3	1988
M44296	Bunch Grass Flat Ranger Station	Revoke	SW1/4, Sec. 6	35N	25W	151.76	3	1988
M034538	East Dickey Lake Recreation Area	Retain	Lot 3, Sec. 14	34N	25W	7.62	3	1988
M1188	Frank Lake Recreation Area	Revoke	Lot 1, Sec. 17	35N	26W	35.31	3	1988
	Green Mountain (Ten Lakes Acquisition, 1980)	Retain/ Revoke	Sec. 23 Sec. 24	37N	26W	15.37	3	1990
M034538	Lower Therriault Lake Rec. Area	Retain	S1/2SE1/4NE1/4 Sec. 30	37N	25W	13.00	3	1988
M1188	Marston Lookout	Revoke	SW1/4NW1/4SE1/4, Sec. 26	35N	25W	10.00	3	1990
M049429	Murphy Lake Administrative Site	Retain	E1/2NE1/4SE1/4 Sec. 6	34N	25W	20.00	3	1988
M1188	Murphy Lake Recreation Area	Retain	Lot 11, Sec. 5; Lot 1, Sec. 8	34N	25W	43.60	3	1988
M034538	Murphy Lake Recreation Area	Retain	Lots 5 & 8, Sec. 5	34N	25W	28.28	3	1988
M034538	North Dickey Lake Recreation Area	Retain	Lot 2, Sec. 9	34N	25W	18.25	3	1988

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M067221	Rock Lake Recreation Area	Pending	S1/2, Lot 6, Sec. 6	35N	26W	78.61	3	1990
M034538	South Dickey Lake Recreation Area	Retain	Lot 4, Sec. 15	34N	25W	16.08	3	1988
M1188	South Dickey Lake Recreation Area	Revoke	Lot 6, Sec. 15	34N	25W	43.95	3	1988
M1188	Stahl Peak Lookout	Retain	E1/2SE1/4SE1/4, Sec. 33	37N	25W	10.00	3	1990
M1188	Sunday Mountain Lookout	Revoke	SW1/4NE1/4SE1/4, Sec. 29	33N	25W	10.00	3	1990
M42111	Twin Meadows Ranger Station	Revoke	NE1/4, Sec. 29	32N	26W	62.00	3	1988
M034538	Upper Therriault Lake Rec. Area	Retain	SE1/4SE1/4SW1/4, Sec. 29; E1/2NE1/4NW1/4, Sec. 32	37N	25W	27.00	3	1988
M1188	Bad Medicine Recreation Area	Retain	Lot 4, Sec. 4	28N	33W	10.00	4	1988
M42178	Callahan Creek Administrative Site	Revoke	W1/2NE1/4, E1/2NW1/4, Sec. 23	31N	34W	160.00	4	1988
M060295	Dorr Skeels Recreation Area	Retain	Lot 1, Sec. 20	29N	33W	45.90	4	1988
M45196	Kilbrennen Administrative Site	Revoke	NE1/4, Sec. 29	33N	33W	22.50	4	1988

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
	King Mountain Microwave Site	Proposed	SW1/4SW1/4SW1/4, Sec. 35;	32N	33W	10.00	4	1987
			SE1/4SE1/4SE1/4, Sec. 34;	32N	33W	10.00		
			NW1/4NW1/4NW1/4, Sec. 2	31N	33W	10.00		
			N1/2NE1/4, Sec. 3	31N	33W	40.00		
						70.00 Total		
M41926	Last Chance Administrative Site	Revoke	S1/2, Sec. 5; N1/2, Sec. 8	32N	34W	194.02	4	1988
M034538	Lower Spar Lake Recreation Area	Revoke	NW1/4NE1/4SE1/4, Sec. 22	29N	34W	10.00	4	1987
M034538	Ross Creek Cedar Natural Area	Retain	Sec. 12	28N	34W	100.00	4	1988
M067221	Ross Creek Recreation Area	Pending	S1/2NE1/4NE1/4 Sec. 12	28N	34W	20.00	4	1988
	Ross Creek Research Natural Area (380 acres within Scotchman Rec.Wild)	Proposed	Secs. 11 & 12	28N	34W	720.00	4	1987 (defer)
M41927	Troy Ranger Station	Retain	E1/2E1/2, Sec. 2	31N	34W	159.31	4	1988
M42166	Troy Ranger Station	Revoke	Lots 3 & 7, Sec. 1	31N	34W	67.83	4	1988
M034538	Upper Spar Lake Recreation Area	Revoke	S1/2SE1/4SE1/4, Sec. 16	29N	34W	15.00	4	1988

KOOTENAI INVENTORY OF WITHDRAWALS

(Exis|ing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M034538	West Bull Lake Recreation Site	Retain	Lots 1 & 5, Sec. 4	28N	33W	27.30	4	1988
M067221	Yaak Falls Recreation Area	Pending	W1/2NW1/4NW1/4, Sec. 9	33N	33W	20.00	4	1988
M1188	Yaak Mountain Lookout	Revoke	SE1/4SW1/4SW1/4, Sec. 2	32N	34W	10.00	4	1990
	Yaak River Campground Rec. Site	Proposed	N1/2 Lot 1, Sec. 8; All of Lots 7 & 12, Sec. 5; SE1/4SE1/4, NE1/4SE1/4, Sec. 5	32N	34W	24.50 43.29 80.00 147.79 Total	4	1988
M1188	Big Creek Baldy Lookout	Retain	SW1/4NW1/4SE1/4, Sec. 12	33N	31W	10.00	5	1990
M1188	Big Swede Lookout	Revoke	SW1/4 of Lot 2, Sec. 17	30N	30W	10.00	5	1990
M1188	Blue Mountain Lookout	Revoke	S1/2NE1/4NE1/4, Sec. 32	32N	30W	20.00	5	1990
M1188	Horse Mountain Lookout	Revoke	SW1/4SW1/4SW1/4, Sec. 33	28N	30W	10.00	5	1990
M060295	Howard Lake Recreation Area	Retain	NE1/4, Sec. 13	27N	31W	15.00	5	1988
M067221	Howard Lake Recreation Area	Pending	NE1/4, Sec. 13	27N	31W	35.00	5	1988
M014987	Lake Creek Campground	Revoke	S1/2SW1/4SE1/4, Sec. 5; N1/2NW1/4NE1/4, Sec. 8	26N	30W	40.00	5	1988

KOOTENAI INVENTORY OF WITHDRAWALS

(Exis|ing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M034538	Libby Ranger Station Admin. Site	Retain	S1/2S1/2NE1/4, NE1/4SE1/4, Sec. 34	31N	31W	80.00	5	1988
M034538	Loon Lake Recreation Site	Revoke	SW1/4NE1/4NE1/4, Sec. 25	33N	32W	10.00	5	1988
	Norman Mountain Research Natural Area	Proposed	(Within the Cabinet Mtn.Wilderness Adds) Secs.2-5 & 8-11	30N	32W	1100.00	5	1987 (defer)
	Parmenter Research Natural Area	Proposed	Sec. 12	30N	32W	60.00	5	1987
M067221	Paul Bunyan Recreation Area	Retract Proposal	S1/2, Sec. 30	29N	30W	45.00	5	1990
M42166	Pipe Creek Administrative Site	Revoke	NW1/4NE1/4, NE1/4NW1/4 Sec. 2	31N	31W	80.00	5	1988
M1188	Scenery Lookout	Revoke	NE1/4SW1/4SE1/4, Sec. 29	31N	32W	10.00	5	1990
M42163	Swamp Creek Administrative Site	Revoke	NE1/4SE1/4, Sec. 11; W1/2W1/2NW1/4SW1/4, Sec. 12	27N	30W	50.00	5	1988
M067221	Timberlane Recreation Area	Retract Proposal	S1/2, Sec. 35	32N	31W	35.00	5	1990
M1188	Turner Mountain Winter Sports Area	Retain	S1/2NW1/4, N1/2SW1/4, W1/2SE1/4, Sec. 20	33N	31W	240.00	5	1988
M034538	Turner Recreation Area	Retain	N1/2SW1/4SW1/4, Sec. 21	33N	31W	20.00	5	1988

KOOTENAI INVENTORY OF WITHDRAWALS

(Exis|ing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M42161	Big Bend Administrative Site	Revoke	SW1/4, Sec. 8	30N	29W	160.00	6	1989
M1188	Calx Mountain Lookout	Revoke	SE1/4NW1/4NE1/4, Sec. 10	28N	27 1/2W	10.00	6	1990
	Colonite Creek Recreation Area	Retract	NW1/4, Sec. 2	25N	29W	25.00	6	1990
M42110	Fairview Ranger Station	Retain	NW1/4NE1/4, N1/2NW1/4, SE1/4NW1/4, Sec. 22	30N	27W	160.00	6	1989
M1188	Horse Hill Lookout	Revoke	SW1/4 of Lot 3, Sec. 30	30N	26W	10.00	6	1990
M1188	Kenelty Mountain Lookout	Revoke	SE1/4NE1/4SE1/4, Sec. 22	27N	29W	10.00	6	1990
M1624	McGregor Lake Recreation Area	Revoke	Lots 2, 3, & 4, Sec. 12	26N	26W	94.16	6	1990
M034538	Pleasant Valley Recreation Area	Revoke	SE1/4 of Lot 16, Sec. 2	26N	29W	10.00	6	1990
M034538	Raven Ranger Station Admin. Site	Revoke	Lots 9, 10 & 16, Sec. 2	26N	29W	50.00	6	1990
M1188	Sylvan Lake Recreation Area	Revoke	Lots 2 & 3, Sec. 24	25N	29W	86.86	6	1989
M46099	Warland Ranger Station	Revoke	Lot 6, Sec. 27; Lot 2, Sec. 34	32N	29W	76.63	6	1989
M40608	Wolf Creek Administrative Site	Revoke	N1/2NW1/4, Sec. 20	29N	27W	80.00	6	1989

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
	Wolf/Weigel Research Natural Area	Proposed	Secs. 1 & 12	31N	27W	240.00	6	1987
M1188	Ziegler Mountain Lookout	Revoke	SW1/4NE1/4SE1/4, Sec. 31	33N	28W	10.00	6	1990
M40629	Baker Administrative Site	Revoke	SW1/4, Sec. 28; N1/2NW1/4NW1/4, Sec. 33	28N	33W	89.00	7	1989
M036030	Big Eddy Recreation Area	Retain	Lot 3, Sec. 25	27N	34W	16.25	7	1989
M024160	Bull River Bay Recreation Area	Retain	N1/2NW1/4, Sec. 10	26N	33W	32.50	7	1989
M42169	Bull River Ranger Station	Retain	W1/2, Sec. 7; E1/2, Sec. 12	27N 27N	32W 33W	79.28	7	1989
M42173	Grasshopper Site	Revoke	Lots 2 & 3, Sec. 3; SE1/4NW1/4, Sec. 3	26N	33W	100.00	7	1989
M42174	Horse Thief Ranger Station	Revoke	Lot 12, Sec. 4	27N	33W	10.00	7	1989
M028307	Jack Pine Flats Recreation Area	Revoke	NW1/4, Sec. 12	22N	32W	65.00	7	1989
	Noxon Administrative Site	Retain	Lot 8, Sec. 24	26N	33W	36.59	7	1989
M42172	Noxon Administrative Site	Retain	E1/2SE1/4, Sec. 24	26N	33W	80.00	7	1989

KOOTENAI INVENTORY OF WITHDRAWALS

(Existing, Pending, Proposed Additions, Proposed Revocations)

Serial No.	Name of Site	Action	Legal Description	Township	Range	Acreage	District	FY to Accomplish by
M3959	Rock Meadows Recreation Area	Revoke	N1/2, Sec. 6	26N	31W	170.00	7	1987
M42167	Rolling Rock Ranger Station	Revoke	NW1/4, Sec. 24	27N	34W	3.70	7	1990
M42164	Swamp Creek Ranger Station	Revoke	S1/2SW1/4, Sec. 20	25N	31W	60.00	7	1989
M1418	Trout Creek Administrative Site (New Station)	Retain	Lots 6 & 7, NE1/4SW1/4, Sec. 6	24N	31W	105.83	7	1990
M42167	Trout Creek Ranger Station (Old Site)	Revoke	NE1/4, Sec. 24	24N	32W	160.00	7	1989
	Ulm Peak Research Natural Area	Proposed	Portions of Secs. 22, 23, 26, & 27	25N	34W	690.00	7	1987
M40607	White Pine Ranger Station	Revoke	Lots 2 & 3, Sec. 14	23N	31W	92.06	7	1989
M036030	Willow Creek Recreation Area	Retain	SW1/4NW1/4NW1/4, Sec. 3; SE1/4NE1/4NE1/4, Sec. 4	24N	29W	20.00	7	1989

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX FIFTEEN

CORRIDOR CRITERIA

May 1982

Criteria for Identifying Corridor Exclusion Areas, Avoidance Areas and Windows in Montana

The Utility-Transportation Corridor Study for Montana (November 1981) recommends a combined exclusion area, avoidance areas and window concept for identifying and selecting corridors in Montana. The first step in this approach is to develop and agree on criteria for identifying these areas. The following paragraphs define each area and then list identification criteria. The criteria are designed for application to all lands; however, the USDI-Bureau of Land Management, USDA-Forest Service and State agencies will only apply the criteria on lands within their jurisdiction. Local governments and other federal agencies have the option to consider these standards in their planning.

A. Exclusion Areas - Land areas determined to be unavailable for corridor allocation or facility siting.

- Include only those areas with a legal Congressional mandate that excludes linear facilities, example - National Wilderness lands.

Jurisdiction - USFS, US-BLM

B. Avoidance Areas - Land areas that pose particular land use or environmental impacts which would be difficult or impossible to mitigate. (May vary by type of facility.)

1. Areas where establishment and use of corridors conflict with land use/land management objectives.

Examples:

- Specially managed areas; such as areas designated for developed and primitive recreation, research natural areas, environmental education areas.
- Environmentally sensitive areas (certain wildlife habitat areas, faults, wetlands, slump areas, etc.)
- Archeological and historical sites
- Areas with specific visual objectives which conflict with facility placement.
- Active coal mining units

(over)

Jurisdiction: USFS, US-BLM, State

2. Areas with special or unique values that have been accorded specific and sometimes protected management status through "legislative" action. These values conflict with facility placement.

Examples:

- National Recreation Areas (NRA)
- Wild, scenic, and recreational rivers
- Nationally classified trails
- State recreation areas

Jurisdiction: USFS, US-BLM, State

3. Areas which have been identified by local government bodies (within their areas of jurisdiction) as not suitable for the placement of linear facilities.

Examples:

- Urban residential areas
- City parks

Jurisdiction: Cities, Counties

C. Windows - Usually short, narrow passageways through constrained areas which are the most feasible potential locations for linear facilities, considering engineering and/or environmental factors.

Examples:

- Areas recognized as critical corridor segments because of physiographic or technical suitability.

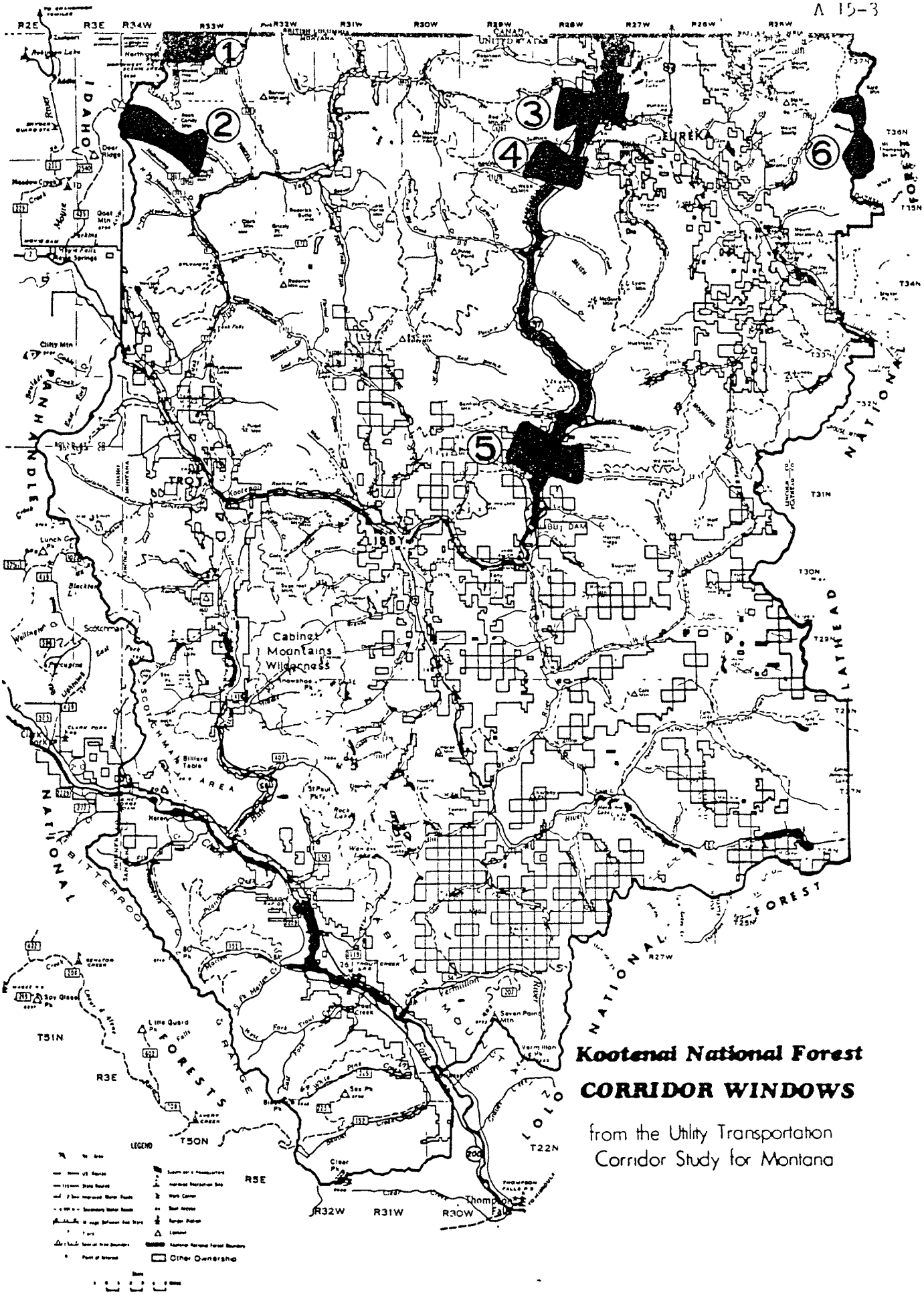
Jurisdiction: USFS, US-BLM, State, Counties

- Restricted passages identified as a result of allocation for exclusion or avoidance areas.

Jurisdiction: USFS, US-BLM, State

- Existing critical corridor segments through sensitive areas, such as urban, residential areas or areas of intensive land use.

Jurisdiction: Mainly Counties, Cities and State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LIBBY
Cabinet Mountains Wilderness
IDAHO
CANADA
UNITED STATES
BITTERROOT NATIONAL FOREST
KOOTENAI NATIONAL FOREST
LOLO NATIONAL FOREST
Kootenai National Forest
CORRIDOR WINDOWS
from the Utility Transportation Corridor Study for Montana
LEGEND
Other Ownership

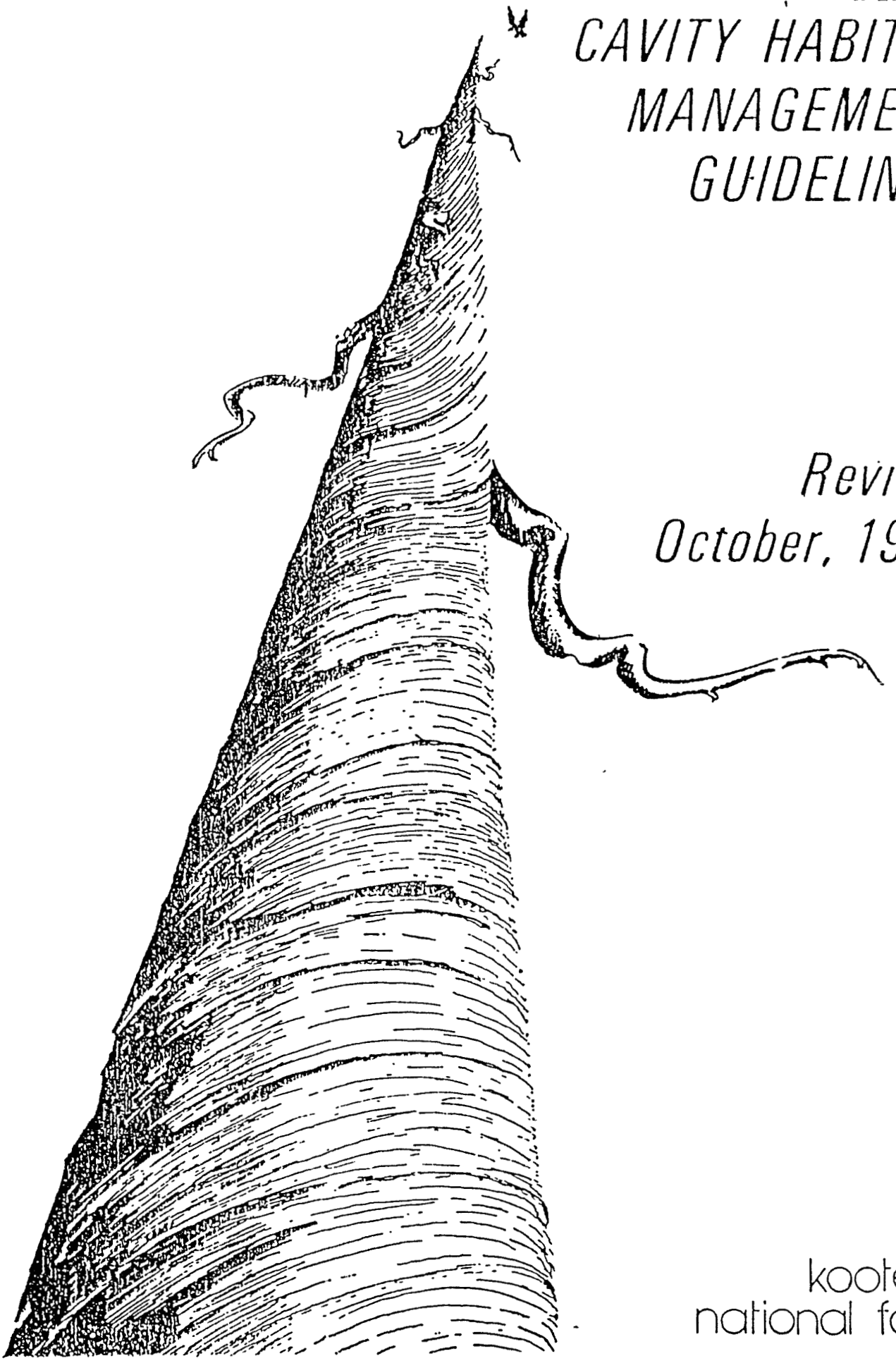
KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX SIXTEEN

CAVITY HABITAT MANAGEMENT GUIDELINES

CAVITY HABITAT MANAGEMENT GUIDELINES



Revised
October, 1984

kootenai
national forest

CAVITY HABITAT MANAGEMENT GUIDELINES

U.S. FOREST SERVICE
KOOTENAI NATIONAL FOREST
LIBBY, MONTANA 59923

Early in FY 84, the need for an activity review of cavity habitat management on the Kootenai was discussed and approved by the management team. Input on concerns and changes needed in existing policy or direction was solicited from each district and staff officer. An activity review group was formed to review input and develop new policy/direction. This group included: Chuck Brooks, Resources Staff Officer; Don Godtel, Wildlife Biologist; Tom Hope, District Ranger; Reed Kuennen, Wildlife Trainee; Steve Petro, Forester-- Sale Administration/Logging Systems Specialist; and Ron Pierce, Fire Management Officer. The following guidelines have been reviewed and accepted by the management team.

I would like to thank all the individuals who contributed to this effort and hope that these guilelines will result in better coordination and on-the-ground management of this important resource.

Approved by: James F. Rathbun Date: 10/9/84
JAMES F. RATHBUN
Forest Supervisor

Policy

The Forest Service has the responsibility to manage the timber resource in harmony with snag-dependent wildlife habitat on public lands and strive to maintain at least minimum viable populations of species utilizing this habitat (NFMA, 1976; Regional Policy 2631.7). Management policy and guidelines were developed in 1979 (KNF Supplement 2631.1; Managing Snag Dependent Wildlife in a Managed Forest, Godtel et. al., 1979) in order to help coordinate cavity habitat needs with other management and efforts have been made to implement them. Recently, however, a need to update these guidelines was recognized.

The policy of the Kootenai National Forest is to provide cavity habitat to meet wildlife needs while satisfying human needs for safety, fuel, fiber, and esthetics. This policy and guideline statement replaces the 1979 policy. It is intended to direct cavity habitat management while helping to ensure that practical objectives are carried from planning stages to on-the-ground accomplishments.

Introduction

Snags, broken-topped live trees, and down logs (all of which provide a substrate for excavation of cavities) are used by a great variety of wildlife species for nesting, denning, perching, roosting, feeding, and cover. Forty-two species of birds, fourteen species of mammals, and several species of amphibians are recognized as totally or largely dependent on cavity habitat on the Kootenai National Forest (Table 1). Snags located where they can eventually fall into streams and lakes are important in contributing to aquatic habitat through creation of pools, cover, and spawning beds. They also provide organic energy input to the stream.

The economic values of retaining snags and down logs in the forest ecosystem should not be overlooked. Franz (1961) cites 229 references to support his conclusion that birds, along with insectivorous bats, small mammals, microbes, and predatory insects (all of which utilize dead or decadent trees) help hold forest insect populations at endemic levels or exert some control during early stages of an outbreak. Thomas (1979) mentions the great expense that European foresters have gone to in order to provide nest boxes for insectivorous birds. Snags also provide an important energy source for the human community and the need to maintain firewood opportunities is an important consideration in project coordination.

Since approximately 1,454,000 acres (65%) of the Kootenai have an expected timber yield, the majority of the forest will be in a managed condition. Without active efforts to maintain cavity habitat it becomes apparent that we would reach a point in the future where a lack of snags of adequate diameter and distribution could seriously limit dependent wildlife populations and possibly render them non-viable. It takes more than 100 years to create a suitable snag for many species, so the decisions we make today with respect to cavity habitat will affect management long into the future.

Ten species of woodpecker are found on the forest. Since woodpeckers must excavate new nest and roost holes each year as part of their nesting or mating behavior, their needs cannot be mitigated by provision of nest boxes. Maintenance of adequate numbers of snags suitable for woodpecker nesting is essential for maintenance of viable populations of these species. In addition, abandoned woodpecker holes are available for use by other cavity-dependent species which are not capable of excavating their own holes. If the needs of woodpecker species are met, the needs of the secondary cavity nesters will be met (to a large extent).

Different species have different territory sizes and preferences which affect nest site selection. For example, McClelland's study of cavity nesters in northwest Montana (McClelland et. al., 1979) found that 74 % of 373 nests sampled were in broken-topped live or dead trees. Only 8% of the nest trees were intact-top snags. Fifty-six percent of nests sampled were in western larch; 30 % in aspen, cottonwood, or paper birch; 6% in Douglas fir or ponderosa pine, 2% in Englemann spruce, and 1% or less in other species. The snag/replacement selection guidelines included later in this document are based on these findings.

Cavity nesting species also select different cover types for locating nests. Species such as bluebirds and Lewis' woodpeckers prefer to nest in snags in the open, while species such as pileated and three-toed woodpeckers prefer to nest in clumps of snags. The large territorial requirements of some cavity dependent species (up to 600 acres) neccessitates that habitat is well distributed throughout a management area such as a compartment or drainage. If a great deal of cavity habitat is provided in one area but is totally lacking in surrounding areas, territorial behavior may limit use of available snags.

The Kootenai Forest Integrated Plan recognizes a need to account for cavity habitat throughout the forest. However, it is also recognized that due to soil conditions, past fires, and other natural factors there are areas which do not, and have not, supplied cavity habitat. In management of such sites and surrounding lands, those conditions will be taken into account when cavity habitat needs are calculated. Old growth areas and non-commercial timber lands can meet a good part of the need for cavity habitat, but do not provide for an adequate number and distribution of snags in some compartments or drainages. Minimum levels for cavity habitat retention should be applied on a drainage or compartment area basis at the following recommended levels: atleast 40% of the potential capacity will be maintained throughout commercial forest lands and at least 60% of the potential will be maintained in riparian areas.

The population capacity figures listed above were derived from Thomas' publication (1979), "Wildlife Habitats in Managed Forests", and are based on the territory sizes and nesting habits of various woodpeckers (primary excavators). Thomas states that management below the 40% level may be too low to maintain self-sustaining populations of many species. Although the concrete limits for population viability are not known, the lower the population level selected, the higher the risk of excluding a species from an area. A large degree of management flexibility can be used in attaining the desired snag level. For instance, managing snags at the 100% level on 60% of the land base would result in 60% of population potential. Another option in achieving this level would be to manage snags at the 60% level on 100% of the land base.

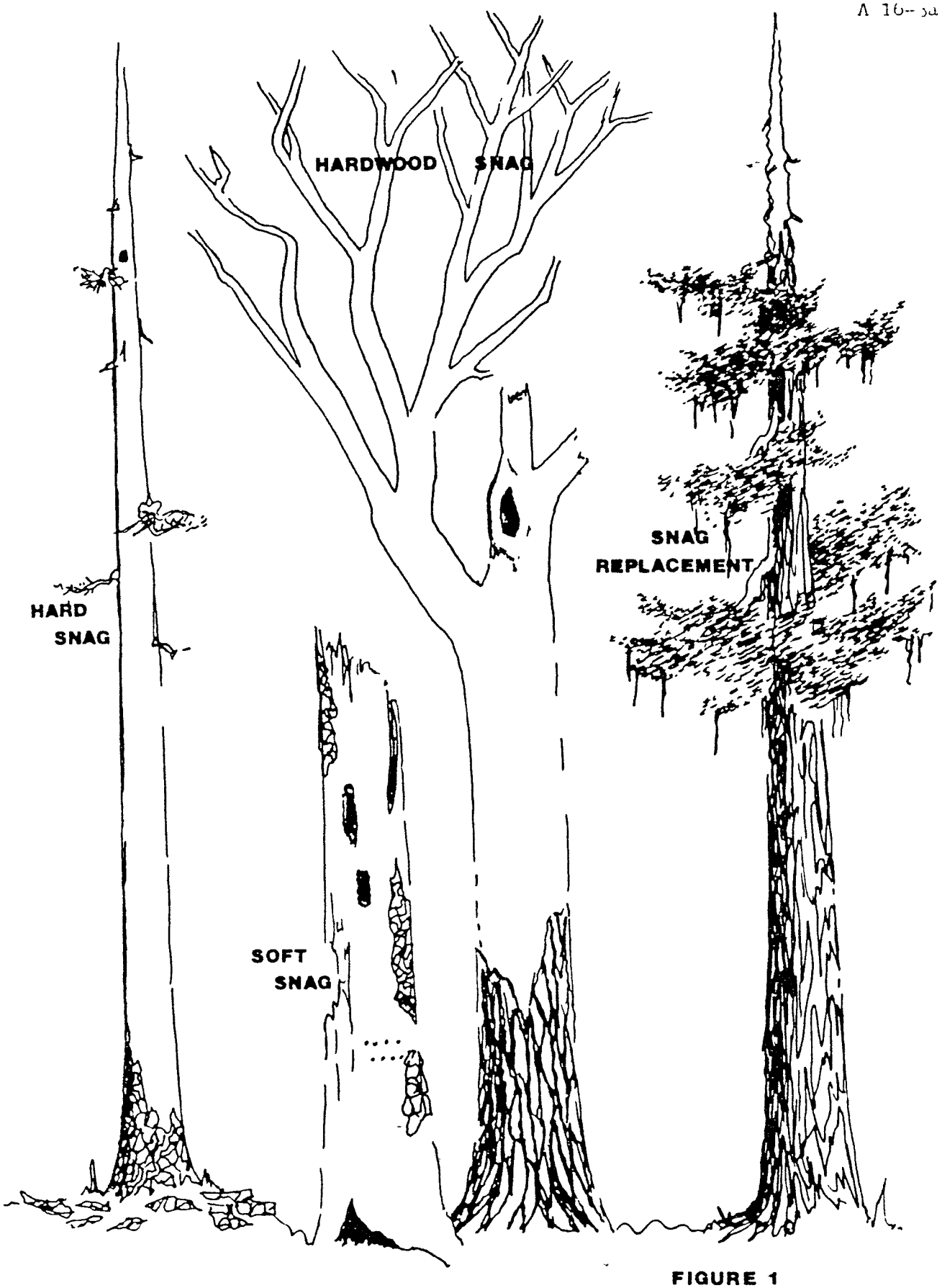


FIGURE 1

For example, in the mixed conifer timber type the various levels of management are:

Number Snags Needed Per 100 Acres	100% Level	60% Level	40% Level
	14 > 20"	8 > 20"	5 > 20"
	136 > 12"	82 > 12"	55 > 12"
	75 > 10"	45 > 10"	30 > 10"
TOTALS	225/100 AC.	135/100 AC.	90/100 AC.

High stumps can fulfill some of the needs for snags. If trees which exhibit insect infestations and feeding activity at their base and lower levels are cut off as high as a sawyer can reach, an important feeding site can be maintained. Such stumps, if supplied at a rate of 3 or 4 per acre, will last for many years and, if they project above normal snow levels, will provide important feeding sites during winter months. These should be considered in addition to (not in place of) snag requirements, because they do not fulfill any function for nesting sites (reproduction).

Due to the need to provide a continuous supply of snags over time, and in light of the fact that snags of adequate diameters may not be produced in the future under normal rotations, there is a need to designate green trees as snag replacements (see fig. 1). In the Forest plan, growth models for timber yield had reductions of 1000 bd ft/acre at harvest to account for cavity habitat needs in coordination. Non-merchantable material and cull trees will be left as replacements wherever possible, but if these trees are not available merchantible trees may be left where it is deemod neccessary to meet future cavity habitat needs. As a multiple-use land management agency, the Kootenai has the responsibility to supply adequate habitat to maintain viable populations of all native species. In some circumstances maintaining this habitat will mean incurring some additional cost.

Goals and Objectives

Goal - The primary goal is to maintain viable populations of cavity-dependent wildlife species throughout the Kootenai National Forest.

Objective I - to actively manage habitat to maintain woodpecker (and secondary excavator) populations in excess of 40 percent of their potential population capacity, and in excess of 60 percent of their capacity in riparian areas. Recognize and account for cavity habitat management on all acres throughout a compartment. Strive for good snag distribution; accounting for acreage currently devoid of snags/replacements such as road clearing zones and past cutting units.

Objective II - Implement I (above) by providing neccessary coordination information, guidelines, and training to appropriate Forest personnel. Utilize prescriptions, contracts, and administration to achieve this objective.

Objective III - utilize mitigation measures when the goal cannot be accomplished through coordination. Such measures as K.V. projects and direct habitat manipulation are appropriate mitigation considerations. Examples include; providing nest structures or nest boxes, girdling and topping replacement trees, providing nest cavities and properly sized faceplates, and pulling fuels away from designated snags and replacement trees.

Objective IV - abide by the intent of the timber sale contract and safety regulations.

Standards and Management Guidelines

These standards and guidelines provide general guidance for coordinating cavity habitat with all resource management activities. Standards provide specific direction and Forest Supervisor approval is needed for deviation from standards. Guidelines, on the other hand, provide broad direction that should be strived for in management activities but may be altered on the basis of site specific needs.

	Standard	Guideline
Timber/silviculture		
1. Cavity habitat needs will be addressed in timber sale EA's, and will be included under management requirements/constraints. The individual responsible for contract preparation on the district will review this list to ensure that needed specifications are included in the contract.	X	
2. Timber management activities (such as small and large sales, rehab areas, pre-commercial thinning, pulp, sanitation/salvage, and firewood sales) will be coordinated to provide a continuous supply of sizes and types of snags necessary to meet identified wildlife needs.	X	
3. On existing sales where snag management was not addressed, recognize the opportunity to amend the EA to include cavity habitat needs and amend contracts accordingly.		X
4. Silvicultural prescriptions and marking guides will identify cavity habitat management needs. Marking guidelines specific to unit type, logging system, and site prep method will be provided to marking crews. The district biologist will provide training as needed in the rationale for, and use of these guides. (Suggested guidelines are included in Appendix I of this document).	X	
5. Trees to be left in cutting units will be painted with a blue 'W' and stump spot. Marking of snags or replacements is a cost incurred as a result of timber management and will be payed for by the timber function (030 or 031).	X	

6. Information gathered by Timber Stand Inventory crews on pre-harvest snag/cull densities will be entered into appropriate fields in the data base for use in determining cavity habitat management needs. X

7. Marking crews will tally the number of snags and replacements marked in the 10-20" and 20"+ DBH classes. This information will be stored in the stand folder and in a designated field in the timber stand data base. Locations of snag clumps will be shown on a map stored in the stand folder. Clump boundaries will be marked with blue paint and signed with metal tags, if neccessary. X

8. If a tree marked for wildlife must be felled because it is a safety hazard, then it should be left on the site to provide down and dead wildlife habitat and another standing tree should be marked to leave as a substitute. X

9. Leave logs > 12 " diameter scattered throughout dozer-piled units (a few pieces per acre) to provide cover and feeding sites for birds and small mammals. Five to fifteen tons per acre is recommended and is generally compatible with sivicultural needs. X

10. Replacement trees with broken tops, scars, signs of heartrot, or buttrott should be left wherever possible without harming regeneration. If replacement trees with mistletoe are left then K.V. money can be collected to girdle them after the sale (to prevent infection of regeneration). X

11. L.D.S. (leave dead standing) and L.D.D. (leave dead down) will be used around all units. If there is a need to remove snags which are potential fire hazards or in areas of beetle infestation, timber and fire personnel will coordinate snag removal with the wildlife biologist. X

12. Leave high stumps: 1)In steep cable units or adjacent to firelines in broadcast burn units where it is not feasible to leave snags, or 2)In riparian areas where high stumps have high value for wildlife and can aid in preventing debris from entering streams. Select trees which show signs of bird feeding, buttrot, carpenter ant infestation or other defect. This action is best handled through administration during the sale. X

13. Prescriptions and contracts will address the need to leave aspen, cottonwood, and birch standing in cutting units due to their high value to wildlife. X

Engineering

1. Retention of snags will be stressed during road construction in order to make them available to the public for firewood. Snags which are within the clearing limits or are a safety hazard will be felled, but can be decked along roads or unburned in burn-bays for future public firewood use. High stumps can be left where not in conflict with viewing or engineering needs. X

2. Contract administrators will not allow snag removal outside the road construction limits. X

Wildlife

1. Cavity habitat will be de-emphasized within the roadside strip (generally 100' from centerline, depending on slope) and snags in this zone will be available for public use. Where open roads are adjacent to designated old growth or other key habitat, signs designating it as a "wildlife leave area--no firewood cutting" will be displayed as needed. X

2. Where cavity habitat is lacking due to past management activities, mitigation needs will be identified in EA's, and SAI plans will be developed and implemented to correct the situation. X

3. Cavity habitat will be monitored following timber management activities as specified in the Integrated Forest Plan. X

Fire

1. Marking guidelines will provide direction for marking snags and replacements so that they do not pose a hazard, and should be coordinated with fire personnel on a unit-by-unit basis. If leaving snags in certain units poses a hazard, a greater number of snag replacements should be left standing to compensate for this. X

Management

1. Contract administrators will not make changes affecting snags (other than safety) without prior line officer and/or wildlife coordination. X

2. Efforts will be made to inform the public, contractors, and forest service personnel of cavity habitat needs and opportunities to get firewood which will minimize cavity habitat conflicts. X

APPENDIX I --GUIDELINES FOR MARKING SNAGS AND REPLACEMENTS

These guidelines provide general direction for marking snags and replacements. They will be modified as needed on a site-specific basis. Guidelines for selecting types of snags/replacements to mark are included at the end of this section. For all unit types, snags/replacements should be marked with a blue 'W' and the number of snags/replacements marked should be tallied by diameter class (10-20" and 20"+) as stated above. It is important to recognize that snags reach their highest potential when located adjacent to riparian zones and should be left wherever posssible without posing safety hazards or management problems. Unsound snags pose a high hazard in units and landings where helicopters will be operating and will be felled if unfirm and over 16 feet in height. If snags are felled, they should be high-stumped if possible. Snag replacements should be retained.

I. Clearcut Unit

Since the majority of cutting units in a sale area are often clearcuts, it is neccessary to leave some snags and replacements in clearcuts in order to meet cavity habitat objectives. Leave strips will be future cutting units in most cases, so managing snags only within leave strips is not consistent with good long-term management. On cable ground the ability to retain snags and replacements is severely limited, and should be taken into account in long-term planning. The following guidelines apply to clearcut units:

1. On dozer piled units, leave all unmerchantable WL, PP, DF, and WRC snags > 10" dbh which do not pose a safety hazard. Leave additional snag replacements as needed to provide for long-term habitat needs and as identified in the prescription. This will often be twice the number of snags needed. Leave a few down logs per acre > 12" diameter scattered throughout the unit to provide cover and feeding sites for birds and small mammals.

2. In broadcast burn units of less than 35% slope or with light fuel loading follow the guidelines in 1 above, but avoid marking snags along the top center of the unit or along the side facing prevailing winds (often the NE side). Sound snags outside the boundary which are not leaning towards the unit can be left. Snag replacements should be marked in clumps so that they will be easier to burn around. In the top portions of the unit L, DF, or PP snag replacements greater than 18" DBH are preferrred as they have the best chance of surviving. In other portions of the unit trees greater than 14" DBH have the best chance of withstanding fire.

3. In broadcast burn units of greater than 35 % slope retain only snags which are greater than 10" DBH (generally not taller than 40'),favoring those greater than 18" DBH with broken tops for retention. Give low priority to marking snags within 100' of the unit boundary, because these are often felled before the unit is burned. Wherever possible, snags/ replacements should be marked in clumps so that they will be easier to burn around.

4. In cable clearcut units, retain clumps of snags/replacements from 1/2- 4 acres in size along the lower edge of the unit boundary (see figures in Appendix II for illustrations of different types of marking in cable units). Snags/replacements can also be left between cable corridors if it is cost effective and agreeable to the purchaser.

II. Leave Tree Units (Includes all other harvest prescriptions except ITM)

1. Same as I-1 above for snag marking on tractor ground. On cable ground mark snags as in I-4 above.

2. It is best to designate cull trees as snag replacements on the initial entry so that trees with high merchantability values will not have to be left in the future. Wildlife trees should be marked with a blue W so that the purchaser will not be charged for damaging them. Scarred trees have entryways for fungal infection which is valuable for future snag creation.

3. Hardwoods (10" DBH +) will not be cut without coordination with the district biologist and written approval.

III. Individual Tree Mark Units

Wildlife snags will be actively marked with a blue 'W' in ITM units at the time that individual trees are marked for harvest.

In OSR units all existing snags should be left since snag densities should already have been addressed in the previous entry. It may also be neccessary to paint snag replacements in these units. Trees damaged by logging or with other cull are preferred.

IV. Other Timber Management Activites

When timber management activities occur which could result in removal of desirable wildlife snags or replacements, but where trees to be removed are not actively marked (i.e. pre-commercial thinning, species designation, salvage, etc.) the need to retain wildlife snags/replacements will be addressed in the contract. If it is cost effective to mark snags/replacements prior to the activity they will be marked. If not, contract language or a letter to the purchaser will specify the types of snags/replacements to be left.

SNAG/REPLACEMENT SELECTION RECOMMENDATIONS [a]

I. Existing Snags

A. Size

1. Diameter

a. Maximum: none-- the larger the better
b. Minimum: Approximately 10" DBH.

Strive to select a range of diameters including at least 14/100 acres greater than 20" DBH.

B. Characteristics

1. Any showing obvious wildlife use such as nesting, feeding, or denning.

2. Soft snag

a. Broken-topped preferred (this is usually a result of decay)
b. Intact top but showing rot, decay, or any indication of a soft interior.

3. Hard snags, sound

a. broken-topped preferred
b. Intact top-- retain a mixture of these with soft snags. They can be used by pileated woodpeckers for nesting (generally if over 20" DBH) and by others for drumming or perching.

C. Species

1. Conifers (in order of preference if of sufficient diameter): WL, PP, DF, WRC. All species get used, but others are not as highly preferred by birds and/or may not stand as long. If preferred species are not available, leave less preferred species.

2. Hardwoods: Cottonwood, aspen, and birch >10" DBH should be retained through contract language, but occassionally large diameter cottonwood, aspen, or birch will need marking. These trees have high wildlife values.

D. Quantity

The number of snags to be marked will vary according to what is available elsewhere in the drainage, logging system, site prep type, etc. Numbers to be marked should be analyzed and included in marking guides on a site specific basis.

a- developed by the Sylvanite Ranger District, 1984

E. Distribution

Snag clumping should be used when the opportunity exists. Clumps should not exclude marking solitary snags throughout units. Clumps should be designed to include replacement snags intermixed in the clump. Clumps can be marked out as islands (with blue paint and metal tags) or as individual trees to facilitate logging of some species. Clump size will be based on site specific needs and will be applied to the overall number of snags needed per acre. A clump can also be just a few snags in a tight pocket (with or without replacements.)

II. Replacement Trees

A. Size

1. Diameter: select a mix of diameters from 10-25" DBH

2. Height: none-- select broken-topped trees when available

B. Characteristics (in order of preference)

1. Any showing obvious signs of wildlife use: nesting, feeding, denning, etc.

2. Broken-topped trees or trees with dead tops.

3. Cull trees with low timber value-- trees showing signs of heartrot are preferred, also scars from fire, lightening, or old logging.

4. Non-cull trees as needed to meet minimum quantity per acre.

C. Species

1. Conifers: in order of preference-- WL, PP,DF,WRC,LP, Spruce or fir

2. Hardwoods: mark only those showing signs of wildlife use.

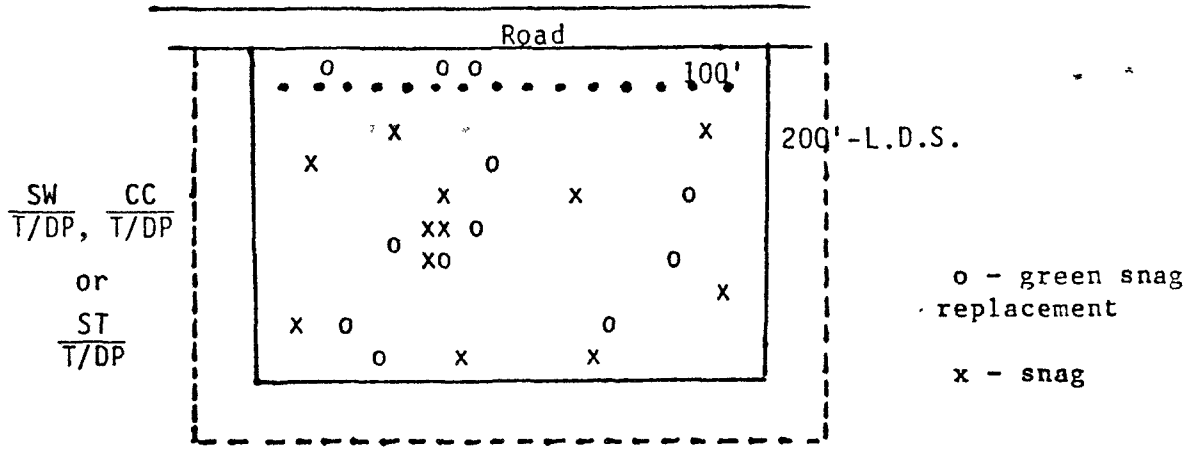
D. Quantity: Usually 2 replacements are needed for every snag needed. Numbers to be marked will be analyzed and included in marking guides on a site specific basis.

General reminders on locating snags to leave

A. Snags within 100' of p-lines will probably be removed by firewood cutters unless in a remote area. Snags within falling distance of broadcast burn unit boundaries will often be felled. When marking snags always keep site specific factors in mind such as terrain, location of unit edges and p-lines, logging system constraints, etc. Try to mark snags/replacements which have a good chance of making it through road construction, logging, site prep, and subsequent firewood access.

APPENDIX II -- ILLUSTRATIONS OF SNAG MARKING BY LOGGING AND SITE PREP. METHOD [c]

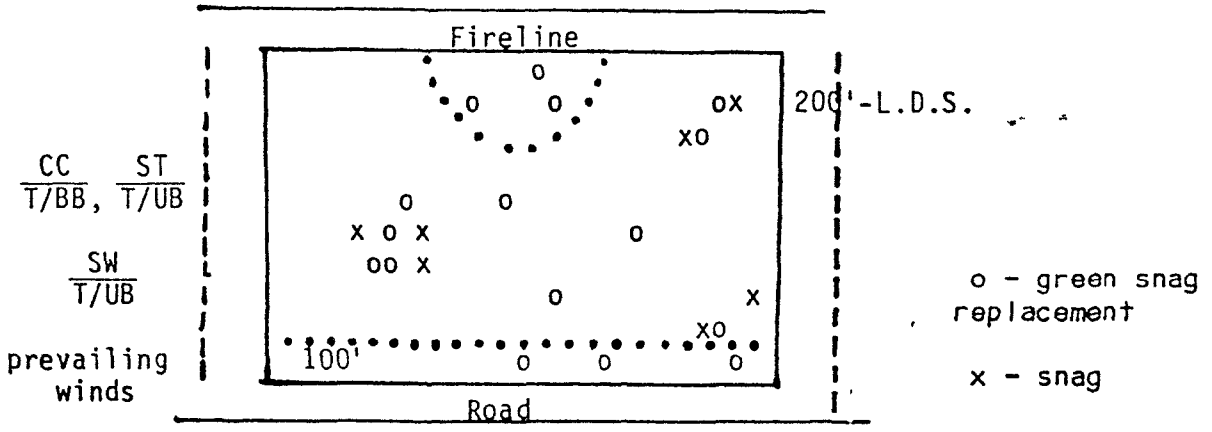
Tractor Clearcut or Leave Tree Unit - Tractor Piling



- No snags marked within 100' of the road.
- Green snag replacement trees left throughout the unit.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31- CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

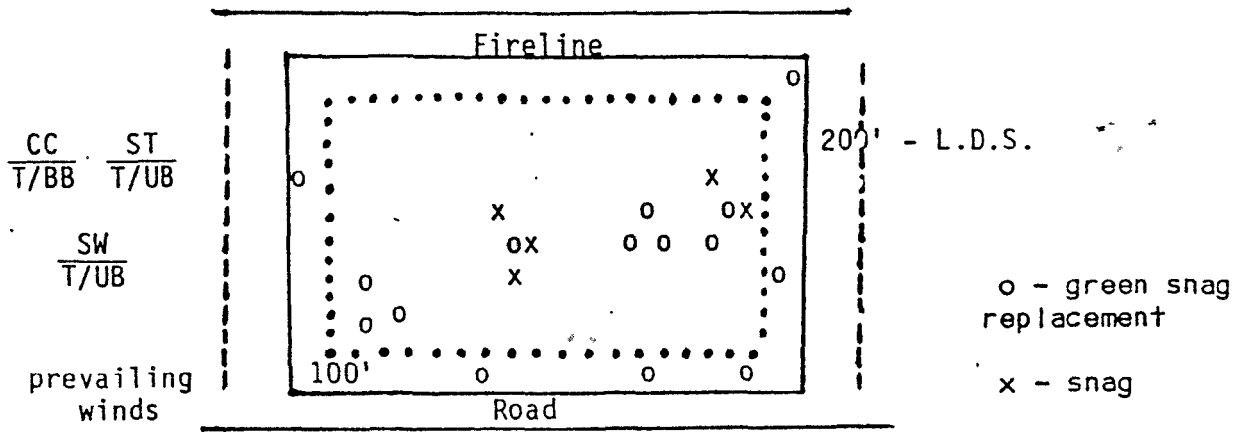
c - illustrations adapted from Gifford Pinchot N.F.-- Fish and Wildlife Workshop on Snags and Reserve Trees, 1977.

Tractor Clearcut or Leave Tree Unit -- Broadcast Burn, Less Than 35% Slope



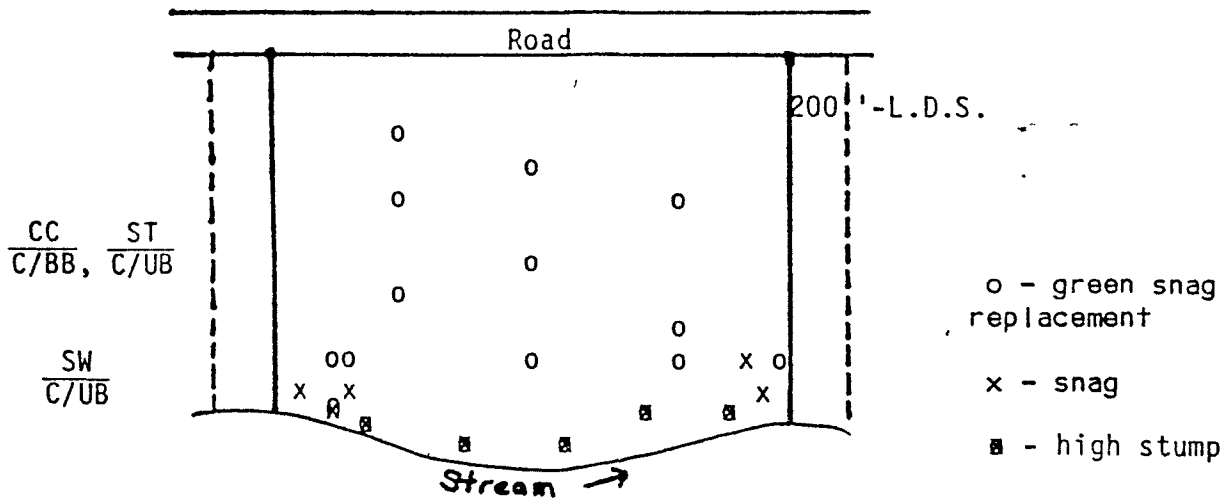
- No snags marked within 100' of the road.
- No snags marked in uphill, center of unit or on side of unit facing prevailing winds.
- 18" + DBH DF, L, or PP replacements marked in uphill center of unit. Replacements 14"+ DBH left elsewhere in unit.
- Many of snags and replacements marked in clumps to make it easier to burn around them.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31- CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

Tractor Clearcut or Leave Tree Unit -- Broadcast Burn, Greater Than 35% Slope



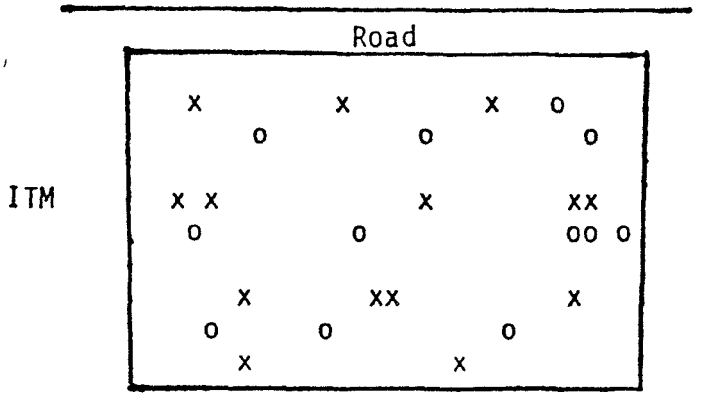
- No snags marked within 100' of the road or unit boundary.
- Snags marked in rest of unit. Sound snags > 10" DBH with broken tops preferred for marking to reduce safety hazard.
- Many of snags and replacements marked in clumps to make it easier to burn around them.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31-CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

Cable Clearcut or Leave Tree Unit



- Snag replacements left in downhill corners of unit and between cable corridors.
- Sound snags which don't pose a safety hazard left in clumps with replacements.
- High stumps left adjacent to stream on downhill side of unit.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31-CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements. High stumps and replacements left between cable corridors by agreement.

Individual Tree Mark Unit-- Tractor Piling



o - green snag replacement

x - snag

- Leave all existing snags which do not present a personnel or fire safety hazard. Clear debris from around snags during piling operations.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations.
- Clause C2.301 may be used to save snags and replacements or a letter may be written to the purchaser under B2.35.

TABLE 1. Species and their Association with Ecological Zones and Snags [b]

	Occurrence by Ecological Zones				Uses of Snags				
Species	Riparian Zone	Douglas fir Ponderosa Pine Zone	Cedar-Hemlock-Spruce-Grand Fir Zone	Lodgepole pine Alpine fir Zone	Cavity Excavator	Cavity Nester	Snag Nester	Roost or Perch tree	Food Source
Pileated Woodpecker	X	X	X		X	X		X	X
Red Shafted Flicker	X	X	X	X	X	X		X	X
Lewis' Woodpecker	X	X			X	X		X	X
White-headed Woodpecker		X	X		X	X		X	X
Yellow-bellied Sapsucker	X				X	X		X	
Williamson's Sapsucker		X	X		X	X		X	
Hairy Woodpecker		X	X	X	X	X		X	X
Downy Woodpecker	X				X	X		X	X
Black-backed three toed Woodpecker		X		X	X	X		X	X
Northern three-toed Woodpecker				X	X	X		X	X
Wood Duck	X					X			
American Golden-eye	X					X			

b- from, Managing Snag Dependent Wildlife in a Managed Forest, Godtel et. al., 1979.

TABLE 1. Species and their Association with Ecological Zones and Snags

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Barrow's Golden eye	X					X			
Bufflehead	X					X			
Common Merganser	X					X			
Hooded Merganser	X					X			
Kestrel	X	X	X			X			
Screech Owl	X					X		X	
Flammulated Owl		X	X			X		X	
Saw-whet Owl	X	X	X	X		X		X	
Pigmy Owl		X	X			X		X	
Vaux's Swift			X	X		X		X	
Violet-green Swallow	X	X				X			
Tree Swallow	X	X				X			
Black-capped Chickadee	X	X				X		X	
Mountain Chickadee		X	X	X		X		X	
White Brested Nuthatch		X	X			X		X	
Red Brested Nuthatch			X	X		X		X	

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Pygmy Nuthatch		X				X		X	
House Wren	X	X	X	X		X			
Western Bluebird		X	X			X		X	
Mountain Bluebird		X	X			X		X	
English Sparrow	X					X		X	
Starling	X	X				X		X	
Canada Goose	X						X		
Mallard	X						X		
Red-tailed Hawk	X	X					X	X	
Golden Eagle	X	X					X	X	
Bald Eagle	X	X					X	X	
Osprey	X	X					X	X	
Barn Owl	X	X	X				X		
Little Brown Myotis	X	X	X	X		X		X	
Yuma Myotis	X							X	
Long-eared Myotis	X	X	X	X		X		X	
Long-legged Myotis	X	X	X	X		X		X	

TABLE 1. Species and their Association with Ecological Zones and Snags

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Species	Riparian Zone	Douglas fir Ponderosa pine Zone	Cedar-Hemlock-Spruce-Grand Fir Zone	Lodgepole pine Alpine fir Zone	Cavity Excavator	Cavity Nester	Snag Nester	Roost or Perch tree	Food Source
Silver-haired Bat	X	X	X	X		X		X	
Big Brown Bat	X	X	X	X		X		X	
Martin			X	X		X			
Fisher	X		X	X		X			
Shorttail Weasel		X	X	X		X			
Longtail Weasel	X	X	X	X		X			
Yellow Pine Chipmunk	X	X	X	X		X			
Red Squirrel		X	X	X		X			
Deer Mouse	X	X	X	X		X			
Northern Flying Squirrel	X	X	X	X		X			
Total in Zone	38	37	30	22					
% in Zone	69%	67%	54%	40%					

KOOTENAI NATIONAL FOREST

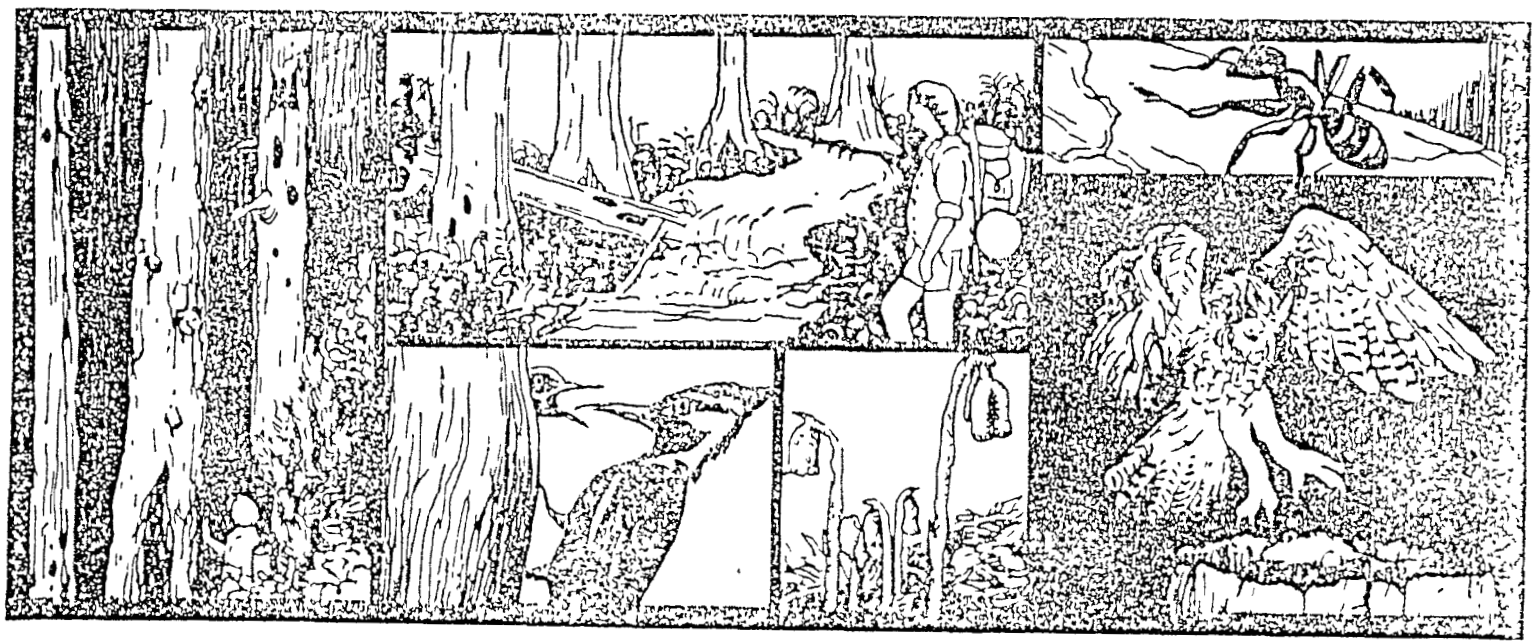
FOREST PLAN

APPENDIX SEVENTEEN

OLD-GROWTH HABITAT MANAGEMENT GUIDELINES

APPENDIX 17

OLD GROWTH HABITAT CHARACTERISTICS AND MANAGEMENT GUIDELINES



kootenai national forest

United States Department of Agriculture
U S Forest Service
Region One
August 1984

Introduction - Old growth is an oft-used term but one which few people describe in the same way. With respect to wildlife it represents a distinct successional stage that is an important component of wildlife habitat on the Kootenai National Forest. Conversion of old growth stands was once considered a priority for productive forest management. Now, however, the importance of "hanging onto all the pieces" is recognized while efforts to gain a better understanding of wildlife needs in a complex forest environment are continued.

The "classic" idea of an old growth stand is one which is physically imposing with tall, full-crowned trees; large standing dead material; fallen dead material; a dense canopy; and temperature moderating conditions. Actually the physical conditions are what make an old growth stand, but age generally dictates the development of those conditions. As stands increase in age, growth rates slow and vegetative conditions become relatively stable over time. Some trees in the stand die and eventually fall to the ground, leaving an opening in the canopy which allows increased light penetration. The extra light stimulates the germination of forbs, shrubs, and conifers which develop into small enclaves of site specific, high diversity. As shade tolerant conifers grow they block out the sunlight and the forbs or shrubs eventually die away. The cycle is repeated throughout the stand so that at any time a number of enclaves of forbs, shrubs, and shade tolerant conifers are just starting, are in full development, or are dying out. This results in a mosaic of habitats which meets the needs of a wide variety of wildlife species but is contained within the confines of an old growth stand. This phenomena has been referred to as a "shifting mosaic steady state" (Bormann and Likens, 1979) and is very descriptive of the stable nature of old growth stands, yet recognizes the inherent variety constantly evolving within the stand.

Richness in habitats translates into richness in wildlife. Roughly 58 wildlife species on the Kootenai (about 20 percent of the total) find optimum breeding or feeding conditions in the "old" successional stage, while other species select old growth stands to meet specific needs (e.g., thermal cover). Of this total, five species are believed to have a strong preference for old growth and may even be dependent upon it for their long-term survival (see Appendix I). While individual members of old growth associated species may be able to feed or reproduce outside of old growth stands, biologists are concerned that viable populations of these species may not be maintained without an adequate amount of old growth habitat.

Wildlife richness is only a part of the story. Floral species richness is also high, particularly for arboreal lichens, saprophytes, and various forms of fungus and rots. Old growth stands are genetic reservoirs for some of these species, the value of which has probably yet to be determined.

Since old growth stands often have high wood volumes per acre and are not producing new wood as fast as their younger counterparts, they have often been considered a high priority for harvest. On the West Coast it is feared that under current harvest projections, old growth will be eliminated in all but wilderness areas or parks (Juday, 1978; Harris et. al., 1982) if not given special management emphasis. Once harvested, old growth will not be replaced under normal rotations. Frequently the best old growth occurs on the most productive timber sites and reaches its highest value for wildlife when in close proximity to riparian zones (McClelland, 1977). This situation exists on the Kootenai and long range management of old growth habitat requires recognition that several resources are inherent on many of the same sites.

In recognition of the need to maintain old growth habitat, the Kootenai has made a preliminary inventory of existing old growth and designated specific areas for old growth management through the Integrated Forest Plan. The following guidelines will provide: 1) a description of old growth on the Kootenai, 2) the importance of old growth habitat to wildlife, and 3) management recommendations for old growth.

I. DESCRIPTION

Several authors have described old growth conditions (Juday, 1978; McClelland, 1977; McClelland, et al., 1979; Thomas, 1979) with certain features appearing to be universal. These features include: 1) large diameter trees (often exceeding 20" dbh) with a relatively dense, often multilayered canopy, 2) the presence of large standing dead or dying trees, 3) down dead trees, 4) stand decadence associated with the presence of various fungi and heartrots, 5) an average age often in excess of 200 years, and 6) a basal area ranging from 150-400 square feet per acre. Some of the individual features listed above may occur in other successional stages, but old growth stands are unique in integrating all these features in a complex and diverse whole.

During the winter of 1982-83, each District on the Kootenai completed a preliminary inventory of existing old growth using a broad definition similar to the one described above as a goal. Aerial photos, stand exam information, and ground knowledge were used to identify and map those stands having a high potential for old growth. These data were incorporated in a revision of the draft Integrated Forest Plan. It was recognized that field surveys were needed to determine the accuracy of the inventory. Consequently, during the 1983 field season a field survey of about 70 stands which were listed on District old growth inventories was completed.

A subjective determination was made in the field as to whether a stand was: 1) existing old growth, 2) "replacement old growth", or 3) neither existing nor replacement old growth. Forty-one (60%) of the sampled stands were classified as existing old growth, meaning they contained features # 1-4 described above. Seventeen (25%) of the sampled stands were classified as near-term replacement old growth. These stands had an abundance of live large-diameter trees, but were lacking in decadence or the large dead tree component which characterizes old growth wildlife habitat. Eleven stands (15%) were classified as not meeting old growth habitat criteria now, nor could they be expected to in the near future.

In analyzing the survey results, stands were grouped into three habitat groups: 1) warm and moist, 2) cool and moist, and 3) warm and dry. A dry, cold group was not identified on the Kootenai since most of these stands are above 5500' in elevation and are not suitable for reproduction of most old growth associated wildlife species. Neither did the forest identifymonotypic lodgepole pine stands since they are relatively short-lived. Although lodgepole stands do receive use by some old growth related wildlife species, they are not as diverse as other old growth types and

often lack many of the physical characteristics of old growth (e.g., trees greater than 20", large downed trees, and large standing trees suitable for cavity excavation). These stands are also difficult to maintain over long rotations (> 140 years), and generally occur within the normal rotation period without special management emphasis.

A description of old growth for each habitat group is listed below. Table 1 displays (for stands classified as "existing old growth") the mean, range of measured values, and 95 percent confidence interval generated from the results of the 1983 field survey. Parameters are such that the descriptions fit well with stand exam data. The table represents a description of the "best" old growth stands in each habitat group. At present, it is as close as we can get in terms of defining old growth wildlife habitat on the Kootenai. Old growth stands are representative of a variety of characteristics and it is not possible to define them with a "minimum number" for any one characteristic. For example, a stand may have 14 trees per acre greater than 19" DBH, but does not necessarily qualify as old growth unless it also has some of the other old growth characteristics such as defect or snags. By the same token, a stand may have only 10 trees per acre greater than 19" DBH but have a large number of larch snags and trees with heartrot. This stand would be valuable to manage as old growth even though it did not have an ideal number of large, live trees.

Habitat Group 1 (Warm-Moist)

Habitat types (Pfister, 1977) representative of this group are Thpl/Clun, Tshe/Clun, Thpl/Opho, Abgr/Clun, and Abgr/Libo. Sampled stands contained two or more of the following overstory species; western redcedar, western hemlock, western larch, Douglas-fir, grand fir, white pine, or Engelmann spruce. Of all old growth types sampled, this one had the densest canopy and often had the greatest number of trees/acre exceeding 19" DBH (up to 48/acre). Stands in this group often bordered streamcourses and had large numbers of trees 30-40"+ DBH, with ages up to 310 years. Canopy closure ranged from 70 to 95 percent. These stands generally had a high incidence of defect such as heartrot or broken-topped trees and also contained large diameter snags. The understory was sparse in heavily canopied areas, although there may have been patches of very dense regeneration. These stands often have the appearance of what is regarded as "classic mixed-conifer old growth." Forty-three percent of sampled stands had evidence of feeding by pileated woodpeckers and two had possible nest sites. Pileated feeding sign was observed at the base of live cedar, larch, and hemlock as well as on standing dead trees. Numerous small holes, assumed to be made by mammals, were found at the base of large diameter (25"+ DBH) cedar, hemlock, and spruce.

Habitat Group 2 (Cool-Moist)

Habitat types representative of this group are Abla/Clun, Abla/Mefe, Abla/Xete, Abla/Vagl, Tsme/Mefe, and Plen/Clun. Sampled stands contained two or more of the following overstory species: Engelmann spruce, lodgepole pine, mountain hemlock, subalpine fir, western larch, or Douglas-fir. Stands in this group were often in "cold air drains" along streamcourses or at elevations greater than 4500 feet. Sampled stands ranged in age from

127-482 years and canopy closure ranged from 78-90 percent. In general, these stands were not as heavily canopied as stands in Habitat Group 1. They also had heavier concentrations of down logs ≥ 12" DBH, and fewer snags ≥ 12" DBH. The total basal area of these stands was comparable to those in habitat group 1, but the basal area of trees ≥ 17" DBH was lower. Stands at higher elevations often didn't have as many trees/acre ≥ 19" DBH and trees appeared to die and fall down faster than in stands at lower elevations. One stand contained a possible pileated woodpecker nest site and 57 percent of the stands sampled showed pileated feeding sign.

We did not sample enough stands in habitat group 2 to develop meaningful 95 percent confidence intervals at this time, but the mean values are listed in Table 1 to provide a rough comparison.

Habitat Group 3 (Warm-Dry)

Habitat types representative of this group are; Psme/Phma, Psme/Fesc, Psme/Libo, and Psme/Caru. Stands contained a mixture of two or more of the following species: Douglas-fir, ponderosa pine, and western larch. Old growth stands in this group were more "open" than those in the other two groups and had as few as 10 trees/acre ≥ 19" DBH. These stands often had numerous broken-topped Douglas-fir snags 12"+ DBH as well as scattered, firescarred larch and ponderosa pine. Due to their history of more frequent fires, these stands also had fewer down logs/acre. No pileated nest sites were observed in stands within this group, but 45 percent showed pileated feeding sign. Although these stands do not fit the classic mixed conifer description of an old growth stand, they do contain many of the physical and structural characteristics which are important to wildlife, and they represent a distinct ecological type on the Kootenai.

Table 1 - Characteristics of Sampled Old Growth Stands--1983

M=mean, R=range, CI=95% confidence interval

Parameter	Habitat Group 1 (Warm-Moist)	2 (Cool-Moist)	3 (Warm-Dry)
# of old growth stands sampled	(n=23)	(n=7)	(n=11)
# trees/acre ≥ 19" DBH	CI=16.8<M<25.1 M=20.9 R=11.4-47.9	M=19.9 R=14.4-24.9	CI=14.3<M<24.7 M=19.5 R=9.4-34.1
# trees/acre 17-19" DBH	CI=4.7<M<8.8 M=6.8 R=0-19.8	M=7.6 R=3.0-18.8	CI=3.6<M<12.0 M=7.8 R=0-22.9
stand age	CI=201<M<239 M=220 yrs. R=170-306	M=303 yrs. R=127-482	CI=169<M<203 M=186 yrs. R=163-230
# down logs/acre 12-20"	CI=10<M<18 M=14 R=3-41	M=37 R=8-81	CI=10<M<22 M=16 R=3-31
# down logs/acre 20"+	CI=21<M<37 M=12.7 R=9-77	M=4.3 R=6-50	CI=3.2<M<7.4 M=5.3 R=0-38
# snags/acre 20"+[a]	CI=10.2<M<15.2 M=12.7 R-0-17.0	M=4.3 R=0-10.0	CI=3.2<M<7.4 M=5.3 R=0-37.5
# snags/acre 12-20"[a]	CI=.17<M<2.4 M=1.3 R=0-11.1	M=4.5 R=0-10.7	CI=3.8<M<10.8 M=7.3 R=0-37.5
stand basal area	CI=133<M<181 M=157 sq.ft. R=145-218	M=164 sq.ft. R=135-204	CI=91<M<167 M=129 sq.ft. R=67-177
basal area ≥ 17" DBH	CI=76<M<132 M=104 sq.ft. R=56-153	M=73 sq.ft. R=60-92	CI=0<M<74 M=37 sq.ft. R=13-87
canopy closure **	CI=84<M<89 M=87% R=70-95	M=83% R=78-90	CI=67<M<73 M=70% R=53-83

[a] Due to the uneven distribution of snags throughout a stand, our sampling method did not generate the actual density of snags found in the field, but provides a relative figure to use in evaluating stands from stand exam information.

** Measured with a spherical densiometer.

All old growth stands sampled contained some type of defect or decadence such as heartrot, buttrot, broken tops, mistletoe, or firescars. Ninety percent of the old growth stands sampled were photo interpretation (PI) types 11 and 17, but many stands typed as 11 or 17 were mature stands which lacked the special characteristics of old growth.

II. VALUE OF OLD GROWTH HABITAT TO WILDLIFE

A listing and analysis of wildlife species that occur yearlong or seasonally on the Kootenai was conducted as an initial part of developing the data base for the Integrated Forest Plan. This analysis of about 280 species was conducted in a manner similar to that done for wildlife in the Lolo National Forest Plan (Mike Hillis, Forest Wildlife Biologist, pers. comm.). Using concepts similar to those described in Ag Handbook 553 (Thomas et al., 1979), each of six distinct successional stages (grass-forb through old growth) was rated for its value to each wildlife species for feeding or reproduction, two primary life functions. Based on this analysis it was demonstrated that about 20 percent of the wildlife species listed find optimum feeding or breeding conditions in old growth habitat (see Appendix I). This is consistent with data for bird species feeding in the northern Rocky Mountains (McClelland et al., 1979) and serves to highlight the significance of old growth habitat to wildlife.

Because of the complex biological and physical composition of old growth habitat, wildlife utilizes it in a variety of ways;

1. Old growth trees are vertically complex and offer many functional habitats; e.g., trunk, branches, foliage, crown, cavities, large roots, overturned stumps.

    a. A large surface area of deeply fissured bark upon and in which wildlife seek insects, shelter, and nests.

    b. Strata upon which mosses and lichens grow, some of which are partial to older trees (Juday, 1978) and due to the height of older trees, which reflect microhabitats associated with various height zones on the trees.

    c. An extensive root system and interface between soil and tree which creates opportunities for burrows, insect infestation, rots, and feeding sites.

    d. Often abundant litter and lichen fall which is utilized by ungulates, small mammals and soil pathogens.

e. Decadence, which in turn attracts insects and other pathogens that provide food for wildlife.

f. Needles, buds, cones, and seeds for wildlife--food sources for mammals and birds.

G. A dense and abundant canopy upon which foliage gleaning birds seek insects and plant material.

2. Old growth stands offer physical features which provide favorable conditions for many species of wildlife;

a. Often excellent thermal cover is associated with old growth stands and is important to many birds and mammals in winter and summer. A multistoried, dense canopy provides opportunities for thermal regulation by allowing birds to perch at different heights in the canopy.

b. The cool, moist conditions and deep duff layer found in some old growth stands is important to many small mammals and amphibians.

c. Old growth stands are selected nest sites by many bird species because of available cavities and broken-topped trees, relatively dense foliage which provides seclusion, large and stable branches for nesting platforms, and preferred height associated with large trees.

d. A standing and downed dead component which contributes food and nesting or denning cover to many wildlife species. Large, down logs provide cover for some small mammals in deep winter snows and provide hunting sites for small predatory mammals year-round. The availability of a dead tree component directly affects many species. Without a dead or decadent component, primary excavators (such as pileated woodpeckers) are not present and the cavities associated with their feeding and nesting are not available to the many secondary cavity dependent species (such as bluebirds and flying squirrels). Down dead material also contributes to nutrient cycling and moisture retention.

3. Drainages with predominantly old growth stands often have the highest water quality and are generally very stable (Juday, 1978). Logs and root wads provide some of the highest quality pools in certain Kootenai streams (Al Bratkovich, District Biologist, D-5; John Lloyd, Forest Fisheries Biologist, pers. comm.).

III. MANAGEMENT RECOMMENDATIONS

Old growth should be recognized as an important habitat and managed to ensure its availability and utility to wildlife over time. The first step in management should be to identify the existing situation. Questions germane to old growth management are;

1. How many acres in an analysis area (such as a drainage or compartment) are providing old growth conditions?

2. Are old growth stands representative of habitat types in the area and are they well distributed in the analysis area?

3. Are (a) and (b) sufficient to support viable populations of dependent species?

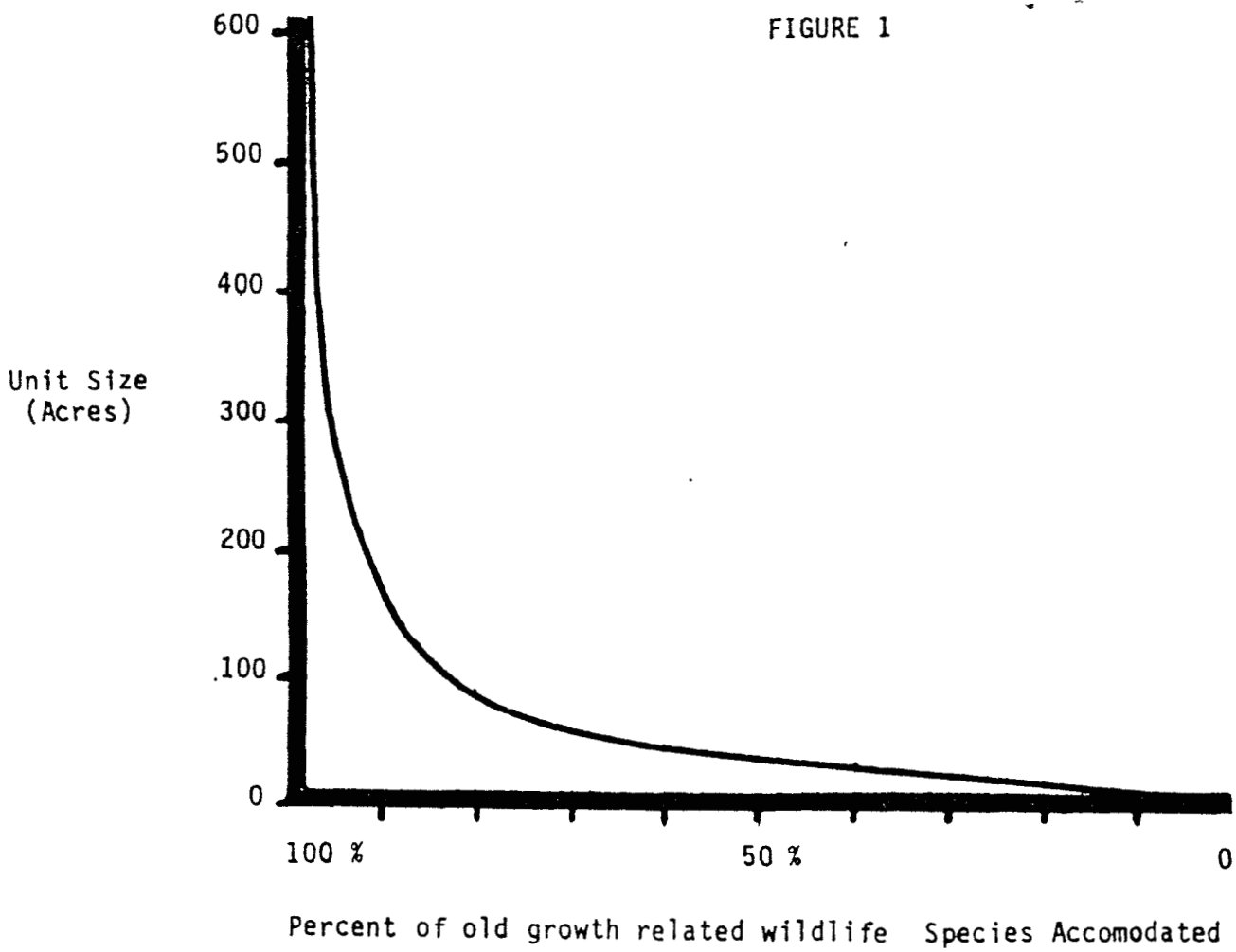
The Kootenai completed step 1 in this process during the winter of 1983 (see Interim Guidelines dated January 31, 1983). Although this inventory needs to be further refined through continued field verification, it provided more reliable baseline information than was formerly available through P.I. type inventories. Each District mapped old growth stands on 2.64" or 1":mile maps and analyzed the percentage of old growth currently existing in analysis units such as third order drainages or compartments (averaging about 10,000 acres in size). This inventory pointed out that some areas have a good distribution of old growth while others were almost entirely lacking in old growth. Harsh sites, extensive fires in 1910 or the 1930's, and past timber harvest have all contributed to a lack of old growth in some areas on the Forest. The following section describes goals to strive for in the distribution and amount of old growth, recognizing that in some cases past activities or events may preclude reaching these goals in the near future.

Distribution and Amount of Old Growth Habitat

A review of applicable literature on wildlife species and their habitat needs indicated that a minimum of 8-10 percent of available wildlife habitat should provide old growth conditions (McClelland, 1978; Juday, 1978) at any given time. This habitat should be: 1) well distributed geographically to allow breeding and genetic exchange between individuals of the same species, 2) representative of timber types available in the area (e.g., Douglas-fir/larch/ponderosa pine, cedar/hemlock, and spruce/fir) to ensure adequate diversity, and 3) in units of a size which meets the biological needs of related wildlife species.

A unit of 1000 acres would probably meet the needs of all old growth related species (Munther, et al., 1978) but does not represent a realistic size unit in conjunction with most other Forest management activities. On the other hand, units of 50-100 acres are the smallest acceptable size in view of the nesting needs of pileated woodpeckers, a primary excavator and an old growth related species (McClelland, 1979). However, managing for a minimum size of 50 acres will preclude the existence of species which have larger territory requirements. In fact, Munther, et al. (1978), report that units of 80 acres will meet the needs of only about 79 percent of the old growth dependent species (see Figure 1). Therefore, while units of a minimum of 50 acres may be acceptable in some circumstances, 50 acres should be the exception rather than the rule. Efforts should be made to provide old growth habitat in blocks of 100 acres or larger. If, due to past fires or management activities, the only remaining old growth blocks are less than 50 acres, they may still be useful habitat provided that several small blocks are clustered together or are surrounded by mature timber. Isolated blocks of old growth which are less than 50 acres and surrounded by young stands contribute very little to the long-term maintenance of most old growth dependent wildlife species.

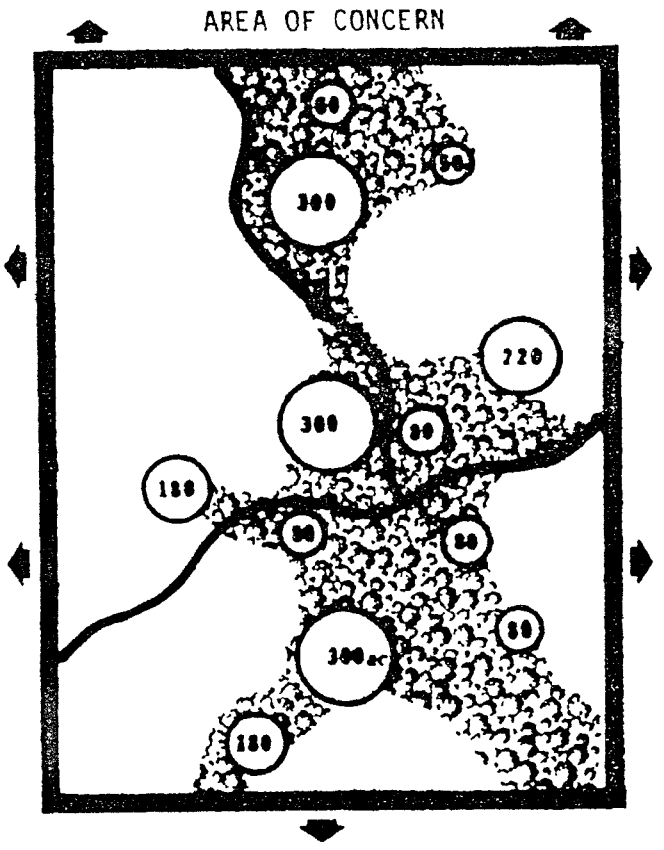
FIGURE 1



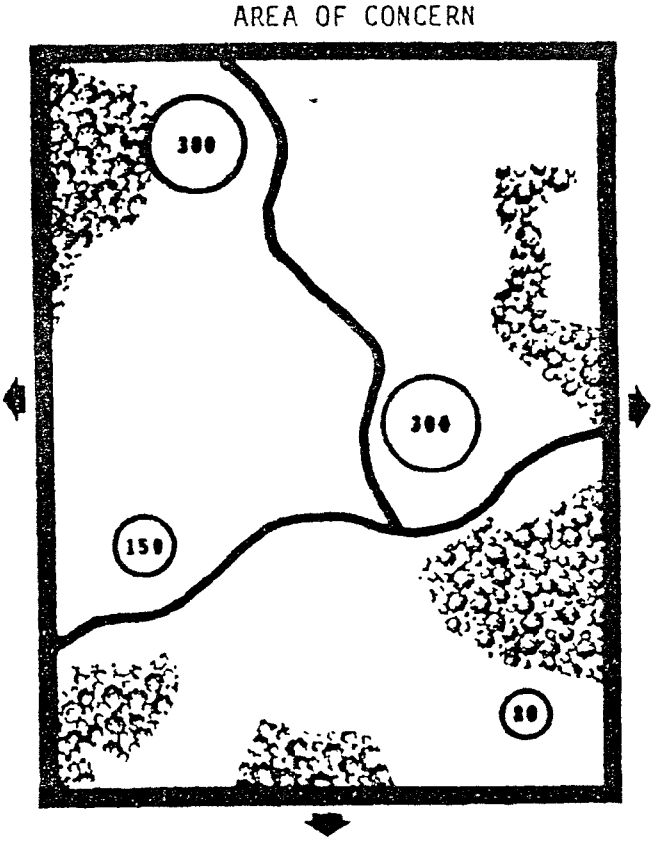
*From Munther et. al., 1978

Cutoff, isolated patches of old growth that are greater than about 1-2 miles from other old growth patches will be severely restricted in genetic exchange between breeding species. These patches probably will not sustain viable populations of those old growth dependent species with short dispersal distances. In effect, such areas become islands and the number and composition of species will dwindle as the size of the island and the exchange with similar areas decreases. An ideal situation could be described as a drainage with: 1) variably sized old growth stands no more than 1 mile apart, 2) old growth stands ranging up to several hundred acres in size with a well distributed pattern, and 3) interconnected with timbered corridors (see Figure 2).

FIGURE 2



Good Distribution of Old Growth Areas within 3 watersheds -- old growth stands interconnected with timbered corridors



Poor Distribution of Old Growth Areas within 3 watersheds -- isolated old growth stands

In riparian areas, units of old growth should preferably be in a "block" type configuration but can extend in a linear fashion along streams if at least 300 feet wide. On some unstable streams (such as Keeler Creek) excessive recruitment of large diameter logs may contribute to channel degredation. In this situation, stream management plans should be utilized to provide direction for management of old growth stands adjacent to streams.

All the old growth should not be crowded into the stream bottoms or up on a ridge. Of the minimum 8-10 percent overall, 2-3 percent should be managed on productive, main stem sites in an analysis area. The remaining 5-7 percent should be well distributed in and representative of the analysis area. This 2-3 percent should be <u>within</u> a 1/4 mile wide zone in the stream bottom area and, preferably, adjacent to the stream (at least partially).

While the distribution and amount of old growth described above is the desirable situation throughout the Forest, in some cases it is necessary to

"hang onto" whatever old growth is left. At present, efforts should be made to identify old growth stands to retain for the near future, achieving the best distribution possible.

If there is not enough "legitimate" old growth (as earlier defined) in the area to meet the 8 percent minimum level at present, mature stands with key components of old growth (large snags and down logs, defect, scattered large trees) should be maintained. In the long term it will be necessary to designate younger stands to be managed as old growth for the future, but it is premature to make extensive designations of future old growth until a clear picture of the existing status and distribution can be determined.

Managing Old Growth

Old growth exists on the Kootenai in two broad types of management situations;

1. old growth which occurs within Forest Plan management allocations which are not programmed for timber harvest (unregulated MA's 2, 3, 5, 7, 8, 10, 18, 19, 29).

2. old growth designated as MA 13 (Wildlife/Timber) which is in the regulated base.

Old growth in the first type of management situation was inventoried and will be protected from hazards in most cases. It will remain unroaded or have low road densities and will not be logged in the forseeable future. This old growth will essentially be the "natural" old growth component and will undoubtedly have inherently longer rotation periods than "managed" old growth. (possibly 400+ yrs.)

Old growth in the second type of management situation (MA 13) will be "managed" on an extended rotation (250 years for planning purposes). Individual stands may be regenerated when they can be replaced by another old growth stand of equivalent acreage in the same analysis area so that available, legitimate old growth does not drop below minimum levels.

Until the end of the rotation, stands identified as MA 13 will be managed to retain their old growth characteristics (multi-storied canopy; large trees, snags, down logs, trees with spike tops, heartrot, etc.). Given our current level of knowledge; intermediate harvest, salvage sales, or firewood sales are not compatible with maintenance of old growth characteristics. In the future it may be demonstrated that certain types of logging can occur within old growth stands and still maintain their value to old growth dependent species, but until that time old growth stands should not be scheduled or planned for salvage, pulping or intermediate harvest.

Large snags (especially larch, hardwoods, Douglas-fir, and ponderosa pine) are a necessary component of old growth but are also highly sought after by firewood cutters. Management of firewood gathering activities in or near old growth stands is very important. While a certain amount of old growth can be managed simultaneously with human use, the behavior of some wildlife species will preclude their presence in areas of heavy people use--particularly during the nesting season. Road management should be used as a tool to limit people use where this is necessary to protect old

growth values. Old growth should also be protected from extensive blowdown. This is not to say that buffer strips should be left around old growth stands, but that harvest methods used in adjacent stands should reflect consideration of blowdown potential.

Fire was a naturally occurring event in many of the ponderosa pine/Douglas-fir/larch old growth stands and can still be used as a management tool if used judiciously. Old growth values can still be maintained with cool or patchy burns which leave the overstory and patches of snags intact. A case-by-case consultation with fire management personnel and wildlife biologists will be needed in such instances. In most other old growth types (cedar/hemlock, spruce, mixed conifer) fires are stand regenerating and these stands should be protected from fire.

Monitoring/Tracking of Old Growth Stands

Although this aspect of old growth management has not been fully developed at this time, some generalizations can be made:

1. During the next decade, each District will work towards completing a field inventory of designated old growth stands. Specific information items will be gathered which will help in monitoring and determining habitat suitability for several indicator species and will help to rate the relative value of each stand. The key information items will be stored in some type of data base to help facilitate use of habitat suitability models for monitoring of dependent wildlife species. A list of dependent species has been developed and tentative indicator species have been delineated as part of the forest planning process (see Appendix I).

2. It is anticipated that as old growth field verification and other stand exams continue, we will find that some designated stands are not suitable old growth habitat while others not previously designated will be found to be suitable. Records of these findings should be kept so that the Forest Plan data base can be updated.

3. Some type of system will be developed for keeping track of the location of old growth stands so that they will not be planned for harvest until they can be replaced by an equivalent acreage of timber coming into old growth. At present, each District has old growth stands mapped on 1":mile or 2.64":mile maps. Regulated old growth (MA 13) will be displayed in the final integrated Forest Plan. Personnel in Timber, Silviculture, and Fire should make themselves fully aware of the existence of the old growth data and consult wildlife biologists before planning activities in old growth stands. In the future, we may also keep track of old growth by establishing new codes in key fields within the timber stand data base.

4. At some point in the future a rotational scheme will be developed for stands in MA 13. Designated young stands (called replacement old growth) will be treated silviculturally to encourage development of old growth characteristics. These stands will then "replace" currently designated old growth. Although the silvicultural treatments necessary to produce old growth have not been proven, the following have been suggested (Thomas, 1979):

a. precommercial and commercial thinning to age 80 to encourage diameter growth, select for desirable tree species, and allow understory growth,

b. allowing the stand to stagnate after age 80 to encourage development of heartrot, development of standing and down dead, and development of understory layers,

c. final harvest at age 250.

Since normal thinning guides are designed to develop stands of healthy, evenly-spaced, vigorously growing trees it may be necessary to use special marking guides for thinning old growth replacement stands. For instance, heavily stocked clumps might be left within thinned areas so that suppressed trees more susceptible to disease would remain. These details will be worked out with silviculturists when management of old growth replacement stands is initiated.

CONCLUSIONS

Old growth habitat is now recognized as an important and necessary element of diversity that supports a myriad of wildlife species. Maintenance of adequate old growth will assist in ensuring viable populations of native species and in maintaining diversity as requried by the National Forest Management Act of 1976 (16 U.S.C. 1600).

There are several basic elements inherent to old growth management; 1) definition, 2) identification, 3) analysis of status, and 4) management recommendations. These guidelines contain all those elements and should provide a framework within which old growth management can be initiated. These guidelines are consistent with available, applicable research and will be updated as new research becomes available. The Kootenai's approach is similar to that of the Flathead, Lolo, and Idaho Panhandle National Forests.

APPENDIX I

The species listed below find optimum habitat in the "old" successional stage. They may also utilize the "mature" stage if adequate sizes and numbers of snags/down logs, or large live trees are present.

B= breeding F= feeding

	Species	Habitat Need		Species	Habitat Need
	Dusky Flycatcher	F	+	Common Flicker	B, F
	Hammond's flycatcher	B, F		Black-backed three-toed woodpecker	B, F
	Olive-sided flycatcher	B		Northern three-toed woodpecker	B
	Black-capped chickadee	B		Downy woodpecker	B, F
	Boreal chickadee	B		Hairy woodpecker	B, F
	Chestnut-backed chickadee	B		Lewis' woodpecker	B, F
	Bald Eagle	B		Williamson's sapsucker	B, F
	Goshawk	B		Yellow-bellied sapsucker	B, F
	Osprey	B	+	Varied thrush	B, F
	Great blue heron	B		Hermit thrush	B, F
	Rocky mountain wolf	B		Common raven	B
	Marten	B, F		Kestrel	B
+	Northern flying squirrel	B	+	Clark's nutcracker	B, F
+	Red squirrel	B		Evening grosbeak	B
	Hoary bat	B		Pygmy owl	B, F
	Long-eared myotis	B		Saw whet owl	B, F
	Little brown myotis	B		Screech owl	B
	Silver-haired bat	B		Pygmy nuthatch	B, F
	Pacific giant salamander	B	+	Red-breasted nuthatch	B, F
	Van Dyke's salamander	B		White-breasted nuthatch	B, F
	Pacific treefrog	B, F		Tree swallow	B
	Spotted frog	B		Violet green swallow	B
	Tailed frog	B		Vaux's swift	B, F
	Common merganser	B		Golden-crowned kinglet	B
	Hooded merganser	B		Winter wren	B, F
	Wood duck	B			
	Dipper	B			
	Western bluebird	B			

In addition, the five species listed below are believed to have an especially strong preference or possibly a dependence on the old successional stage:

Barred owl
Great grey owl
*Pileated woodpecker
Boreal redback vole
*Brown creeper

* = old growth indicator species
+ = indicators of other types of habitat (riparian tree, for example)

APPENDIX II – OLD GROWTH PLOT SURVEY INSTRUCTIONS

Equipment needed:

Increment borer	compass
D-tape	40 BAF prism or relaskop
Spherical densiometer	6.6' pacing stick
Survey forms, map, clipboard	

Survey 1 plot/10 acres or minimum of 8 plots.

1). Stand condition: this is a subjective determination of whether rhe stand is old growth or not, made after you have walked through the whole stand. Call a stand "replacement old growth" if it has large trees but does not contain enough defect or snags to be considered old growth at present. If a stand is not anticipated to be old growth in the next 40-50 years due to such factors as poor growing conditions, heavy past logging, or because the majority of the stand is too small (in diameter) or too young, check is being "neither".

2). Plot #: Each column of data represents one plot, which is a combination belt transect and variable plot. Attached is a diagram showing how plots are run.

3). Bearing: is the compass bearing of your transect segment. Transects should be determined in the office before going to the field and plotted on a map. On a 4": mile map, 1/20 inch = 1 chain (66'). On a 2.64": mile map, .825 mm = 1 chain or about 4 mm = 5 chains.

INFO COLLECTED IN VARIABLE PLOT

Live tree diameters:

4). 17-19" DBH: determine the "in" or "out" trees in a variable plot using a D-tape and write species next to the diameter on the form.

5). 19" +: Same method as above. The rational for measuring only the larger trees is that these size classes are limiting in determining old growth and that smaller trees are needed only for determ9ining whether a stand is multi-storied. This is also done to save time.

6). Age trees 17-19": (Bore 2-3 trees in the 17-19" class and 2-3 in the 19"+ class). Use an increment borer to drill no more than one tree per plot and list it's species. (If present). Try to bore 1 each, of several different species found in the stand.

7). Age trees 19"+: same as above.

8). % canopy cover: measured from center of the variable plot in 4 directions using a spherical densiometer.

9). Habitat type: determined at the center of the variable plot.

INFO COLLECTED IN BELT TRANSECT

10). Major OS species: Listing of overstory by order of greatest occurrence.

11). Major U.S. species: Same as above for understory tree species. i.e. L/DF/LP

12). # down stems 20"+: Count trees within a belt transect 13.2' on each side of the transect line as you walk, for a distance of 1 chain (66'). This equals a 1/25 acre plot. Also record the stage shown in diagrams at the bottom of the sheet. Example: 2-3 down logs stage 3.

13). # down stems 12-20"+: same as above.

14). Decadence: Estimate whether the number of trees showing decadence is L (low), M (mod.), or H (high). Write down the type of defect and tree species. (i.e. punk knots, conks, mistletoe, firescars, or broken tops in L; fading crowns in H or PP,).

15). Comments: give a description of the stands' value as old growth—i.e. how abundant is the defect? Are there lots of larch with defect in the stand? Is the stand causing any stream channel problems? Are the snags present readily available to firewood cutters? If you didn't call it existing old growth, why not? Has past logging decreased the stand's value as old growth? Did you notice any other noteworthy wildlife sign?

PAGE 2

Each column is used to record data for one snag. One sheet is used for each stand. The transect width is as far as you can see. Write down the width of your transect and how far you are along the route (in feet). Then the transect width x length can be multiplied to get acres.

Note: This survey is used to try to define old growth characteristics on the Kootenai and is pretty detailed and consuming. Check the stand exam records before going to the field. They collect much of the same information so if the stand has already been surveyed, copy down as much of the available information as possible on the form. (If the % sampling error is greater than 25%, however, measure variables again.) Write down the sampling error, year surveyed, and show which variables were obtained from stand exams by keeping them in the last column. Also note stand basal area.

Transect #:

Snag Number

Diameter[1]

Species[2]

Hard or Soft Snag (H or S)

Height[3]

Stage[4]

Cavity Use?

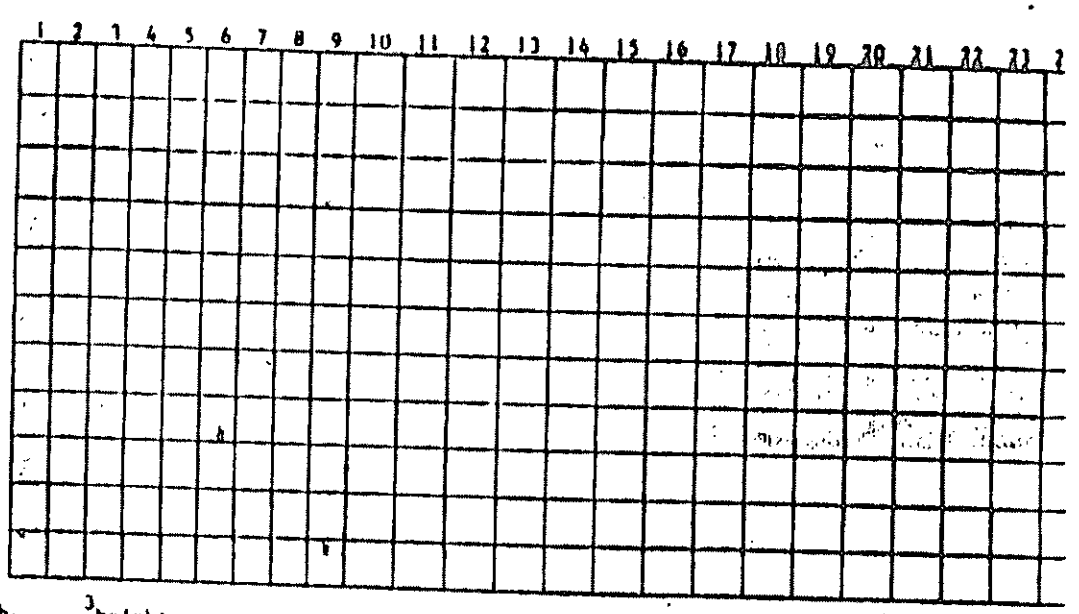
Feeding Evidence?

Pileated Evidence? (Feeding=F Nesting=N)

Fire Scars?

Transect Width

Distance Along Transect



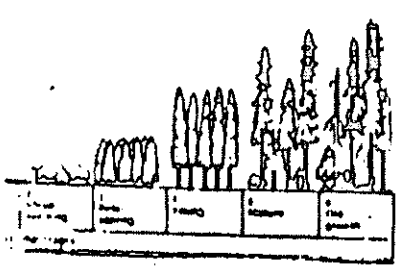
[1] dbh class
1=6"-10"
2=10.1"-20"
3=20"+

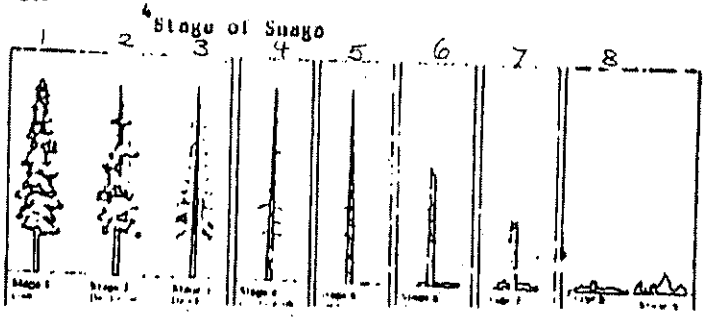
[2] species abb.
WP LP SAP
PP GF H
L DF Asp
CW

[3] heights
1=1'-5'
2=5'-20'
3=20'-60'
4=60'+

Successional Stages

[4] Stage of Snags





P.1. location and transect line within drainage

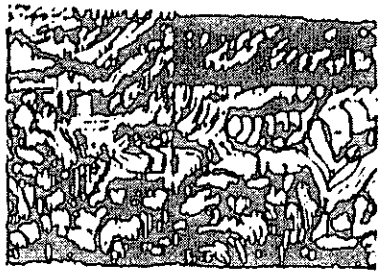


TABLE 1: Field Form

OLD GROWTH PLOT SURVEY

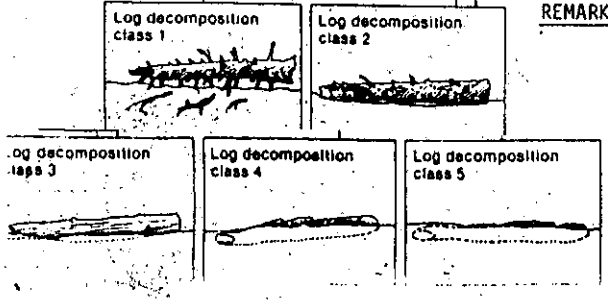
Date_____
Drainage_____
Old growth unit # _____
P.I. type_____

Stand Acres_____
Aspect_____
Elevation _____

Stand Condition:
_____existing old growth
_____replacement old growth
_____ neither of the above

Plot #										
Bearing										
Live tree diams.(Var. P.) 17-19" DBH										
19" + DBH										
age trees 17-19"										
age trees 19" +										
canopy cover %										
habitat type										
major O.S. species										
major U.S. species										
down stems 20"+ & stage										
down stems 12-20", stg.										
decadence (type, amt.) L,M,H										

REMARKS



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KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX EIGHTEEN

GUIDELINES FOR CALCULATING WATER YIELD INCREASES

APPENDIX 18

5/79

GUIDELINES FOR CALCULATING WATER YIELD INCREASES

Introduction

Manipulation of forest vegetation produces complex changes in natural functioning of the forest system. Among the expected effects is an increase in water yield from areas of forest canopy removal. In northwestern Montana, this increase is due primarily to modifications in snow accumulation and snowmelt runoff and to changes in evapo-transpiration. Runoff increases may cause resource damage in the form of aggravated channel scour, sedimentation, and an increased potential for flooding.

The Kootenai National Forest's water yield model is based on measured increases in snowpack accumulation and soil moisture in Forest openings. These increases are the result of changes in interception, transpiration, and the energy budget of openings. The model is designed to estimate increases in spring runoff (April, May, June), because this is the time when the majority of the runoff is known to occur and the potential for stream channel damage is the greatest. The calculated peak flow increase from activity in the basin is compared to an allowable peak flow increase to assess the hydrologic status of the watershed. The allowable peak flow increase is a management decision based on the R-1 channel stability rating method in conjunction with consideration for in-stream resource values.

In the model, the peak flow increase from affected lands is varied by elevation and precipitation zones, aspect, slope, and type of management activity. The increase is initially expressed as a percentage per unit area of clearcut equivalent. Runoff increases from logged lands vary from 26 percent to 50 percent; sites with less soil disturbance and gentler slopes represent the smaller increases with the reverse being true for greater increases. Increases from roads vary from 51 percent to 74 percent. The higher figures for roads reflect a more rapid contribution to runoff in addition to snow accumulation increases.
The magnitude of peak flow increases vary also with the amount of area disturbed in a drainage. This area is expressed as a clearcut equivalent (CCE), where 100 percent canopy removal represents 100 percent CCE and lesser removals result in smaller CCE's. A distinction is made between CCE area from existing cutting units and those proposed for the future. The CCE area from existing units is adjusted downward as vegetation reoccupies sites after logging.

In normal applications there are three primary outputs to the water yield model:

1. Potential Equivalent Clearcut Area (PECA).

2. Additional Allowable Clearcut Equivalent (ACE).

3. Increase in Peak Flow (IPF).

PECA is the area (in acres) in the watershed which is allowed to be in a clearcut equivalent condition at any given time. It is varied according to the percent peak flow increase to be expected per CCE acre and the allowable increase as determined from channel stability and instream resource value. The allowable peak flow increase varies from ten percent to 20 percent.

Introduction

ACE is the area (in acres) which may be added to the existing clearcut equivalent area in the watershed at the time to which the analysis is projected. To determine this, it is necessary to calculate the existing CCE area in roads and in each existing stand. Vegetative recovery since initial cutting is taken into consideration.

IPF is the percent runoff increase to be expected during the spring months. It may be calculated as an existing increase if only past cutting is considered or as a projected increase including both existing and proposed cutting. It is the IPF which is compared to the percent allowable peak flow increase to determine if coordinating requirements are being met.

The focus upon peak flow increases, in contrast to annual water yield increases, represents a more hydrophysically sound approach to this analysis because channel scour and transport are most active during peak flows. The change is not at variance with the Forest coordinating requirements, however. The coordinating requirements address both "annual discharge" increases and "annual peak discharges," with the intent of protecting instream values from flood damage.

WATER YIELD INCREASES

Instructions

The water yield analysis procedure as usually applied, involves five primary steps;

1. Watershed characterization
2. Potential equivalent clearcut area (PECA)
3. Existing clearcut equivalent
4. Additional allowable clearcut equivalent (ACE)
5. Increase in peak flow (IPF)

When these steps are completed, the land manager has an indication of how much area in the watershed may be in clearcut equivalent condition, how much area will be in a clearcut condition prior to additional activity, how much additional clearcut area is available, and how much peak flows have been increased by the existing situation. An extension of the procedure allows calculation of total proposed and existing clearcut equivalency and peak flow increases if additional treatment areas have been determined.

The following instructions are intended to guide the user through the water yield analysis procedure step-by-step. A standard format to be used follows the instruction section. Necessary charts and graphs are provided in the appendix.

I. Watershed Characterization

The first step in the analysis is to determine the analysis point. This is a distinct point on the stream channel above which the analysis is to be carried out. In most cases it will be at the outlet of the drainage. In some situations, the point may be located on a reach of stream which has been singled out for reasons such as channel stability, fisheries habitat, critical road crossing location, etc. The point may also be located higher on a drainage if there is concern that the upper portion of a watershed requires separate analysis.

The second step is to measure watershed area, mean elevation, and mean slope. The area is that portion of the watershed above the analysis point. The mean elevation and slope are normally sampled throughout those areas of the basin allocated to timber management. This data is used for PECA and IPF calculations and therefore should reflect conditions where timber management takes place. In certain situations such as when disease or fire results in disturbances to other allocation units, sampling should be extended into these units. For basin runoff estimates, elevation must be sampled over the entire basin.

The next step is to determine the predicted peak flow increase per clearcut equivalent. This increase factor is expressed as a percentage and varies with elevation zone, landslope, type of treatment, and aspect. The increase factors

are contained in Table 1 in the appendix. In nearly all cases, this factor will be applied to an entire basin to determine PECA and IPF. The first determination will be elevation zone, followed by aspect. In nearly all cases, a variety of aspects are represented in a basin and the "Basin Average" factors are used. The mean slope and treatment type are next considered to get the final predicted increase factor. Increase factors for roads are used only when more detailed stand-by-stand runoff calculations are desired.

The allowable peak flow increase is the next consideration. Peak flow is defined as the total water yield during the months of April, May, and June. The range of allowable peak flow increases due to management practices is ten percent to 20 percent. The determination of allowable peak flow increase is done using the R-1 channel stability rating and identified instream values such as fisheries or water supply. For any given channel stability, the allowable increase may be adjusted ± 2 percent based on these instream values.

Channel Stability	Mean Allowable Peak Flow Increase	Range of Allowable Increase
Poor = 100 - 125	12%	10% to 14%
Fair = 75 - 100	14%	12% to 16%
Good = 50 - 75	16%	14% to 18%
Excellent = <50	18%	16% to 20%

NOTE: Ten percent allowable increase is used for all channels rated very poor (>125).

II. Potential Equivalent Clearcut Area (PECA)

PECA is calculated using the following formula:

$$\text{PECA} = \frac{(\text{Basin Area in Acres})(\text{Allowable \% Increase})}{(\text{Predicted \% Increase per CCE})}$$

PECA is in units of acres.

III. Existing Clearcut Equivalent

The existing clearcut equivalent (CCE) in the watershed is calculated based on initial area cut, crown removal, and vegetative recovery since cutting. It is necessary to determine the date to which recovery is to be calculated. This should be the date when the next entry to the watershed is scheduled. Clearcut equivalency calculations are done on a stand-by-stand basis with roads being considered as stands with no recovery taking place. The following data are needed to calculate CCE:

1. Stand number

2. Area of the stand

3. Habitat type of the stand

4. Year in which regeneration began

5. Original crown removal and clearcut equivalency.

With this information it is possible to calculate the CCE of each stand as a percent and as acre equivalents projected to the next entry of the watershed. The recovery calculation is done using habitat type and two graphs entitled "Crown Removal vs. Clearcut Equivalent" and "Clearcut Equivalent vs. Years of Recovery" which are found in the appendix.

First, one must determine the initial clearcut equivalency of the stand using the graph entitled "Crown Removal vs. Clearcut Equivalent." For example, the 40 percent crown removal corresponds to a 25 percent clearcut equivalency, a 70 percent crown removal to a 77 percent clearcut equivalency, etc. Anything below 15 percent crown removal is considered to be 0 percent clearcut equivalency.

Next, the regeneration year must be determined. It is best to use information available from the stand atlas or ground knowledge. In the absence of such information, five years from time of cutting may be used to approximate initiation of recovery for clearcuts. For partial cuts (< 100 percent crown removal) three years is used on fast recovery habitat types, four years on medium, and five years on slow. Table 2 in the appendix lists habitat types by hydrologic recovery class.

Finally, recovery is calculated using the graph entitled "Clearcut Equavilancy vs. Years of Recovery". The graph consists of three recovery curves for fast, medium, and slow habitat types. The years of recovery are known and clearcut equivalent is read from the Y-axis. For partial cuts, the recovery starts at the initial clearcut equivalent, rather than at 100 percent clearcut equivalent as for complete crown removals. The partially recovered clearcut equivalent is expressed as a percent. This percentage is multiplied by the area of the stand to get clearcut equivalent acres. For roads, no recovery is assumed and a clearcut equivalent factor of 1.3 is used to account for greater hydrological disturbance. Thus, a watershed with ten acres of roads has 13 equivalent clearcut acres of roads. The total existing clearcut equivalent is obtained by summing the stands and roads.

IIIa. Proposed Additional Clearcut Equivalent

This calculation is done only when additional treatment areas have already been proposed. The procedure is identical to that for existing stands except that recovery need not be considered.

IV. Additional Allowable Clearcut Equivalent (ACE)

ACE is calculated using the following formula:

$$ACE_{(\text{at some date})} = PECA - \text{Existing CCE}$$

V. Increase in Peak Flow (IPF)

IPF is calculated using the following formula:

$$IPF_{(\text{at some date})} = \frac{(\text{CCE Area})(\text{Predicted \% Increase per CCE})}{(\text{Basin Area})}$$

NOTE that IPF can be calculated using either existing clearcut equivalent acres or both existing and proposed acres depending upon the output desired.

Appendix - Table 1

PREDICTED PEAK FLOW INCREASES (% per CCE)

LOW ELEVATION < 3500'

ASPECT	SLOPE	CABLE	TRACTOR	ROADS
LOW ENERGY NW, N, NE, E, SE	0 - 10	-	.31	.61
	11 - 20	-	.35	.63
	21 - 30	.35	.40	.65
	31 - 40	.40	.46	.67
	41 - 50	.46	.51	.69
	51 - 60	.46	-	.71
	61 - 70	.40	-	.73
	71 - 80	.35	-	.76
HIGH ENERGY W, SW, S	0 - 10	-	.26	.51
	11 - 20	-	.29	.53
	21 - 30	.29	.34	.54
	31 - 40	.34	.38	.56
	41 - 50	.38	.43	.58
	51 - 60	.38	-	.60
	61 - 70	.34	-	.62
	71 - 80	.29	-	.63
BASIN AVERAGE	0 - 10	-	.29	.57
	11 - 20	-	.33	.59
	21 - 30	.33	.38	.61
	31 - 40	.38	.43	.63
	41 - 50	.43	.48	.65
	51 - 60	.43	-	.67
	61 - 70	.38	-	.69
	71 - 80	.38	-	.71

Predicted Peak Flow Increases (% per CCE)

MID-ELEVATION 3500-4500

ASPECT	SLOPE	CABLE	TRACTOR	ROADS
	0 - 10	-	.31	.62
LOW	11 - 20	-	.36	.64
ENERGY	21 - 30	.36	.41	.66
	31 - 40	.41	.47	.68
NW, N, NE,	41 - 50	.47	.52	.70
E, SE	51 - 60	.47	-	.72
	61 - 70	.41	-	.75
	71 - 80	.36	-	.77
	0 - 10	-	.28	.56
HIGH	11 - 20	-	.33	.58
ENERGY	21 - 30	.33	.38	.60
	31 - 40	.38	.42	.62
W, SW, S	41 - 50	.42	.47	.64
	51 - 60	.42	-	.66
	61 - 70	.38	-	.68
	71 - 80	.33	-	.70
	0 - 10	-	.30	.60
BASIN	11 - 20	-	.35	.62
AVERAGE	21 - 30	.35	.40	.64
	31 - 40	.40	.45	.66
	41 - 50	.45	.50	.68
	51 - 60	.45	-	.70
	61 - 70	.40	-	.72
	71 - 80	.35	-	.74

HIGH ELEVATION > 4500

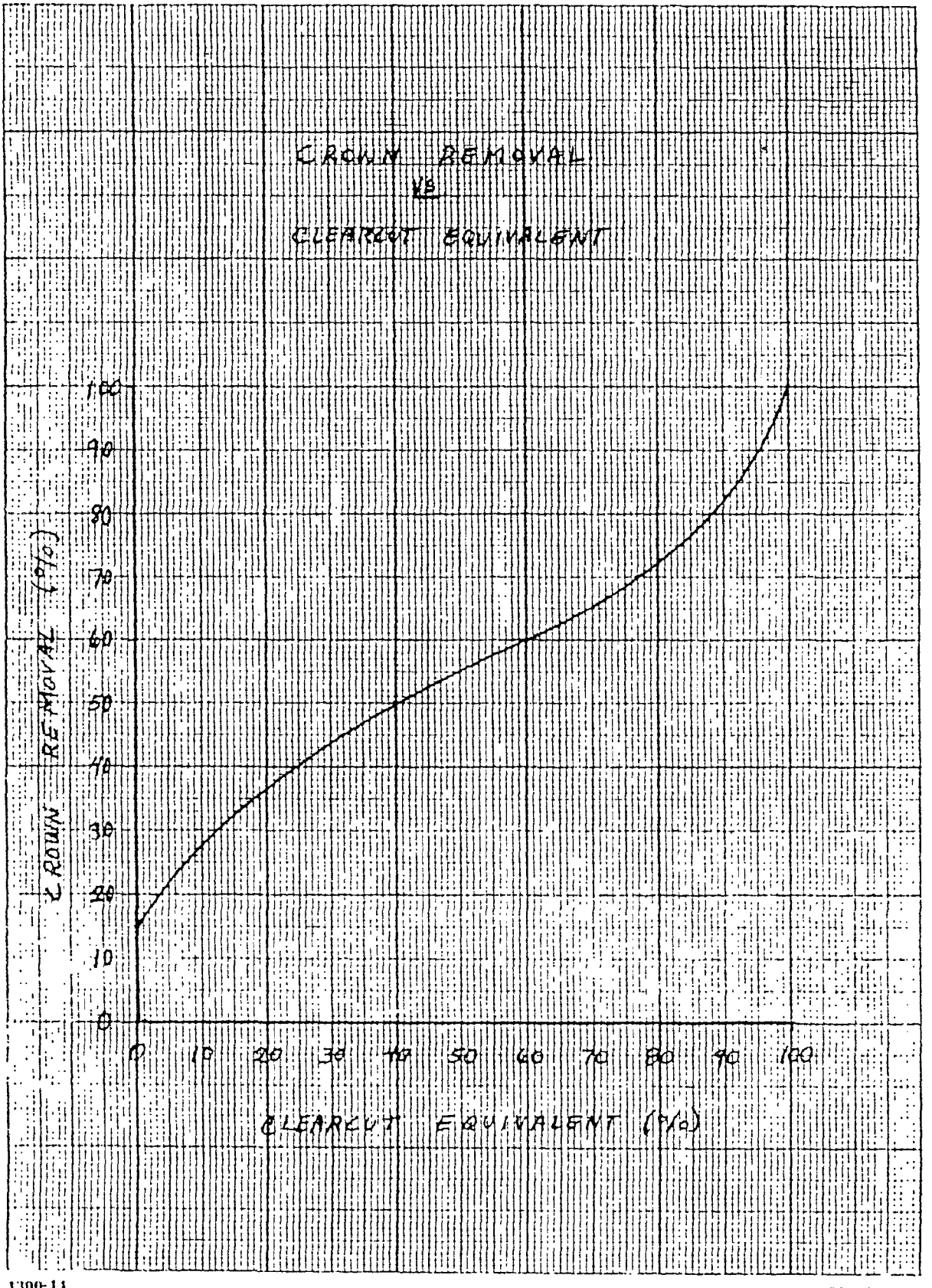
	0 - 10	-	.30	.60
	11 - 20	-	.35	.62
ALL	21 - 30	.35	.40	.64
ASPECTS	31 - 40	.40	.45	.66
	41 - 50	.45	.50	.68
	51 - 60	.45	-	.70
	61 - 70	.40	-	.72
	71 - 80	.35	-	.74

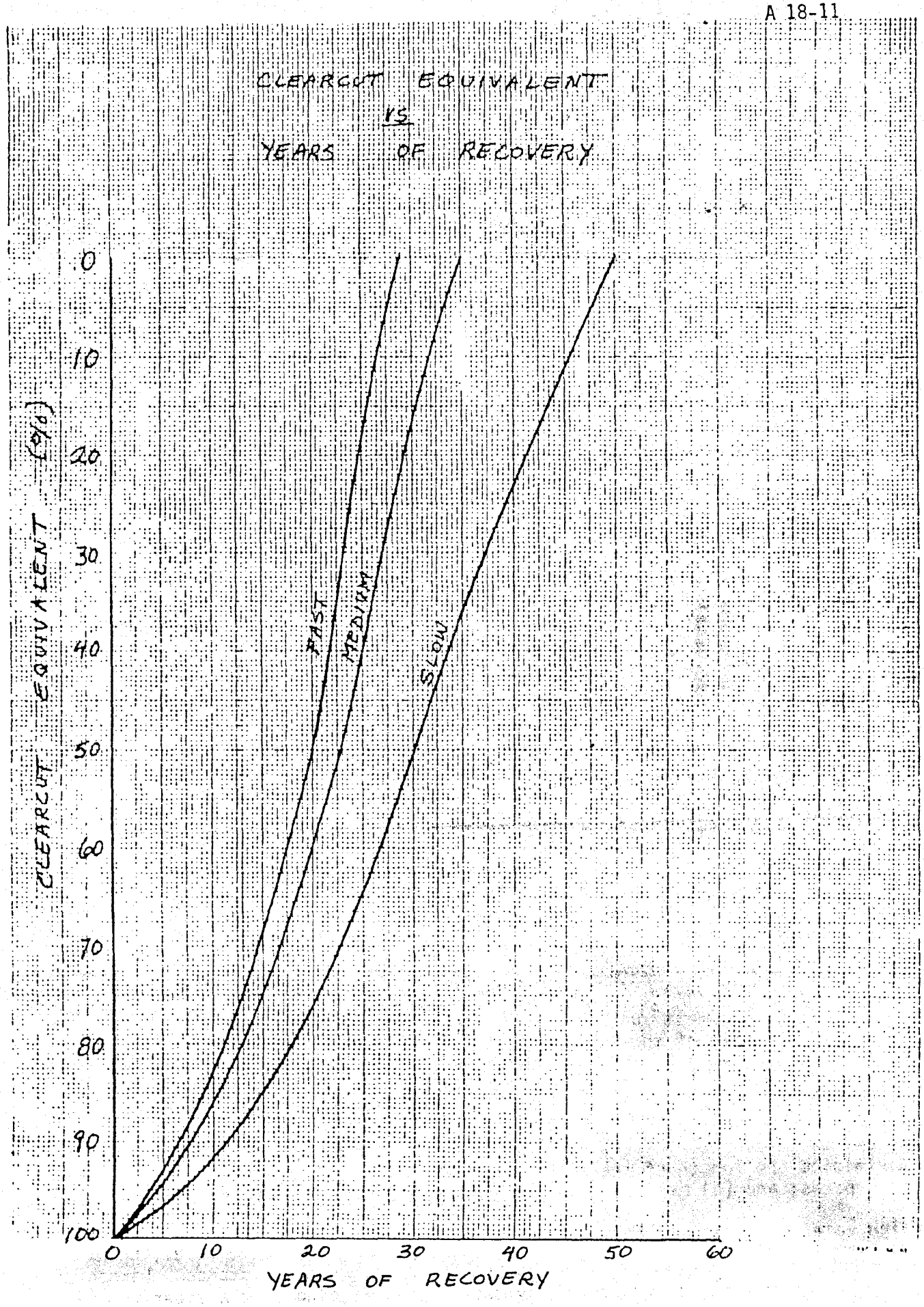
Appendix - Table 2

HYDROLOGIC RECOVERY CLASSES

FAST	MEDIUM	SLOW
WRC/Clun	GF/Xete	AF/Mete
WH/Clun	DF/Syal	MH/Mete
WH/Oplo	DF/Vaca	AF/Lugl
AF/Oplo	DF/Xete	MH/Xete
AF/Clun	DF/Arur	WRP/AF
GF/Clun	DF/Caru	AL/AF
S/Libo	AF/Vase	DF/Agsp
DF/Libo	AF/Xete	PP/Putr
DF/Phma	AF/Vaca	PP/Agsp
	AF/Alsi	
	AF/Libo	

DEPARTMENT OF AGRICULTURE
FOREST SERVICE




CLEARCUT EQUIVALENT
VS
YEARS OF RECOVERY
CLEARCUT EQUIVALENT (%)
0
10
20
30
40
50
60
70
80
90
100
FAST
MEDIUM
SLOW
0
10
20
30
40
50
60
YEARS OF RECOVERY

United States Department of Agriculture | Forest Service | SO

Reply to: 2520 Watershed Protection and Management

Date: March 5, 1982

Subject: Hydrologic Recommendations for Timber Harvest

To: District Rangers

Several times in the past few months we have been asked to provide hydrology-specific guidelines for timber harvest. In effect, we were being asked to delineate the aspects, elevations, and harvest patterns which would result in the smallest water yield increase while still allowing harvest in critical areas.

With this as our intention, we collected research information and generated the following writeup. We feel the document would be valuable to all Districts and thus provide the following.

The goal of minimizing the water yield increase impacts while harvesting timber involves the following objectives:

1. Limit increases in spring peak runoff volumes to the capability of stream channels to safely handle this increase, based on channel condition and stability;

2. Desynchronize snowmelt runoff from the components of a watershed by maximizing the natural diversity in the quantity and timing of snowpack accumulations and melt.

Following these objectives will at the same time result in:

1. Broadening the base of the spring flood hydrograph to reduce peak spring flows and possibly increase late summer flows.

2. Maintenance of stream channel stability.

3. Holding sedimentation to a minimum.

The amount of snowmelt runoff depends largely on the amount of water in the snowpack, the rate of snowmelt, and the capacity of the soil to absorb and store water (Packer, 1962). Snowmelt runoff losses are integrated values of transmission, evaporation, and ground losses, and are largely a function of the length of time of the snowmelt period. On the basis of these factors, investigators primarily interested in minimizing increases in water yield state that this may be achieved by (a) maximizing the diversity of snowmelt; (b) reducing snowmelt rates; (c) maximizing the length of the snowmelt period; (d) maximizing the length of water flow paths; and (e) maintaining high use of water by vegetation (Anderson, 1966).

High rates of water use by vegetation may be maintained by favoring timber harvest methods that produce the least increase in water yield, e.g., partial cutting or, in this case, by leaving healthy nonsusceptible stands. Length of water flow paths may be maximized by restricting logging to the upper portions of slopes, strip cutting on contours, and maintaining high soil infiltration

rates and deep seepage of water. Management practices to change the length of the snowmelt period and snwomelt rates will vary on different parts of the watershed in order to maximize the diversity of snowmelt.

Maximizing the diversity of snowmelt and desynchronizing snowmelt runoff from parts of the watershed may be attained by the following management practices listed by aspects (energy slopes) and elevations:

High Energy Slopes - S, SW, SE, W

Objectives

1. Reduce maximum snow accumulation.

2. Advance time of initiation of melt.

3. Lengthen snowmelt period.

A. Low-Intermediate Elevations - 5000 feet

Cut moderate sized patches, 4 to 20 acres, or use heavy partial cuts (shelterwoods). A heavy seed tree cut leaving 20 percent of the stand would create the most rapid melt. Minimize shading to the south by providing a high view factor (the ratio of opening diameter to tree height) on SE, S, and SW perimeter of opening. This will include removing tall trees on the southern perimeter to permit more direct radiation into the opening and the leaving of trees on the N and NE perimeter to increase back radiation into the opening. South facing clearcuts located below the watershed mid-elevation can be considered as yielding their flows before the peak runoff period.

Sites where soil moisture and soil temperatures may become limiting for tree reestablishment with minimization of shading will need special treatment. Some shading will be beneficial on these sites for reducing water losses and soil tempertures.

B. High Elevations - >5000 feet

Similar to lower elevations except that opening may be larger here (up to 40 acres). Wide cuts should be avoided since the snow will be deeper and melt slower than narrow cuts.

Low Energy Slopes - N, NW, NE, E

Objectives

1. Delay or maintain time of initiation of melt.

2. Minimize increases in water yield.

3. Maintain low snowmelt rate during spring. (Even though the rate in surrounding forest will be less.)

4. Lengthen snowmelt period.

At all elevations, clearcut strips will be oriented parallel to contours and ideally would have wide leave-areas between cuttings. The steeper the slope, the wider the strip may be.

A. Low Elevations - <3500 feet

Selectively log small groups, ideally only up to 2A in size, with low view factor to SE, S, SW. Leave all trees, with dense crowns on SE, S, and SW perimeter to gain maximum shade and reduce direct radiation. A somewhat dense strip of dead or dying LPP will still be at least partially effective here. Remove tall trees on N and NE perimeter to reduce back radiation. This type of cutting will retard early melt, reduce melt rates and lengthen the snowmelt period.

B. Intermediate - 3500 to 5000 feet

Favor single tree or group selection cuttings to reduce density to around 45 to 50 percent. Clearcuts should be in small patches or very narrow strips 1 to 5 acres in size, designed to maximize snow accumulation and delay melt.

C. High Elevations - >5000 feet

Cutting units which occur in this high elevation, north aspect zone can be evaluated as contributing most of its increase after the peak discharge of the watershed.

Harvest patterns should be similar to the intermediate elevations but more acres can be harvested.

In summary, low elevation south aspect and high elevation north aspect harvests produce the smallest increase in peak flows. If the suggested harvest patterns are (or can be) followed, peak flows increases and the threat of channel damage can be minimized.

In theory, if the normal discharges from very small tributaries (first, second, and third order) to main channels (fourth and fifth order) can be disrupted using cutting strategies discussed above, the effect would be to broaden the base of the stream hydrograph in both directions from the period of peak flow, with no aggravation and possibly a reduction in peak discharge. This would result, at the same time, in perhaps increasing late summer flows, in safeguarding the integrity of stream channels, and in holding sedimentation and other damages to water quality to a practical minimum.

Existing and planned transportation systems; timber types, conditions, and valves; and fire and disease potential will, of course, be involved in the sale area layout. Nevertheless, we hope these guidelines assist you with future sale planning.

LARRY H. MESHEW
Hydrologist

STEVEN R. JOHNSON
Hydrologist

Enclosure

cc: Johnson
Meshew

Water Yield References

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KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX NINETEEN

CULTURAL RESOURCES

Appendix 19

CULTURAL RESOURCES

The Forest will undertake a systematic program of cultural resource inventory, evaluation, and preservation aimed at the enhancement and protection of significant cultural resource values. Integration of culutral resource management concerns into the overall Forest multiple resource management effort will be emphasized, as will coordination with the public, the scientific community, and appropriate Native American groups. Standards of fieldwork, data recovery, mitigation, analysis, and personnel qualifications will reflect the most current federal guidelines, laws, and Forest Service policy direction. Implementaion of the following management prodedures will achieve this objective.

Management Procedures

a. Preservation

Cultural resource sites determined as significant under the criteria established by 36CFR800 will be preserved in place whenever possible. When such resources are threatened by another resource activity or project development, an effort to avoid or minimize adverse impact by project redesign will be made. When avoidance of an evaluated, significant cultural property or site is judged to be not prudent or feasible by the Forest Supervisor, the scientific or historic values of the site will be conserved through proper scientific excavation, recordation, analysis, and reporting.

b. Inventory

The Forest will continue to undertake cultural resource inventory surveys on all new "undertakings" as defined in 36CFR800.2, employing qualified cultural resource specialists, paraprofessionals, consultants, or researchers. The inventory will result in a formal Cultural Resource Inventory Report or documentation of former inventory submitted to the Montana State Historic Preservation Office for comments. Ongoing undertakings that had not previously been inventoried will be prioritized for inventory. For large projects, such as timber sales, a subjective sampling strategy will be used as generally outlined in the Kootenai National Forest Cultural Resource Inventory Methodology. This survey strategy will be updated to integrate new information as needed and when feasible they will be tested for it's accuracy. The Forest will seek SHPO concurrence on their survey strategy, working towards a formal Memorandum of Agreement. Each project will be given an individualized survey design as determined by the responsible specialist. Small projects such as recreation sites, and small mineral exploration sites will require survey of the entire project area. Forest inventory efforts will focus on three areas:

1. Areas where formal archaeological surveys will provide management data that are broadly applicable to ecologically similar areas and which will facilitate the development of predictive models capable of addressing issues of cultural site density, distribution, and significance

2. Areas where systematic sample surveys will provide data to test the accuracy of the Kootenai National Forest Cultural Resource Inventory Methodology.

3. Areas where specific project activities such as timber sales, road developments, range improvements, or projects administered under contract result in significant ground disturbance.

Large-scale inventory projects such as those required for surface mines, oil fields, and cost-share projects greatly exceed Forest in-Service survey capabilities and will be recommended for contracting by private consultants operating under special use permits. Consultants, universities, or museums conducting privately-sponsored, project-specific cultural resource inventories must coordinate all such activities with the appropriate District Ranger and cultural resource specialist, and they are required to meet all current federal data recovery standards and qualifications. The Forest will ensure the level of performance required through permit administration, report review, field compliance inspections, and the preparation of scope-of-work documents for more complex reconnaissance or mitigation projects. Such projects will be coordinated with the State Historic Preservation Office and the Advisory Council on Historic Preservation.

The Forest will encourage scientific research by privately-funded universities as a means of acquiring additional inventory and interpretive data. The Forest will manage cultural site locational information by means of a cultural resource site map, an historic site probability map, and a site lead file at each Ranger District. District Rangers will ensure that their respective District cultural resource files are kept current. A master cultural resource atlas and site file which sythesizes all District site locational information will be maintained at the Forest Supervisor's Office. Cultural resource site information is exempt from disclosure under the Freedom of Information Act. Site locational data may be released on a need-to-know basis to consultants, univerisities or museums holding a current special use permit for research or consulting work on the Kootenai Forest. All other disclosures of cultural site locational information require written approval of the Forest Supervisor.

c. Monitoring

Program monitoring requires the identification of mechanisms with which to evaluate achievement of stated standards.

Standard	Evaluation Mechanism	Frequency of Evaluation
Survey/Inventory of all new undertakings	Review by Archaeologist and District Personnel.	Annual
Inventory 100% of high and medium probability areas and 10% of low probability areas.	Review of project report by Forest Archaeologist, Staff Officer, and SHPO.	Per project
Adequate training and supervision of paraprofessionals.	Review by Forest Archaeologist	Ongoing
Monitoring of projects during or after project impacts as recommended in individual project reports.	Review by Forest Archaeologist and District Ranger.	Per project
Monitoring of signifi-sites as recommended in individual project reports.	Review by Forest Archaeologist and District Ranger.	Per project.

d. Evaluation

Discovered cultural resources will be evaluated in relation to published Advisory Council on Historic Preservation (ACHP) criteria for eligibility to the National Register of Historic Places. The Forest will seek a concensus determination of eligibility with the Montana State Historic Preservation Office on all sites recorded from 1986 forward and will address the backlog of unevaluated sites on a priority basis. Cultural resource sites determined eligible will be nominated to the National Register on an opportunity and priority basis.

e. Integration

The Forest will effectively integrate cultural resource management into the overall, multiple-use planning process. This will be accomplished by the preparation of a detailed Forest prehistoric and historic overview. Significant cultural resource sites will require individual cultural resource management plans to be developed on a priority and opportunity basis. Furthermore program integration will be achieved by providing on-going cultural resource training opportunities for Forest personnel.

f. Site Stabalization and Enhancement

The Forest will develop a prioritized list of sites to be stabalized and will implement stabalization as the opportunity arises.

The Forest will enhance and interpret significant cultural sites for the education and enjoyment of the public when such development will not degrade the cultural property or conflict with other resource considerations. Interpretation and enhancement of significant cultural resources may include but are not necessarily restricted to the following items or activities:

1. Scientifically and historically accurate District displays.

2. Scientifically and historically accurate brochures, posters, interpretive signs, lectures, or self-guided tours.

3. Encouragement of scientific or historical research on the Forest and the distribution of the resulting reports, monographs, or books to the interested public. Archaeologists and historians conducting research on the Forest will be encouraged to present lectures, slide shows or films for the education and enjoyment of the public.

Sites recommended for enhancement will be prioritized accordingly.

g. Protection

Known significant cultural resource sites on the Forest will be protected from inadvertent or intentional damage or destruction. Proactive measures may include: 1) physical on-site measures such as fences or gates, 2) posting of antiquities-law warning signs, 3) portection of site location information, 4) systematic monitoring of site condition, 5) public education, and 6) such law enforcement measures as patrolling and investigation of antiquities violations. Site protective measures will be employed only where their presence will not degrade a significant cultural property, and such measures will require Forest Supervisor approval prior to implementation.

h. Coordination

The Forest will make an effort to coordinate cultural resource issues and concerns with members of the public, the archaeological and historic interest communities, and with appropriate Native American groups. The Kootenai Forest is adjacent to or lies within the former range of the Kootenai Native American tribal group. Some issues of direct interest to these groups concern burial or interment sites, areas of sacred or ceremonial significance, confidentiality of site information, the disposition of Native American artifacts, and accuracy of portrayls of Native Americans in displays or at interpretive sites. In addition to aboriginal or prehistoric burial sites, many marked and unmarked historic graves are known to exist on the Kootenai Forest.

Accidental disturbance of Native American or historic graves through road development, timber harvest, range improvements, or other ground-disturbing projects is of concern to Native Americans, the public, and the Forest. Forest policy in such instances will include the following actions:

1. Evaluation by a Forest Archaeologist will be made immediately to determine if the skeletal remains are human and to what time period or ethnic group they may be related.

2. Reinterment in-place and avoidance of further disturbance by project redesign will be considered, in consultation with the associated living Native American tribal group.

3. In cases where cultural affiliations with a living Native American tribal group can be reliably ascribed and where reinterment in-place is not prudent or feasible, the appropriate tribal group will be contacted regarding proper reinterment elsewhere.

4. Human skeletal remains which cannot be accurately connected with a living Native American or historic group and where reinterment is not feasible, will be scientifically excavated, analyzed, and permanently stored at an approved curational facility.

The Forest will take into consideration in its multiple-use management process sites which are former or current ceremonial or religious sites, or sites of sacred significance to Native Americans in accordance with Regional and Forest policy. The Forest will meet the requirements of the American Indian Religious Freedom Act.

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWENTY

SNOW COURSES

Kootenai National Forest Plan

Appendix 20

SOIL CONSERVATION SERVICE SNOWCOURSES

Snowcourse Name	Ranger District	Management Area No.
Red Mountain	1	18
Hawkins Lake	2	2
Davis Creek	2	2
Garver Creek	2	14
Newton Mountain	2	2
Red Top	2	14
Friday Hill	2	14
4th of July Creek	2	15
Stahl Peak	3	8
Grave Creek	3	12
Weasel Divide	3	13
Keeler Creek	4	12
Cedar Grove	5	14
Poorman Creek	5	2
Bald Eagle Peak	5	7
Baree Creek	5	7
Baree Trail	6	2
Baree Midway	6	Private Land
Bristow Creek	6	11
Lost Soul	6	18
Banfield Mountain	6	12
Brush Creek	6	2
none existing	7	n/a

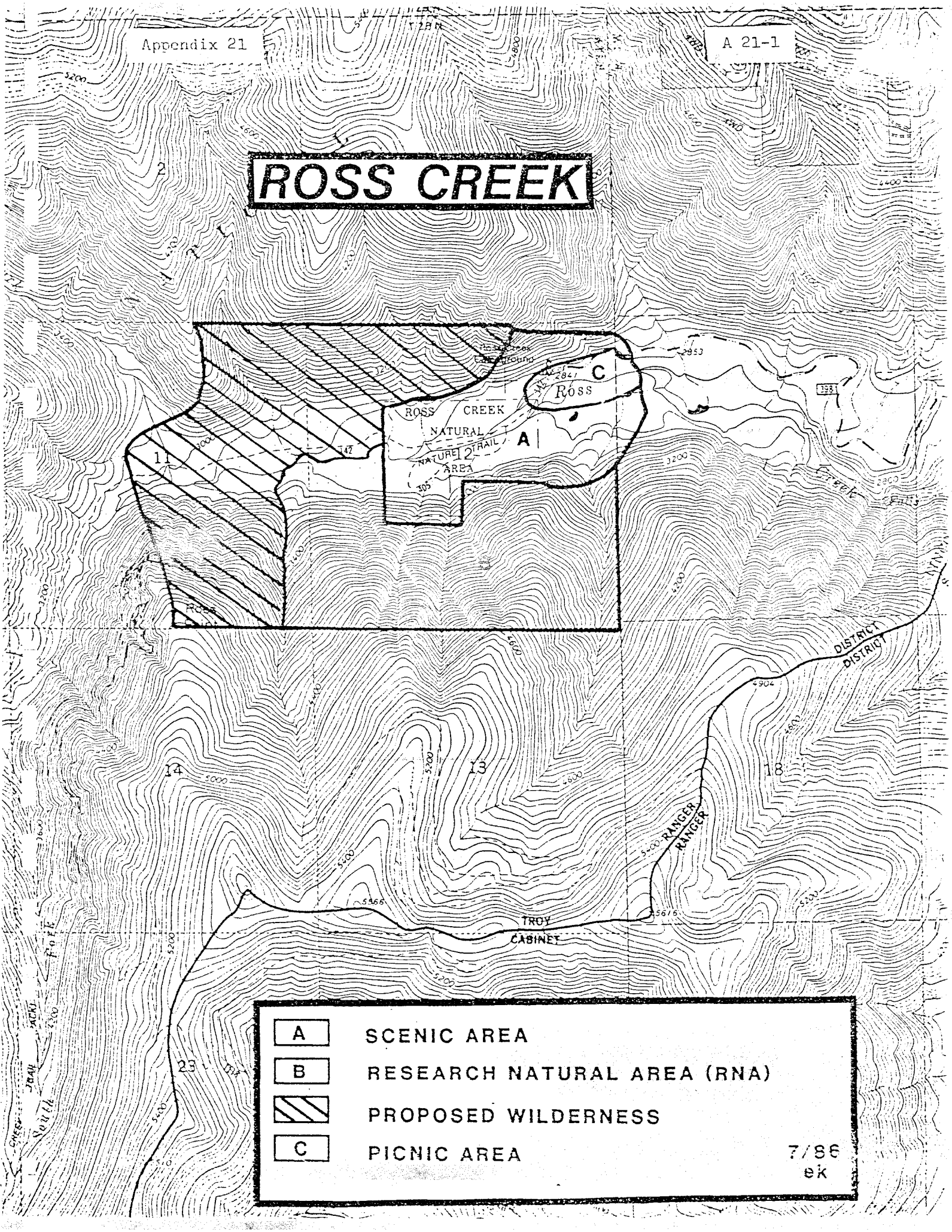
For further details refer to the 2560 casefolder for the existing Memorandum of Agreement.

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWENTY-ONE

ROSS CREEK RNA/SENIC AREA MAP


ROSS CREEK
ROSS CREEK NATURAL TRAIL
NATURE AREA
A
C
Ross
DISTRICT
RANGER
TROY
CABINET
A SCENIC AREA
B RESEARCH NATURAL AREA (RNA)
PROPOSED WILDERNESS
C PICNIC AREA
7/86
ek

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWENTY-TWO

WILD AND SCENIC RIVERS

APPENDIX 22

WILD and SCENIC RIVERS

Currently there are no Wild and Scenic Rivers on the Kootenai Forest but four rivers appear to be eligible for consideration and they are discussed in this Appendix. The rivers are the Yaak, Kootenai, Bull, and Vermilion. Final designation as a Wild and Scenic River is done by Congress after thorough study and public involvement. The four rivers discussed in this section will be formally studied and recommended for or against inclusion in the Wild and Scenic River system. In the interim, their river values will be protected on the Kootenai Forest land involved within the identified river corridor.

Background: The purpose and authority for study of wild and scenic rivers is established in the Wild and Scenic Rivers Act of October 1, 1968, as amended. Under the authority of the Act, the Kootenai Forest is charged with the identification of potential additions to the Wild and Scenic Rivers System. As a result, rivers on the Forest were analyzed for their eligibility and potential classification in the System.

River Eligibility and Potential Classification: To be eligible for consideration for addition to the System a river must be free-flowing and with its adjacent land area possess one or more "outstandingly remarkable" values. Scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values are examples of the considerations. The eligible river systems are assigned a potential classification of Wild, Scenic or Recreational. A river can have all three classifications in different segments or sections.

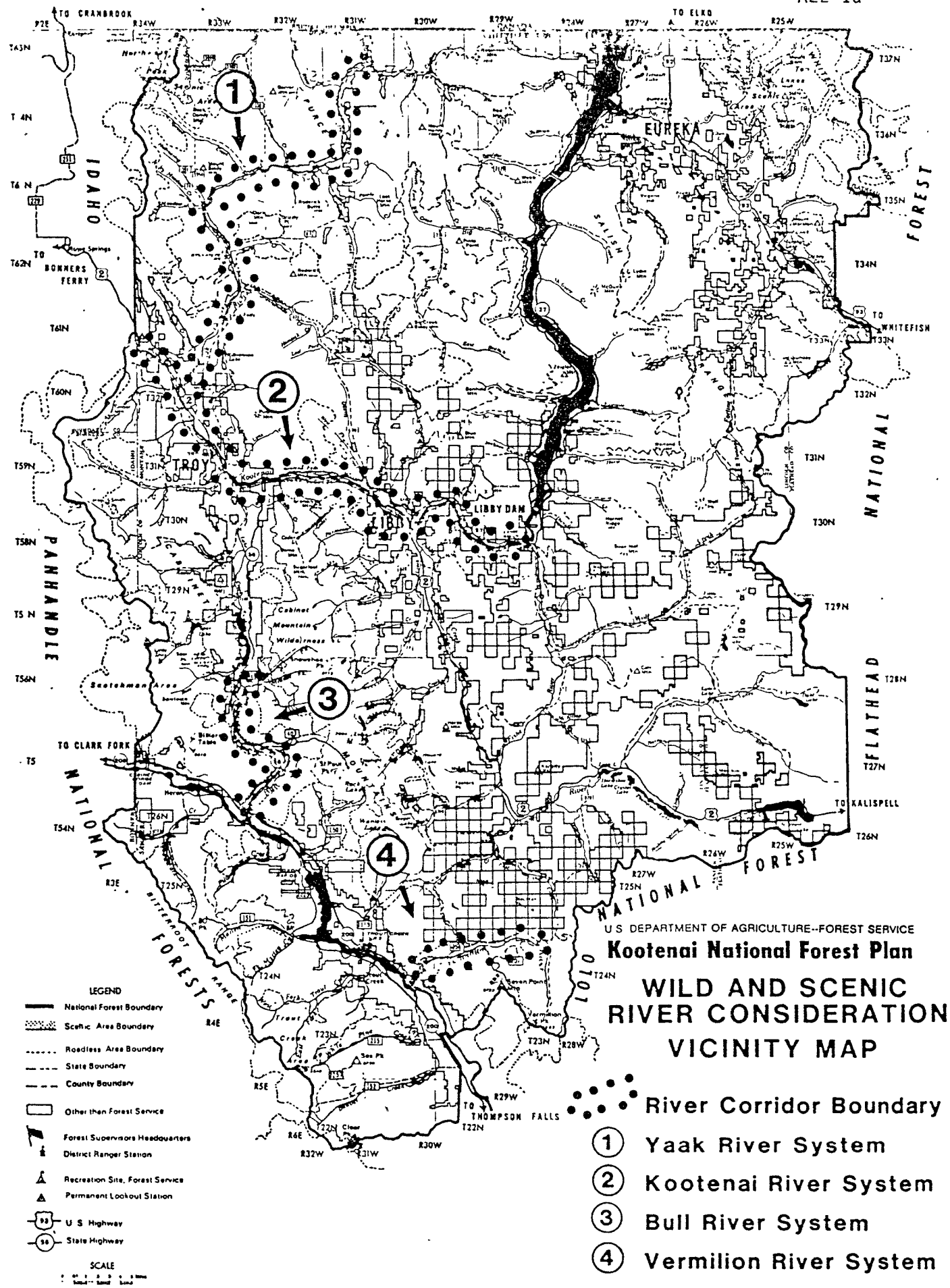
The characteristics of these three classifications are:

Wild River - Rivers or sections of rivers that are generally accessible only by trail, with the watershed or shoreline essentially primitive and undeveloped.

Scenic River - Rivers or sections of rivers with shorelines and watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.

Recreation River - Rivers or sections of rivers that are readily accessible by roads, have some development along their shoreline and may have some history of impoundment or diversion.

By application of the above criteria the following rivers were identified as eligible for further consideration as potential additions to the Wild and Scenic Rivers System.



U S DEPARTMENT OF AGRICULTURE--FOREST SERVICE

Kootenai National Forest Plan

WILD AND SCENIC RIVER CONSIDERATION VICINITY MAP

River Corridor Boundary

1. Yaak River System
2. Kootenai River System
3. Bull River System
4. Vermilion River System

2/87

YAAK RIVER SYSTEM

Introduction

The Yaak River drains the northwest portion of the Kootenai Forest and merges with the Kootenai River 6 miles downstream from the town of Troy, Montana. The Yaak is 45 miles long with 57% of the river mileage in National Forest ownership. 16,000 acres are included within a 1/2 mile-wide corridor. The qualities that contribute to its eligibility are the scenic values along the entire length, as well as the historical values that are related to the gold-mining days. The natural topographic features along with the landownership pattern readily yield four different segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the East and West Fork, downstream for 17 miles to Pete Creek. This segment meanders through valley-bottom land in a rural wetland setting that is primarily private ownership (67%). The historical community of Yaak, Montana and a major portion of the Yaak River Road are located within the corridor. Also included is the Upper Ford work center (Yaak Ranger District).

Segment 2 - Recreation river potential for 9 miles from Pete Creek to Meadow Creek. This segment flows at an increased rate through a heavily forested setting that is primarily National Forest ownership (90%). The Pete Creek and Whitetail Creek campgrounds, as well as the Yaak River Road are located within the corridor.

Segment 3 - Recreation river potential for 12 miles from Meadow Creek to the Yaak Falls. This segment flows at a still faster rate through a forested, narrow, valley-bottom setting that is primarily National Forest land (68%). The Red Top Campground, historical mining community of Sylvanite and the Yaak River Road are located within the corridor. Also included is the Sylvanite Ranger Station.

Segment 4 - Wild river potential begins at the Yaak Falls and cascades downstream for 8 miles through a deep canyon setting and ends at the Bonneville Power Administration (BPA) electric transmission corridor paralleling U.S. Highway 2 adjacent to the mouth of the Yaak River. This rugged segment is almost entirely National Forest land (97%) and includes the Yaak Falls Campground.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1, 2, 3, and 4). This would produce a 45-mile river system with 16,000 acres, of which 64% would be National Forest land. 37 miles would be in a Recreation River status and 8 miles would be in a Wild River status. This alternative would involve the largest amount of private land (5,710 acres).

Alternative B: The lower 2/3 of the river corridor (river segments 2, 3 and 4). This would produce a 29-mile river system with 10,300 acres, of which 82% would be National Forest land. 21 miles would be in a Recreation River status, and 8 miles would be in a Wild River status similar to Alt. A. This alternative would effect 1,850 acres of private land.

Alternative C: A significant portion (42%) of the lower river corridor (river segments 3 and 4). This would produce a 19-mile river system with 6,800 acres, of which 78% would be National Forest land. 11 miles would be in a Recreation River status, and 8 miles would be in a Wild River status similar to Alts. A and B. This alternative would effect 1,500 acres of private land.

Alternative D: The lower portion of the river corridor (river segment 4). This would produce an 8-mile Wild River system that would be 93% National Forest land and have the least effect on private land (180 acres). This alternative could be extended to include the lower portion of the Kootenai River. See river segment 5 in the Kootenai River discussion.

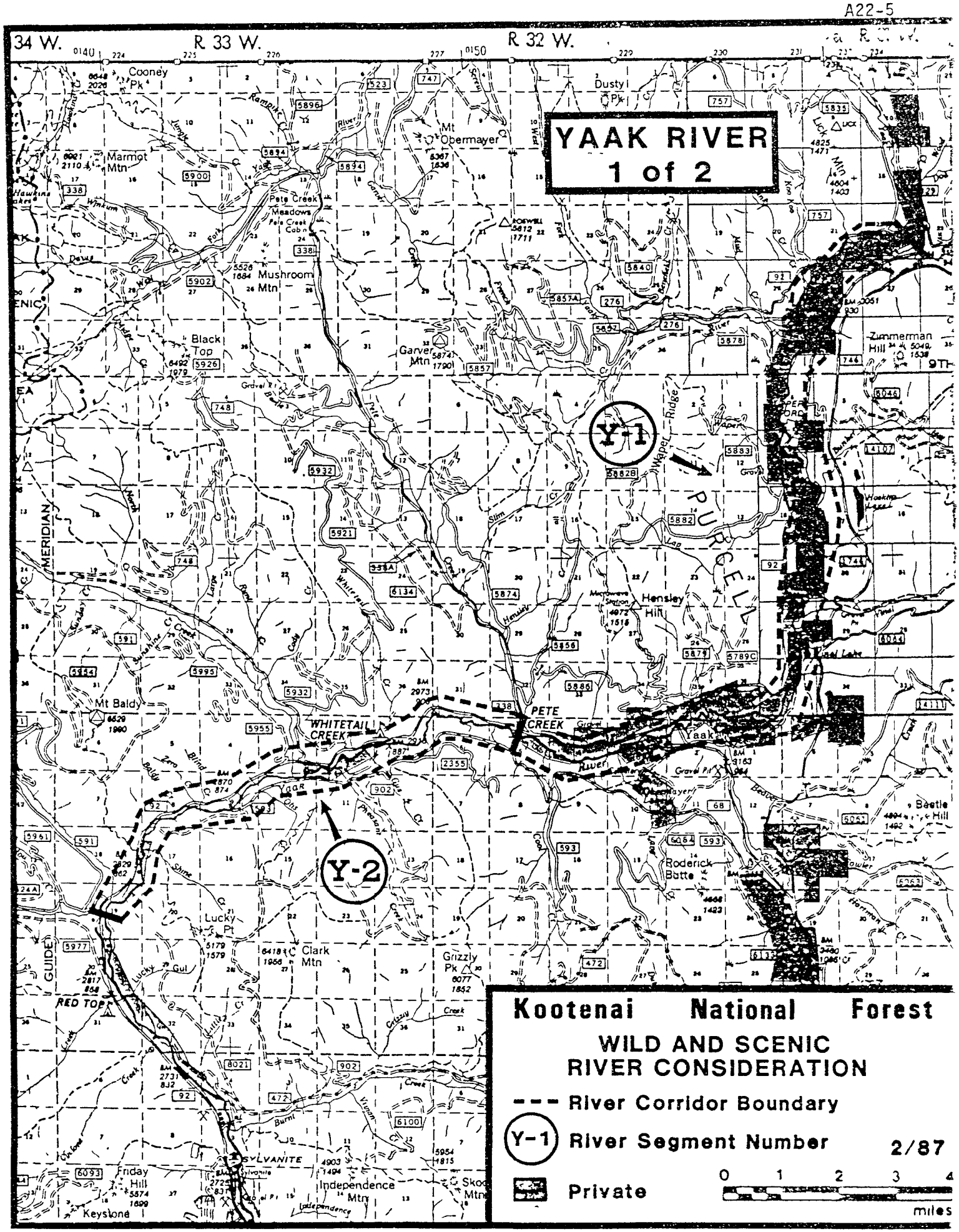
Interim Management Considerations

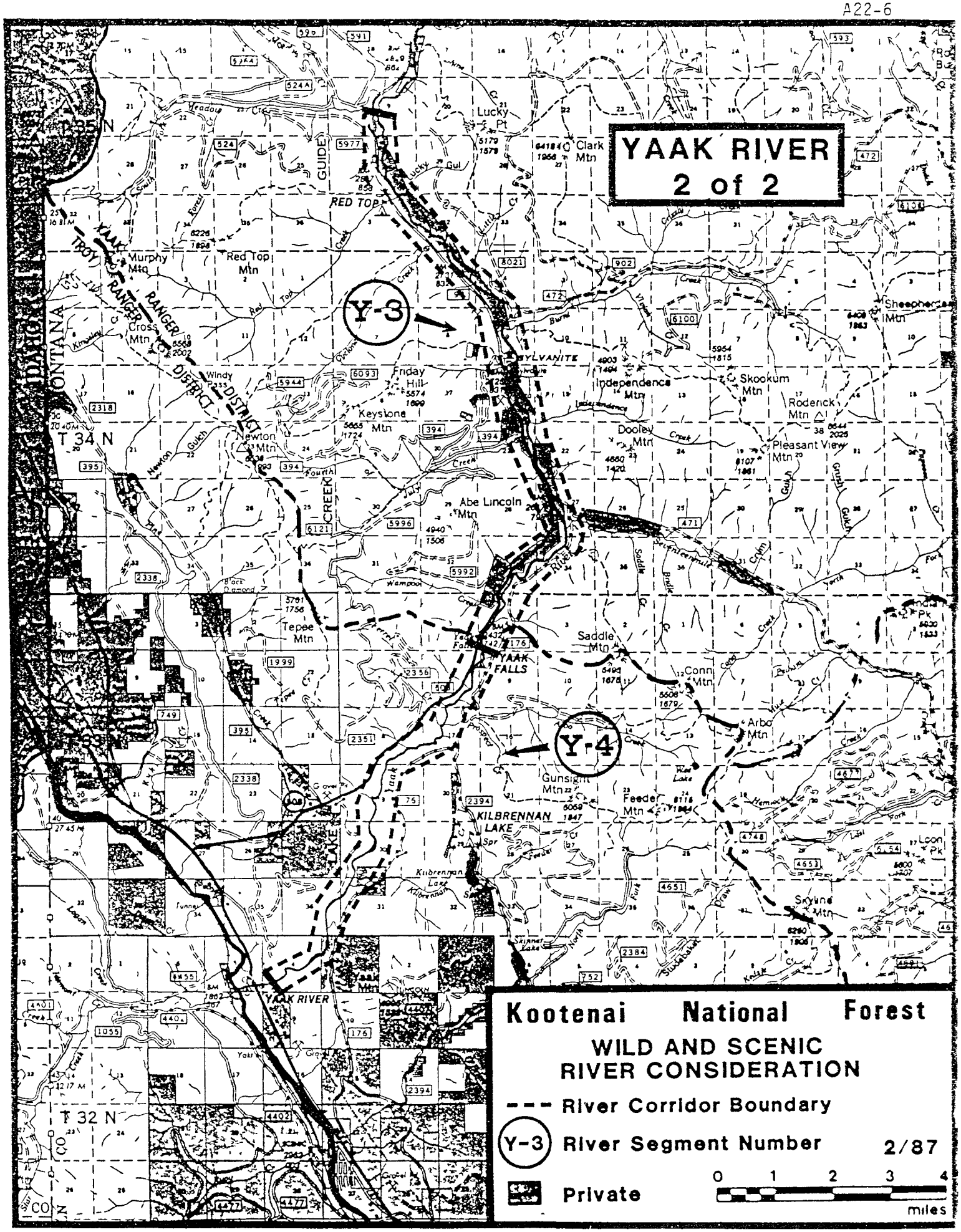
The Forest Plan has land designations within the identified river corridor that will protect the Yaak River qualities for future consideration as a potential addition to the Wild and Scenic River System. Management Direction is included within the Recreation Standards in Chapter II which provides the necessary interim protection of river values.

Table III-13

YAAK RIVER SYSTEM

	River Segments				
	1	2	3	4	
	E. & W. Fork to Pete Cr. (Recr.)	Pete Cr. to Mdw. Creek (Recr.)	Mdw. Cr. to Yaak Falls (Recr.)	Yk. Falls to BPA Trans.Line (Wild)	River Corridor Totals
River Miles					
on Private land:	12.6	2.3	4.2	0.2	19.3
(% Priv.)	75	24	36	3	43
on National Forest:	4.1	7.1	7.4	7.5	26.1
(% KNF)	25	76	64	97	57
Total Miles in Segment:	16.7	9.4	11.6	7.7	45.4
(% of Total River	37	21	26	17	100
Landownership (acres)					
on Private land:	3,860	350	1,320	180	5,710
(% Priv.)	67	10	32	7	36
on National Forest:	1,870	3,200	2,830	2,420	10,320
(% KNF)	33	90	68	93	64
Total Acres in Segment:	5,730	3,550	4,150	2,600	16,030
(% of Total Acres)	36	22	26	16	100
Road Miles					
on Private land:	12.3	1.0	7.7	0.0	21.0
(% Priv.)	69	6	38	0	33
on National Forest:	5.6	15.9	12.7	7.8	42.0
(% KNF)	31	94	62	100	67
Total Road Miles in Segment:	17.9	16.9	20.4	7.8	63.0
(% of Total Road Miles)	28	27	32	12	100


YAAK RIVER
1 of 2
34 W.
R 33 W.
R 32 W.
Cooney Pk
Dusty Pk
Mt Obermayer
Marmot Mtn
Pete Creek Meadows
Mushroom Mtn
Black Top
Garver Mtn
Zimmerman Hill
Y-1
Hensley Hill
PURCELL
MERIDIAN
Mt Baldy
WHITETAIL CREEK
PETE CREEK
Yaak
Roderick Butte
Beetle Hill
Y-2
Lucky Pt
Clark Mtn
Grizzly Pk
GUIDE
RED TOP
SYLVANITE
Friday Hill
Keystone
Independence Mtn
Kootenai National Forest
WILD AND SCENIC RIVER CONSIDERATION
River Corridor Boundary
Y-1 River Segment Number
Private
2/87
0 1 2 3 4
miles


YAAK RIVER
2 of 2
Kootenai National Forest
WILD AND SCENIC
RIVER CONSIDERATION
River Corridor Boundary
Y-3 River Segment Number
Private
2/87
0 1 2 3 4
miles
Y-3
Y-4
T 35 N
T 34 N
T 33 N
T 32 N
IDAHO
MONTANA
TROY RANGER DISTRICT
GUIDE
RED TOP
Lucky Pt
Clark Mtn
Murphy Mtn
Red Top Mtn
Cross Mtn
Windy Mtn
Friday Hill
Keystone Mtn
Newton Mtn
SYLVANITE
Independence Mtn
Skookum Mtn
Roderick Mtn
Sheepherder Mtn
Dooley Mtn
Pleasant View Mtn
Abe Lincoln Mtn
Tepee Mtn
Saddle Mtn
YAAK FALLS
Conn Mtn
Arbo Mtn
Gunsight Mtn
Feeder Mtn
KILBRENNAN LAKE
Skyline Mtn
Loon Pk
YAAK RIVER

KOOTENAI RIVER SYSTEM

Introduction

The Kootenai River drains the northern portion of the Kootenai Forest from Libby Dam downstream to the Montana-Idaho State line. The Kootenai is 47 miles long with 71% of the river mileage in non-National Forest landownership. 18,500 acres are situated within a 1/2 mile-wide corridor including 3,500 acres of water surface. The qualities that contribute to its eligibility are the scenic values along the entire length including Kootenai Falls, the fishery values, as well as the historic and pre-historic values that are related to the early days of northwest exploration and settlement. Natural topographic features along with the landownership pattern readily yield five different segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the Fisher River (3 miles below Libby Dam), downstream for 10 miles to Tub Gulch approximately 4 miles upstream from the town of Libby, Montana. This segment flows through a wide-bottom canyon in a rural setting that is mostly non-National Forest ownership (86%). The historical site of Jennings, Montana and Jennings Rapids are located within the corridor. Also included are State Highway 37, the Burlington Northern Railroad, the W.R. Grace Mine mill and loading facility, the Canoe Gulch Ranger Station and a potential hydro-electric site (Libby Re-Regulating Dam).

Segment 2 - Recreation river potential for 10 miles from Tub Gulch to Quartz Creek. This segment flows through a wider valley-setting that is more developed than Segment 1 although open hayfields border the river in many places. Landownership is primarily non-National Forest (81%). A portion of the town of Libby, Montana, a major portion of State Highway 37, 4 miles of U.S. Highway 2, and the Burlington Northern Railroad are all located within the corridor.

Segment 3 - Recreation river potential for 8 miles from Quartz Creek to Surprise Gulch, 2 miles below Kootenai Falls. This segment flows at a faster rate through a forested, narrow, valley-bottom and canyon setting that is primarily National Forest land (63%). China Rapids, Kootenai Falls, the Lions picnic ground and vista point, the historic 'swinging footbridge' as well as the David Thompson portage trail and Kootenai Falls Cultural Resource District are located within the corridor. U.S. Highway 2, the Burlington Northern Railroad, and the Pacificorp electric transmission line are also included as well as the Kootenai Falls hydro-electric site (Northern Lights REA).

Segment 4 - Recreation river potential for 10 miles from Surprise Gulch to a mile below Kootenai Vista Estates. This segment flows through a valley-bottom setting and includes a portion of the town of Troy, Montana, U.S. Highway 2, the Burlington Northern Railroad and a Bonneville Power Administration (BPA) Substation. Landownership is 95% non-National Forest.

Segment 5 - Recreation river potential for 8 miles to the Montana-Idaho State line and the Kootenai Forest boundary. (Another 5 miles of recreation river continues into Idaho with a significant portion of National Forest land located within the Idaho Panhandle National Forest.) This segment flows through a forested, wide canyon-bottom and includes the mouth of the historic Yaak River (which could be a natural continuation under one alternative). Landownership is 84% National Forest land. U.S. Highway 2, and the Burlington Northern Railroad are also located within the corridor.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1, 2, 3, 4 and 5). This would produce a 47-mile Recreation River system with 18,500 acres of land and water surface, of which 33% would be National Forest ownership. The largest amount of private land (12,350 acres) would be affected as well as two towns (Libby and Troy, Montana) and two potential hydro-electric sites (Libby Re-reg. and Kootenai Falls).

Alternative B: The lower 2/3 of the Recreation River corridor (river segments 2, 3, 4 and 5). This would produce a 37 mile river system with 14,500 acres of land and water surface, of which 39% would be National Forest land. 8,800 acres of non-national Forest ownership would be affected as well as the two towns of Libby and Troy, Montana, and the Kootenai Falls hydro-electric site.

Alternative C: The lower half of the Recreation River corridor (river segments 3, 4 and 5). This would produce a 26 mile river system with 10,200 acres, of which 47% would be National Forest land. This alternative would effect 5,400 acres of private land including a portion of the town of Troy, Montana, and the Kootenai Falls hydo- electric site.

Alternative D: The lower portion of the river corridor (river segment 4 and 5). This would produce a 19-mile Recreation River system that would be 39% National Forest land. 4,200 acres of private land would be affected including a portion of the town of Troy, Montana.

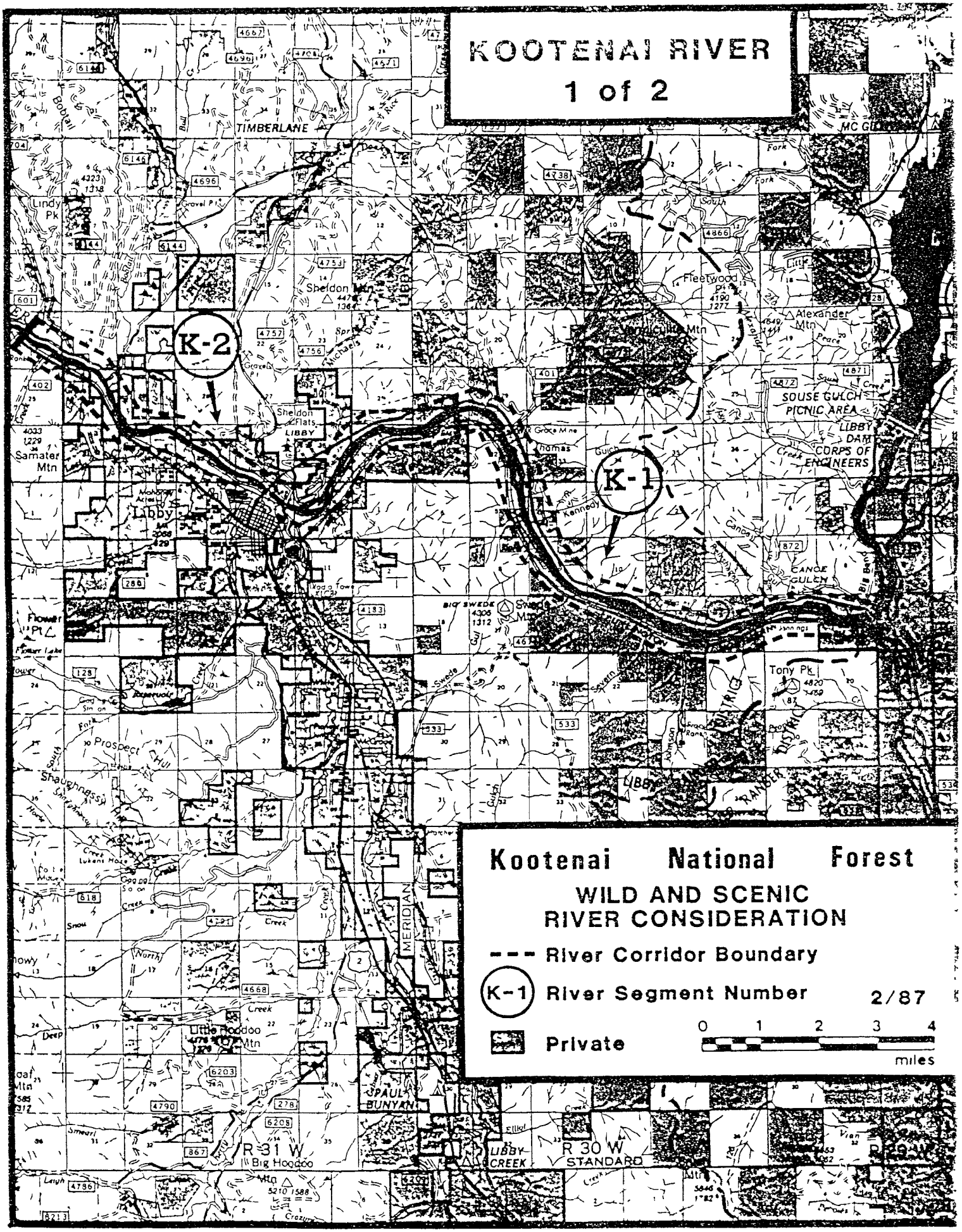
Alternative E: The lowest portion of the river corridor (river segment 5). This would produce an 8-mile Recreation River system that would be 84% National Forest land. This river portion could be joined with the lower portion of the Yaak River as another alternative. See the description of river segment 4 in the writeup on the Yaak River system.

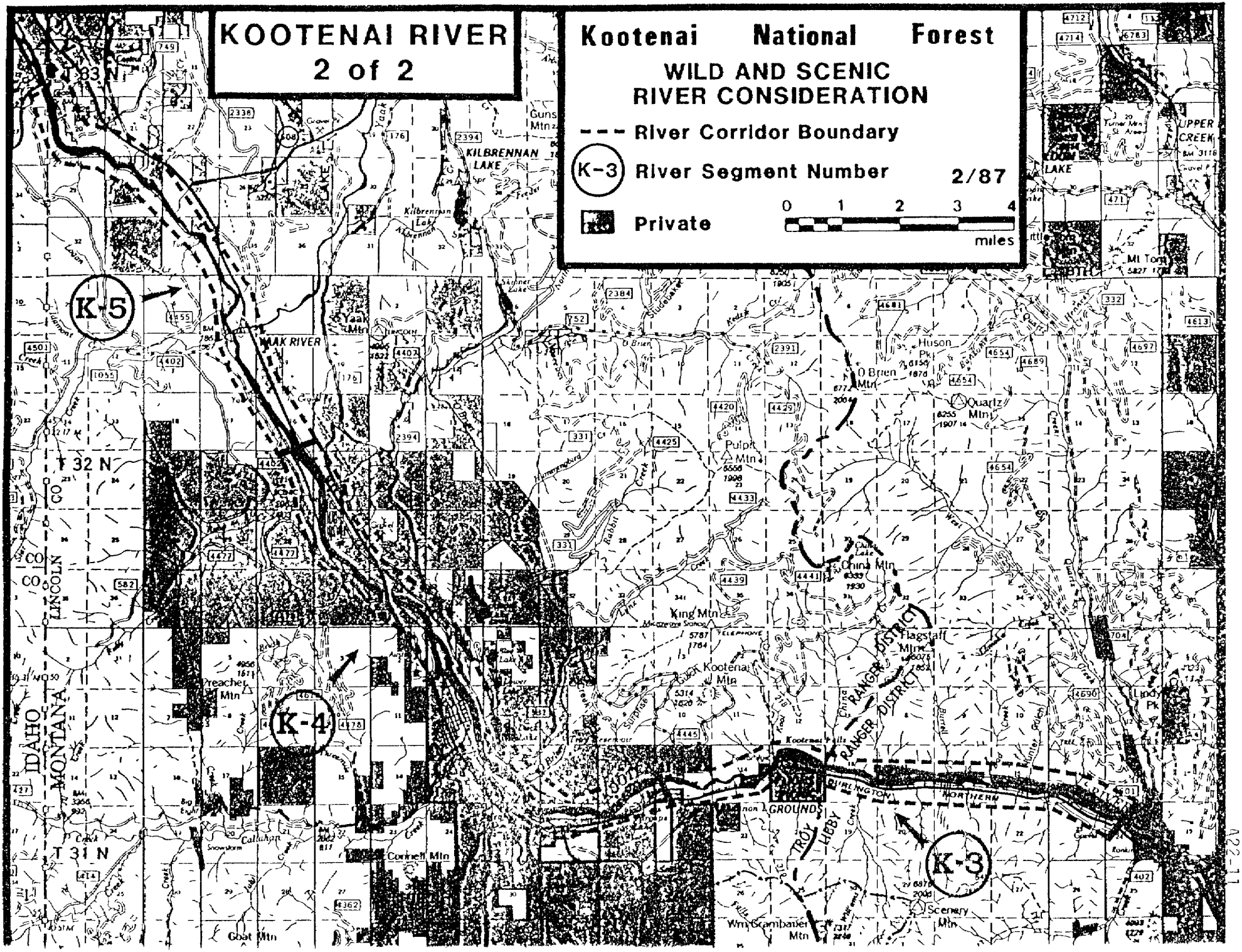
Interim Management Considerations

The Forest Plan has land designations within the identified river corridor that will protect the Kootenai River qualities for future consideration as a potential addition to the Wild and Scenic River System. Management Direction is included within the Recreation Standards in Chapter II which provides the necessary interim protection of river values.

Table III-14 KOOTENAI RIVER SYSTEM

	River Segments					
	1	2	3	4	5	
	Fisher River to Tub Gulch (Recr.)	Tub Gl. to Quartz Cr. (Recr.)	Quartz Cr. to Surpr. Cr (Recr.)	Surpr. Cr to Koot. Vista (Recr.)	Koot. Est. to Vista Idaho Line (Recr.)	River Corridor Totals
River Miles						
on Private land:	7.8	8.4	4.6	9.1	3.2	33.1
(% Priv.)	79	81	60	89	38	71
on National Forest:	2.1	2.0	3.1	1.1	5.3	13.6
(% KNF)	21	19	40	11	62	29
Total Miles in Segment:	9.9	10.4	7.7	10.2	8.5	46.7
(% of Total River	21	22	16	22	18	100
Landownership (acres)						
on Private land:	3,500	3,410	1,230	3,720	490	12,050
(% Priv.)	86	81	37	95	16	67
on National Forest:	580	810	2,090	200	2,510	6,190
(% KNF)	14	19	63	5	84	33
Total Acres in Segment:	4,080	4,220	3,320	3,920	3,000	18,540
(% of Total Acres)	22	23	18	21	16	100
Road Miles						
on Private land:	19.2	19.9	5.7	18.8	2.3	65.9
(% Priv.)	80	86	50	85	26	74
on National Forest:	4.7	3.2	5.7	3.4	6.5	23.5
(% KNF)	20	14	50	15	74	26
Total Road Miles in Seg:	23.9	23.1	11.4	22.2	8.8	89.4
(% of Total Road Miles)	27	26	13	25	109	100


KOOTENAI RIVER
1 of 2
K-2
K-1
TIMBERLANE
Sheldon Mtn
Fleetwood Pt
Alexander Mtn
SOUSE GULCH PICNIC AREA
LIBBY DAM
CORPS OF ENGINEERS
Samater Mtn
Libby
Flower Pt
Prospect Hill
Tony Pk
CANOE GULCH
Little Hoodoo Mtn
PAUL BUNYAN
LIBBY CREEK
R 31 W
R 30 W
STANDARD
Big Hoodoo Mtn
Kootenai National Forest
WILD AND SCENIC
RIVER CONSIDERATION
River Corridor Boundary
River Segment Number
Private
2/87
0 1 2 3 4
miles


KOOTENAI RIVER
2 of 2
Kootenai National Forest
WILD AND SCENIC
RIVER CONSIDERATION
River Corridor Boundary
K-3 River Segment Number
2/87
Private
0 1 2 3 4
miles
K-5
K-4
K-3
T 33 N
T 32 N
T 31 N
IDAHO
MONTANA
LINCOLN CO
KILBRENNAN LAKE
MAK RIVER
Pulpit Mtn
O Brien Mtn
Quartz Mtn
Huson Pk
China Mtn
King Mtn
Kootenai Mtn
Flagstaff Mtn
Preacher Mtn
Connell Mtn
Goat Mtn
Scenery Mtn
Wm Grambauer Mtn
Lindy Pk
Mt Tom
UPPER CREEK
TROY RANGER DISTRICT
LIBBY RANGER DISTRICT
BURLINGTON NORTHERN
GROUNDS

BULL RIVER SYSTEM

Introduction

The Bull River drains the southwestern corner of the Kootenai Forest and merges with the Cabinet Gorge Reservoir 4 miles northwest of the town of Noxon, Montana. The Bull is 21 miles long with 81% of the river mileage in private landownership. 5,850 acres are included within a 1/2 mile-wide corridor with 60% in private ownership. The qualities that contribute to its eligibility are the scenic values along the entire length.

The natural topographic features along with the landownership pattern readily yield two different river segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the North and South Forks, downstream for 12 miles to the junction of the East Fork. The river meanders through the upper Bull river valley which is primarily rural wetlands and important riparian areas. Landownership is 79% private. The Bull River Highway and Cabinet Mountain Vista Point are included within the corridor.

Segment 2 - Recreation river for 9 miles from the junction of the East Fork to the Cabinet Gorge Reservoir. This segment flows at a faster rate through a narrow valley-bottom canyon setting that is 54% National Forest ownership. A major portion of the Bull River Highway and the historical Bull River Guard Station are included within the corridor.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1 and 2). This would produce a 21-mile Recreation River system with 3,500 acres of private land (60%) affected.

Alternative B: The lower portion of the river corridor (river segment 2). This would produce a 9-mile Recreation River system that would be 54% National Forest land and affect the least amount of private land (1,500 acres).

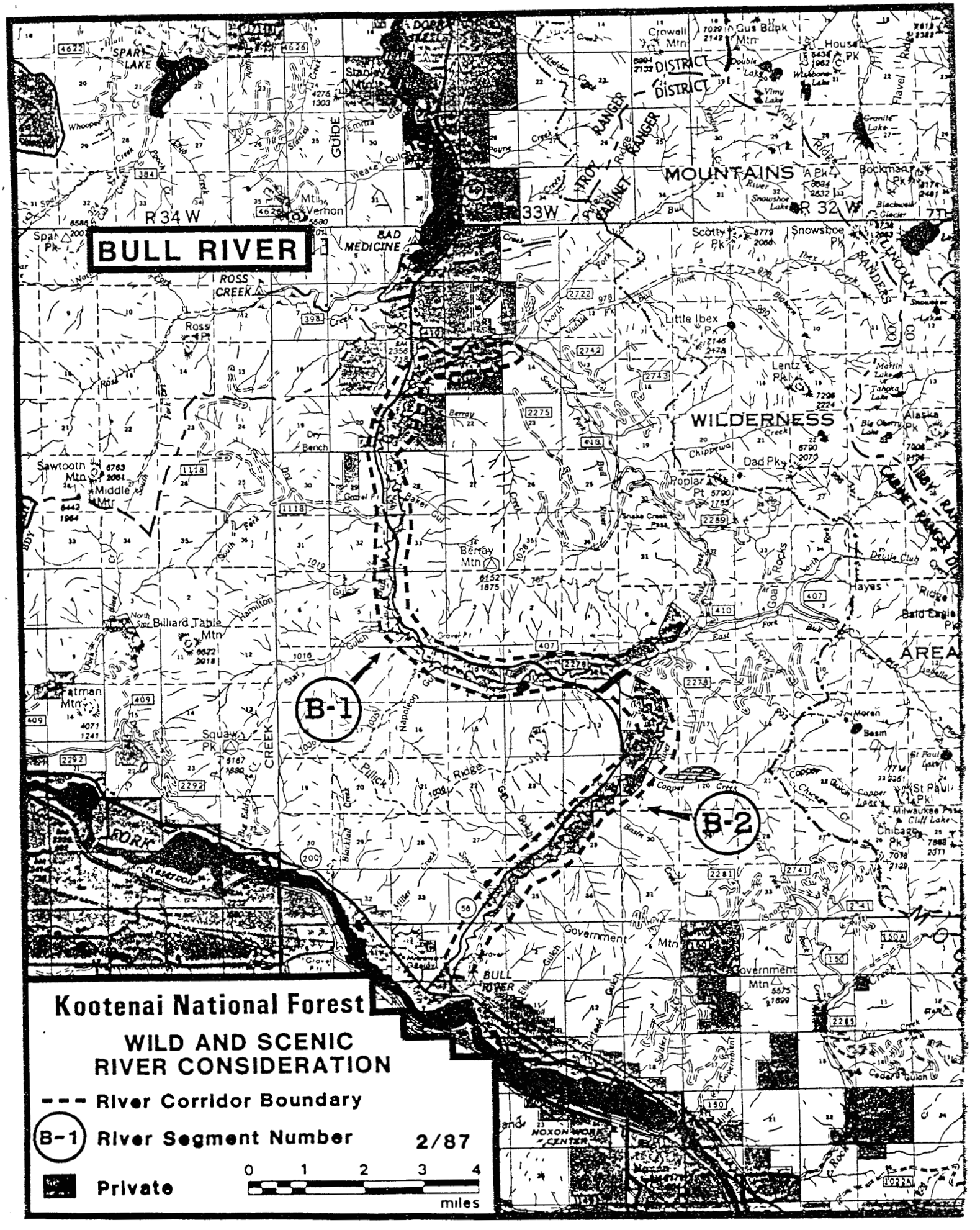
Interim Management Considerations

The Forest Plan has land designations within the identified river corridor that will protect the Bull River qualities for future consideration as a potential addition to the Wild and Scenic River System. Management Direction is included within the Recreation Standards in Chapter II which provides the necessary interim protection of river values.

Table III-15

BULL RIVER SYSTEM

	River Segments 1 N. & S. Fork to East Fk. (Recr.)	2 East Fk. to Cab. Gorge Res. (Recr)	River Corridor Totals
River Miles			
on Private land:	11.1	6.0	17.1
(% Priv.)	90	69	81
on National Forest:	1.3	2.7	4.0
(% KNF)	10	31	19
Total Miles in Segment	12.4	8.7	21.1
(% of Total River	59	41	100
Landownership (acres)			
on Private land:	2,020	1,500	3,520
(% Priv.)	79	46	60
on National Forest:	550	1,780	2,330
(% KNF)	21	54	40
Total Acres in Segment:	2,570	3,280	5,850
(% of Total Acres)	44	56	100
Road Miles			
on Private land:	7.8	2.0	9.8
(% Priv.)	60	29	50
on National Forest:	5.1	4.8	9.9
(% KNF)	40	71	50
Total Road Miles in Segment:	12.9	6.8	19.7
(% of Total Road Miles)	65	35	100


BULL RIVER
Kootenai National Forest
WILD AND SCENIC
RIVER CONSIDERATION
River Corridor Boundary
B-1 River Segment Number
Private
2/87
0 1 2 3 4
miles
B-1
B-2
R 34 W
R 32 W
33W
MOUNTAINS
WILDERNESS
AREA
BAD MEDICINE
ROSS CREEK
SPARK LAKE
Mtn Vernon
Berray Mtn
Billiard Table Mtn
Squaw Pk
Government Mtn
Little Ibex Pk
Lentz Pk
Dad Pk
Poplar Pt
Scotty Pk
Snowshoe Pk
Sawtooth Mtn
Middle Mtn
Crowell Mtn
Gus Bldg Mtn
Stanley Mtn
Bockman Pk
Alaska Pk
Chicago Pk
St Paul Pk
Hayes
Moren
Basin
Dry Bench
Coal Rocks
Devils Club
Napoleon
Pullick Ridge
Copper Creek
Cedars Gulch
NOXON WORK CENTER
BULL RIVER
FORK
Reservoir
GUIDE
TROY RANGER DISTRICT
CABINET RANGER DISTRICT
LINCOLN
RANDERS
LIBBY RANGER DISTRICT

VERMILION RIVER SYSTEM

Introduction

The Vermilion River drains a southern portion of the Kootenai Forest and merges with the Noxon Reservoir 3 miles southeast from the town of Trout Creek, Montana. The Vermilion is 12 miles long with 85% of the river mileage in National Forest ownership. 4,150 acres are included within a 1/2 mile-wide corridor with 87% in National Forest ownership. The qualities that contribute to its eligibility are the scenic values along the entire length, including Vermilion Falls, as well as the historical values that are related to the gold-mining days.

The natural topographic features along with the landownership pattern readily yield a continuous Recreation river segment from the junction of Willow Creek, downstream to Noxon Reservoir. The river cascades over the Vermilion Falls located near the upper end of the river segment, and down through a narrow, timber-covered canyon. The seasonal, unpaved Vermilion River road parallels the river for the entire length within the study corridor. 530 acres of private land would be effected.

Alternatives for Future Study

It appears that the entire 12-mile segment can be analyzed in its entirety because of the short length.

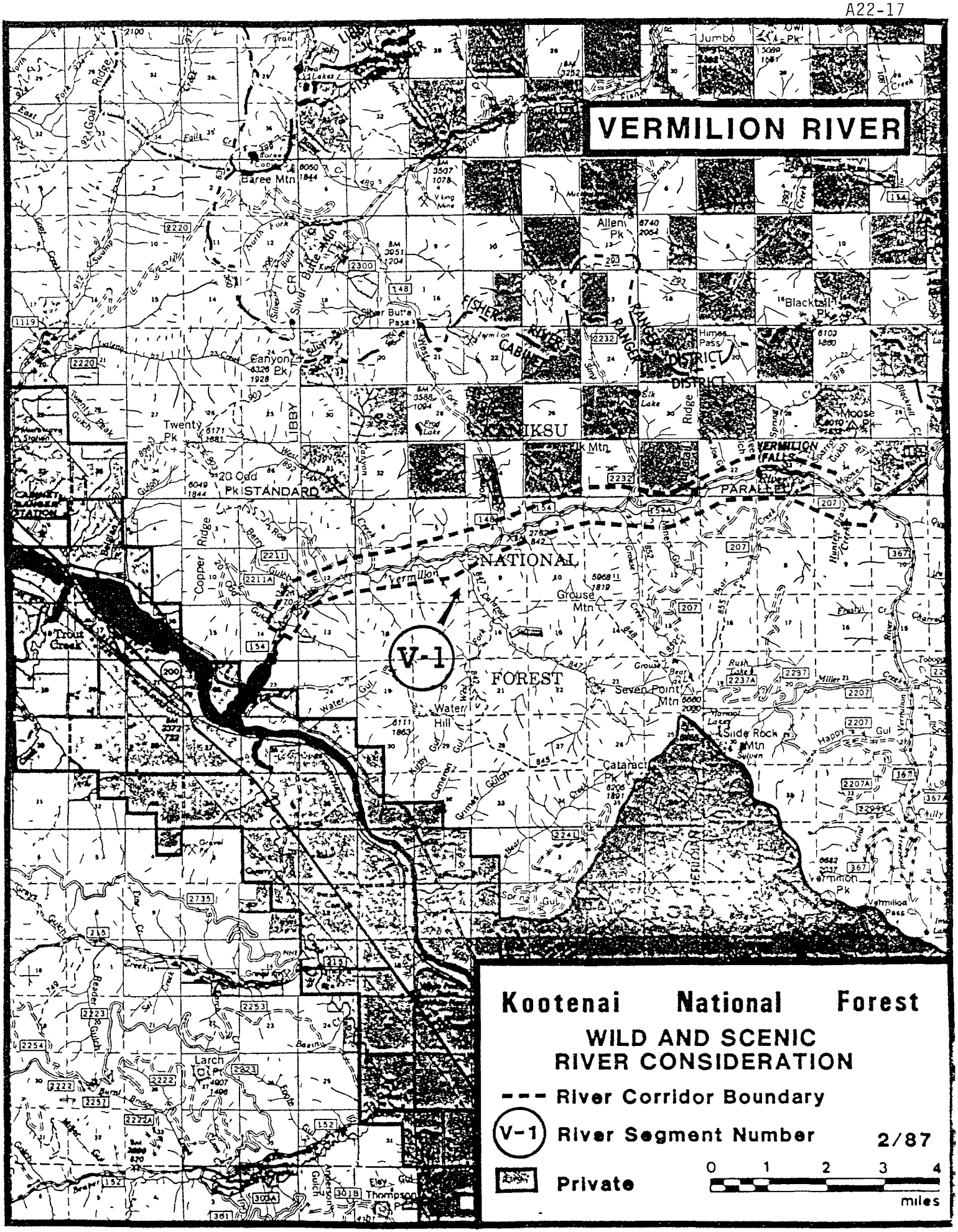
Interim Management Considerations

The Forest Plan has land designations within the identified river corridor that will protect the Vermilion River qualities for future consideration as a potential addition to the Wild and Scenic River System. Management Direction is included in the Recreation Standards in Chapter II which provides the necessary interim protection of river values.

Table III-16

VERMILION RIVER SYSTEM

Item	River Segment 1 Willow Cr. to Noxon Reservoir (Recr.)	River Corridor Totals
River Miles		
on Private land:	1.8	1.8
(% Priv.)	15%	15%
on National Forest:	9.9	9.9
(% KNF)	85%	85%
Total Miles in Segment:	11.7	11.7
(% of Total River)	100%	100%
Landownership (acres)		
on Private land:	530	530
(% Priv,)	13%	13%
on National Forest:	3,620	3,620
(% KNF)	87%	87%
Total Acres in Segment:	4,150	4,150
(% of Total Acres)	100%	100%
Road Miles		
on Private land:	2.4	2.4
(% Priv.)	17%	17%
on National Forest:	11.9	11.9
(% KNF)	83%	83%
Total Rd. Miles in Seg.	14.3	14.3
(% of Total Road Miles)	100%	100%


VERMILION RIVER
Kootenai National Forest
WILD AND SCENIC
RIVER CONSIDERATION
River Corridor Boundary
V-1
River Segment Number
2/87
Private
0 1 2 3 4
miles
V-1
Baree Mtn
Allen Pk
Blacktail Pk
Canyon Pk
Twenty Pk
Moose Pk
Elk Mtn
Grouse Mtn
Seven Point Mtn
Water Hill
Slide Rock Mtn
Cataract Pk
Vermilion Pk
Larch Pk
Thompson Pk
Trout Creek
Jumbo
Silver Butte Pass
Himes Pass
Vermilion Falls
Vermilion Pass
Copper Ridge
Goat Ridge
Reader Gulch
Standard
Parallel
National
Forest
Fisher River
Cabinet
Ranger District
Kaniksu
Libby
Cabinet Ranger Station

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWENTY THREE

WILDERNESS MANAGEMENT ACTION PLAN

Appendix 23

CABINET MOUNTAIN WILDERNESS ACTION PLAN

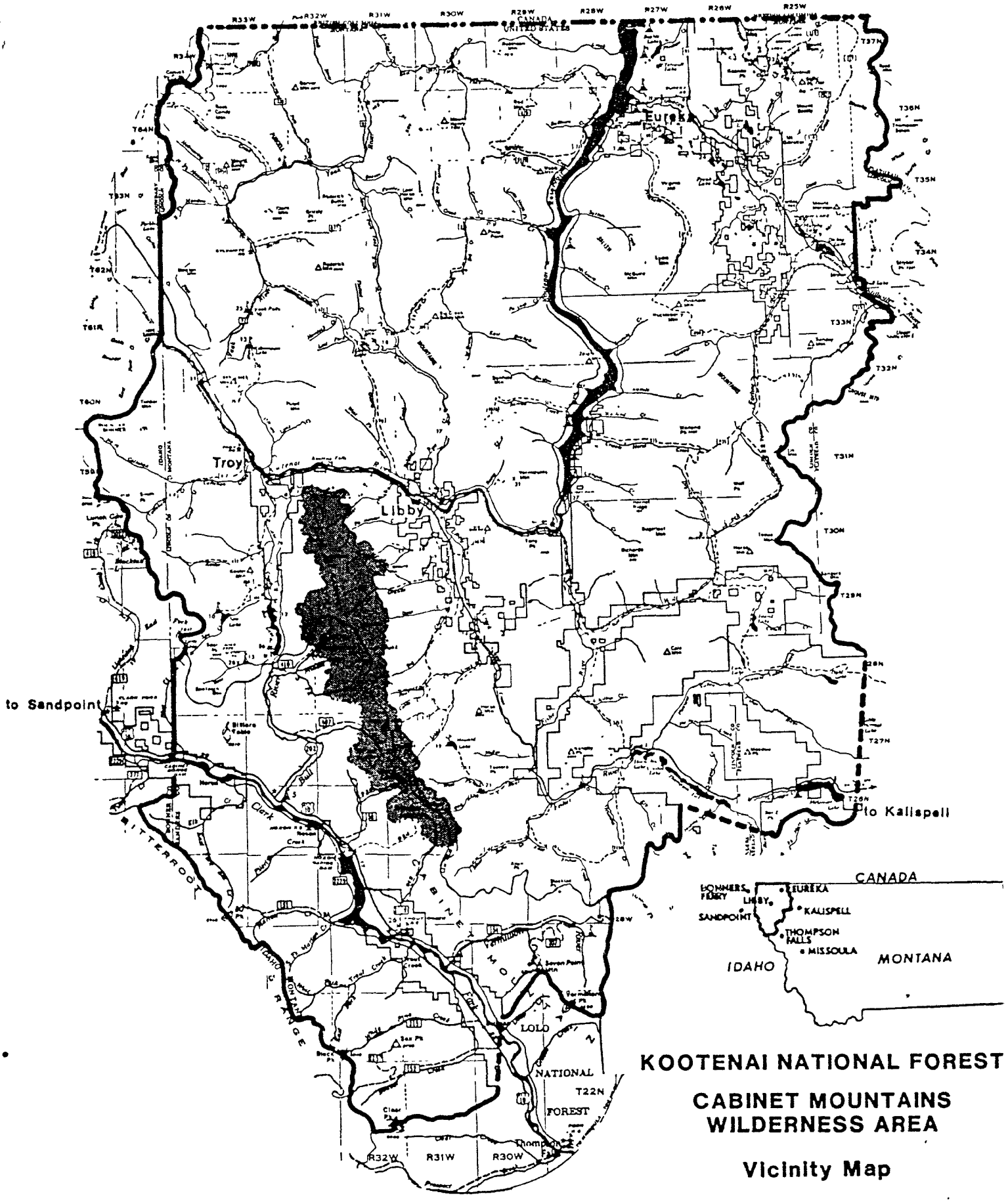
Kootenai National Forest

GOAL STATEMENT

The Cabinet Mountains Wilderness will be managed under the Wilderness Act to minimize the impact of man and his technology upon the wilderness resource. In this area, man will be a temporary visitor who leaves no permanent imprint of his visit. The forces of nature will dominate the landscape and evidence of man's activity will be substantially unnoticeable. Man cannot improve the wilderness resource and manipulation of the flora, fauna, or land surface will be allowed only to the extent necessary to meet provisions of the Wilderness Act.

Management will seek to preserve as much freedom from regulation as possible while preserving the wilderness resource. Management will also seek to minimize the impact of use rather than limit use.

The Wilderness will be managed to provide opportunities for scenic, scientific, educational, conservation and historical purposes. Additionally, opportunities for recreation of a primitive nature featuring solitude, physical and mental challenge, and freedom from unnatural intrusions will be provided. Wilderness offers the chance to experience unmodified ecosystems and to travel without mechanized vehicles in an environment where one's success or failure is directly dependent upon one's ability, knowledge, and initiative. Management of the Cabinet Mountains Wilderness shall preserve for future generations an enduring wilderness resource.



KOOTENAI NATIONAL FOREST

CABINET MOUNTAINS WILDERNESS AREA

Vicinity Map

TABLE OF CONTENTS

INTRODUCTION

The Cabinet Mountains Wilderness is a 94,360 acre unit of the National Wilderness Preservation System. The management of this northwest Montana wilderness is shared by three Ranger Districts of the Kootenai and Kaniksu National Forests. Detailed information about this area is included in Appendix A. There, a reader will find information about geography, ecology, history, current use, and management.

This plan sets a framework for present and future management of the Cabinet Mountains Wilderness. It initiates a process whereby wilderness conditions are identified that are judged acceptable, then prescribes actions to protect or achieve those conditions in a recreation setting. The process includes the development of measurable objectives related directly to the area.

Currently, the desired standards are described primarily in qualitative terms. Quantitative standards will be established as inventory information is collected and used in identifying acceptable conditions.

Public involvement has been incorporated into the development of this plan. Additional involvement will be solicited when major actions, outside of the scope of this plan, are being considered.

The process follows the conceptual framework listed below.

1. Area Issues and Concerns. This is accomplished in Sections I and II, WILDERNESS OBJECTIVES, and ASSUMPTIONS AND AGENCY CONCERNS.

2. Opportunity Class Identification. Geographic subunits with similar use characteristics are identified in Section III, MANAGEMENT DIRECTION.

3. Desired Conditions. Criteria are defined for the desired social, biological and managerial components of the environment by opportunity class. Quantifiable factors are identified where possible (Section III).

4. Condition Inventory. Site specific inventories are an integral part of this process. These inventories monitor changes in the physical condition of high-use zones in the wilderness. When sites reach a particular level of impacts as identified during the inventory process, then certain management actions, as defined in Section III, will be taken to counter further degradation.

5. Condition Standards. As the inventory process continues, existing qualitative standards will be replaced by quantitative standards for each opportunity class. These standards will define the desired physical condition in measurable terms.

6. Opportunity Class Designation. The process provides for the allocation of areas to opportunity classes, thereby determining what resource and social conditions are to be maintained or achieved. Two opportunity classes were identified based upon current resource situations and recreation use patterns.

7. Implementation and Evaluation. The final steps of the process are the implementation of recommended actions and the evaluation of the effectiveness of those actions. Wilderness managers on each District will implement the ACTION PLAN (Section IV) and Wilderness Information and Education Plan (Appendix G).

I. WILDERNESS OBJECTIVES

A. National Wilderness Preservation System Objectives

Excerpts from the Wilderness Act of September 3, 1964:

"Sec. 2(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. ...and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, and preservation of the wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness..."

"Sec. 2(c) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain, ... retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; has outstanding opportunities for solitude or a primitive and unconfined type of recreation; and may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

B. USDA Regulations

Excerpts from 36 Code of Federal Regulations 293.2:

"National Forest Wilderness shall be so administered as to meet the public purposes of recreational, scenic, scientific, educational, conservation, and historical uses; and it shall also be administered for such other purposes for which it may have been established in such a manner as to preserve and protect its wilderness character. In carrying out such purposes, National Forest Wilderness resources shall be managed to promote, perpetuate, and, where necessary, restore the wilderness character of the land and its specific values of solitude, physical and mental challenge, scientific study, inspiration, and primitive recreation. To that end:

(a) Natural ecological succession will be allowed to operate freely to the extent feasible.

(b) Wilderness will be made available for human use to the optimum extent consistent with the maintenance of primitive conditions..."

C. Forest Service Objectives

Excerpts from USFS Manual Chapter 2320:

"One of the characteristics inherent in the wilderness resource as defined by the Wilderness Act, is that it must offer outstanding opportunities for solitude or a primitive and unconfined type of recreation. The presence of large numbers of people in any area even though they may cause little or no damage to the soil, vegetation, water, or wildlife, erode and may eventually remove the wilderness resource from the land. Thus, the capacity of the wilderness to be used and enjoyed, yet preserved for future generations, is twofold: social, or anthropocentric, and ecological, or biocentric."

"The wilderness resource must also be protected so that the evidence of man's work is substantially unnoticeable. The Forest Service has accepted minimum-standard trails and some other improvements as being necessary to manage the wilderness resource. Complete justification will be required for retaining or constructing developments in wilderness..."

"Economy, convenience, commercial value, and comfort are not touchstones of administration or use of wilderness. In wilderness, a tree loses its commercial value; the livestock range cannot be manipulated, or utilized to the same degree as elsewhere; visitors must forego the security and creature comforts found in sites highly developed for their use; natural phenomena are less constrained."

"Public use for recreation purposes is usually one of the greatest demands placed on wilderness. The Wilderness Act makes it clear, however, that such recreation is but one of the purposes of the National Wilderness Preservation System. There are places within wilderness where unique values may dictate that recreation activities must be restricted or entirely excluded. The recreation-use capacity, a combination of the social and ecological elements, must also be given due consideration in determining how much public use is allowed. Public use will be administered to ensure that the wilderness resource is maintained."

"The wilderness resource is dominant in all management decisions where a choice must be made between wilderness values and visitor or any other activities."

The direction that follows will provide guidance to achieve a blend of the social, biological and managerial components within the confines of the above wilderness objectives.

II. ASSUMPTIONS AND AGENCY CONCERNS

This section will review the present status of the Cabinet Mountains Wilderness and predict trends in various categories. The concern generated by the agency based on that information follows each section. These concerns will be addressed throughout the document. Detailed information on this Wilderness and its use is found in Appendix A.

A. External Activities

RESOURCE MANAGEMENT ACTIVITIES:
Continued development and modification of lands just outside this narrow Wilderness may have an effect on the wilderness experience of visitors. Timber harvest, road construction, mining, and other private developments will increase the frequency of the sights and sounds of people. Management actions outside the Wilderness boundary will follow direction of the Forest Plan.

As most public lands outside the Wilderness are further developed, the value of untrammeled land becomes greater to visitors looking for wildland recreation experiences. This will contribute to greater numbers of wilderness visitors.

CONCERN: **How will the Forest Service consider the affect of outside management activities on wilderness users?**

CONCERN: **What measures can be taken to regulate non-essential overflights of the wilderness to limit disturbance?**

CONCERN: **How will air quality within the wilderness be protected?**

B. Recreation Use

USE/EXPERIENCE:
Research figures indicate that wilderness recreation use is stabilizing. However, use is concentrated during summer weekends and holidays in areas with popular attractions. Weekday trips in areas without popular attractions or off-season use continues to provide quality experiences.

Outside the Wilderness, development will continue. This development will further the sensation of the wilderness visit being an "island" experience.

While most of the current use in the Cabinets is by area residents, there continues to be an increase in visitors from outside the local area as more people discover this Wilderness. The Cabinets will probably continue to be used primarily as a "weekend retreat" by most visitors.

CONCERN: **How can the Forest Service maintain or enhance opportunities for solitude?**

COMMERCIAL USE:
Interest in commercial use of wilderness lands by outfitters will continue, often in areas of relatively heavy public use.

CONCERN: How will wilderness values be considered in the development of Kootenai National Forest Outfitter/Guide Policy?

C. Resource Protection

RECREATION IMPACTS:
Without proper and timely management, visitors and stock will mean continued loss of vegetation and compaction of soil in areas of concentrated use, and loss of water quality in some local situations. This will be evidenced by incremental enlargements of disturbed sites and creation of new sites. A return to pristine conditions would require long-term exclusion of recreation use. This is not reasonable nor the intent of this plan.

Stock use is expected to remain comparatively light because the Wilderness is easily accessed by many short trails, and cross-country travel is difficult.

It is assumed that there will continue to be insensitive acts disrupting natural ecosystems unless a greater proportion of the visitors arrive educated in the meaning of wilderness and the wilderness experience.

CONCERN: What actions should be taken by the Forest Service to manage use to protect resources?

CONCERN: How should the Forest Service ensure the water quality of lakes and streams?

CONCERN: How can visual quality be restored at degraded campsites?

As long as there is a fishery in Wilderness lakes, there will be a significant number of visitors attracted to confined areas along the shores of these lakes. Fish stocking will continue under the 1979 Memorandum of Understanding (MOU) between the Forest Service and the Montana Department of Fish, Wildlife and Parks (MDFWP) (Appendix D).

CONCERN: How should concentrated use around lake shores be managed to preserve the wilderness resource?

DEVELOPMENTS (Evidence of management activities):
Currently nine lakes are being stocked at four to five year intervals via helicopter. Some lakes will lose their fish population periodically due to freezing. Other lakes will continue to sustain fish populations indefinitely where spawning conditions are favorable.

CONCERN: What opportunities exist to work with the Montana Dept. of Fish, Wildlife, and Parks to manage the fish stocking program to preserve the wilderness environment?

WILDLIFE:
The Wilderness provides a wide range of relatively undisturbed habitats for fish and wildlife species. Wildlife species which use the Wilderness for all or a portion of the year include elk, deer, bighorn sheep, mountain goats, black and grizzly bears, mountain lions, and a host of small game and non-game species. Fish species include westslope and yellowstone cutthroat trout, rainbow trout, bull trout, and brook trout.

The majority of the Wilderness provides high elevation summer range for big game species, but the high basins and slopes also provide good winter denning habitat for grizzly bears. Steep, rocky, south facing slopes provide winter habitat for mountain goats and some bighorn sheep. Timbered drainage bottoms provide year round habitat for a myriad of species.

Use of trails and other areas within Opportunity Class II may reduce habitat effectiveness, particularly where human use is heavy. Such use is felt to have a limited effect on wildlife populations at present. However, continued human activity in the Wilderness may impact animal populations such as mountain goats. Such populations should be monitored along with visitor use to determine if management actions are needed to avoid impacting these populations.

CONCERN: **How will management actions be responsive to species sensitive to recreational use?**

THREATENED AND ENDANGERED SPECIES (T & E):
Grizzly bears are the only known threatened or endangered species within the Cabinet Wilderness. The Cabinet Wilderness is identified as Situation 1 Grizzly Bear Habitat. The proposed Kootenai National Forest Plan is structured to increase the number of grizzly bears to a recovered population. Greater numbers of grizzly bears, achieved by the recovery plan, and greater numbers of wilderness users will increase the probability of grizzly/human encounters. Encounters with people and their food, garbage, or livestock are the primary cause of grizzly bear mortality.

CONCERN: **What management actions would protect habitat effectiveness and limit grizzly/human conflicts?**

CULTURAL RESOURCES:
It is likely that prehistoric sites exist within the wilderness. When such sites are discovered, they will be inventoried and their significance determined. As historic cultural resources are found, their significance will also be evaluated. Direction to remove all facilities and the existence of culturally significant structures may be in conflict. See Appendix A.

CONCERN: **Will measures taken to preserve/mitigate cultural resources be compatible with other wilderness management objectives?**

D. Access

EXTERIOR ACCESS:
Trailheads and access points are abundant and significant changes in location and quantity are not expected. There are no standards regarding levels of development and types of facilities at trailheads.

CONCERN: How can access management be used to affect positive change within the wilderness?

TRAILS:
Trails and travelways concentrate use. Poor location of some trail segments has made maintenance difficult. Years of use has caused some trails to suffer significant physical degradation.

CONCERN: How can trails be managed to protect surface resources and provide an aesthetic experience for users?

E. Fire, Insect, and Disease

Fires will continue to occur at low frequencies within the Wilderness boundaries. Response will be guided by the Fire Action Plan.

Local outbreaks of insect and disease infestations can be expected in the Wilderness. However, environmental conditions do not appear conducive to epidemics. Control activities will be discouraged since insect and disease activity is natural to the ecosystem.

CONCERN: How will the objectives of Fire Management be coordinated with the goals of wilderness management?

F. Minerals

Effective January 1, 1984, under provisions of Section 4(d)(3) of the Wilderness Act of 1964, the Cabinet Mountains Wilderness was withdrawn from all forms of appropriation under the mining and mineral leasing laws, subject to valid existing rights. Nearly 900 mining claims were staked within the Wilderness prior to January 1, 1984. No mineral leases have been issued for the Wilderness.

The Forest Service is presently examining Wilderness mining claims to determine which claims had established valid rights prior to the withdrawal date. Thus far, approximately 350 mining claims have been examined of which 105 claims have been determined to be valid. Development on these claims has been proposed by ASARCO, Inc. and U.S. Borax and Chemical Corporation (Pacific Coast Mining).

Section 4(d)(2) of the Wilderness Act allows for mineral-related activities outside of valid mining claims providing such activity is compatible with the preservation of the wilderness environment. Mineral-related activities under Section 4(d)(2) might be expected in conjunction with development of valid mining claims.

Because of the scope, magnitude, and many uncertainties related to the potential mineral developments, project specific analysis will be required to evaluate and determine the effects such activities will have on the Wilderness and other resources. This action plan, therefore, will not address the mineral-wilderness issue.

III. MANAGEMENT DIRECTION

A. General Direction

General direction for the management of the Cabinet Mountains Wilderness is found in the proposed Kootenai National Forest Plan. Wilderness is included in Management Area 7 of the prescription portion of the Forest Plan (Chapter III). Additions to this Wilderness, if designated by Congress, will be addressed by an addendum to this plan.

Response to the concerns identified in Section II, ASSUMPTIONS AND AGENCY CONCERNS will be of a general nature when the entire Wilderness is potentially affected. Following is the general direction applicable to the Wilderness as a whole.

1. External Activities

RESOURCE MANAGEMENT:
During proposed project analysis, the potential impacts on the wilderness resource will be assessed where appropriate. The project leader will be responsible to see that direction and management actions set forth in this plan, and the Kootenai Forest Plan, are integrated into the project proposal.

AIRCRAFT OVERFLIGHTS:
Make an effort to minimize the number of Forest Service authorized flights over the Wilderness. Seek cooperation from all parties, through education, to make an effort to minimize other flights. The Forest Air Officer will be responsible for coordination and communication efforts. Both fixed-wing and helicopter flights are proliferating in wilderness airspace and solitude is suffering. Reconnaissance, radio-tracking, mineral activities and other functions are leading to increased flights.

AIR QUALITY:
External activities within Forest Service control that affect air quality should be scheduled to reduce temporary degradation of the Wilderness airshed. Activities outside of Forest Service responsibility that negatively affect the airshed will be identified to the State Air Quality Control Board.

2. Recreation Use

USE/EXPERIENCE:
One of the more significant factors impacting solitude and physical site features is group size. Large groups tend to expand areas of impacted soil and affected vegetation. Large groups are usually noisier than the same number of people in multiple small groups. Additionally, this Wilderness has very limited opportunities for extended trips, therefore large numbers of packstock should not be needed for supplies.

A Forest Supervisor's Order will establish a maximum group size of eight people. Stock users will also be limited to one and a half head of stock per person up to eight head. A person travelling alone will be allowed to use two head of stock. Use by groups exceeding the stated limits may be authorized in writing by the Libby, Troy, or Cabinet District Rangers.

Many sites, whether day use or overnight, under current horse use practices will not accommodate a large number of stock without significant site damage. At the same time, we have little basis for restricting stock numbers at a specific site, but we recognize that large groups potentially cause more damage. Therefore, based on site damage concerns, the stock limit per party is set at eight to be consistent with the limit on people per party. This limit may be exceeded at the discretion of the ranger by issuing a written permit. Limits on number of people per party and number of stock per party is also based on concerns for social conflicts. Most of the trails in the Wilderness lead to lakes which are destination sites for fishing, camping, and scenic viewing. User numbers tend to rise on weekends, holidays, and during periods of fair weather or good fishing. At times the number of users may exceed wilderness visitor's tolerance for social contact. This is further justification for restricting people and stock numbers per party. When considering issuing permits for larger parties, rangers may consider social impact in relation to weekends, holidays, weather, or other indicators of expected use levels.

This Wilderness encompasses primarily subalpine and alpine habitats. Such habitats are sensitive to disturbance due to short growing seasons, poorly developed soils, and harsh weather. Generally, forage suitable for stock use in these habitats is limited. Therefore, use of supplemental feed for recreational stock will be encouraged through information and education. Special stock holding sites may be designated, and stock would be required to use such sites.

Signs will be used at Wilderness trailheads to inform potential visitors of mineral activity and management fires.

COMMERCIAL USE:
Commercial use within the Wilderness requires a Special Use Permit. Permits will be issued only for day use except for existing approved camps. Each Ranger District has established limits for the maximum number of overnight service days for this Wilderness. Commercial use is subject to all laws, regulations, and direction pertinent to the enterprise and general wilder- ness use. It is recognized that this Wilderness offers some opportunities for Outfitter/Guide services. However, the small size, easy access and high use limits the need.

3. Resource Proctection

DEVELOPMENTS:
Fish stocking is expected to continue in the wilderness in accordance with the Memorandum of Understanding (Appendix D). Emphasis will be placed on coordination with MDFWP concerning the MOU to modify stocking procedures which may negatively effect wilderness resource.

WILDLIFE:
Where recreation use is adversely impacting sensitive wildlife species, management will attempt to modify that use. Education will be used to inform people of potential recreation impacts to wildlife species.

THREATENED AND ENDANGERED SPECIES (T & E):
The entire wilderness is classified as Situation 1 Grizzly Bear Habitat. Generally, no new trails will be constructed. However, trail relocation will be considered to improve habitat effectiveness. Information and education programs will stress avoidance of encounters through proper handling of food, garbage and other attractants. Wilderness managers will ensure that such actions are taken.

CULTURAL RESOURCES:
The Forest Archaeologist will be notified of discoveries of possible cultural resources. Evaluation of significance will be completed prior to modification of sites. Impacts to significant sites will be mitigated.

4. Access

EXTERIOR ACCESS:
Road management decisions will consider impacts to wilderness. Trailheads will be signed (trail name, map, prohibited acts, and resource conditions) and maintained. Wilderness access trails will be closed to motor vehicles at trailheads.

Improved access is not an objective for Opportunity Class I area, without trails. Existing access will not be marked in any way that would lead to increased visitor use. Future access construction will be discouraged.

Improved road access is not an objective for Opportunity Class II area, with trails. This does not preclude standard maintenance to prevent resource degradation. Routes to trailheads will be marked or signed for directional purposes where necessary. There will be no signs which are promotional in nature. Changing access to trailheads may be used to alter undesirable use patterns. Access trails to Opportunity Class I areas will not be maintained.

TRAILS:
The recreation trail system represents the largest impact of man on the wilderness. Trails serve to bring people into the wilderness and concentrate them. This has a profound influence on the social elements of the wilderness experience--particularly solitude. Ideally, the wilderness should offer outstanding opportunities for solitude and unconfined recreation opportunities, but use patterns and topography do not allow for this.

Generally, no new trails will be constructed. Travelways will not be maintained in Opportunity Class I areas (areas without trails). Trails in Opportunity Class II areas (areas with trails) will be maintained to a maximum of Level III (Appendix E). Relocation and reconstruction may occur to protect resources as long as it is compatible with T & E species. Wilderness managers will develop annual schedules of trail maintenance. These actions will ensure that a spectrum of recreation opportunities is provided.

5. Fire

Decision criteria for managing unplanned ignitions should be re-evaluated to determine if wilderness management objectives are being met. The plan's content will reflect current Wilderness fire policy approved in 1985. Wilderness visitors will be advised at trailheads of the existence of management fires within the Wilderness.

6. Management Actions

To determine the type and extent of management actions appropriate for different portions of the Wilderness, two distinct opportunity classes are identified. The opportunity classes are delineated according to the biological, social, and managerial setting. The characteristics of each class are described in terms of the existing resource conditions, accessibility, and potential of encounters with others. Achieving and maintaining desired standards for each of these elements requires a suitable management response. A description of the classes and management direction follow.

The following is a list of potential management actions applicable to each Opportunity Class.

OPPORTUNITY CLASS I (areas without trails)	OPPORTUNITY CLASS II (areas with trails)
Information and Education	Information and Education
Ranger Contacts	Ranger Contacts
Limit Group Size	Limit Group Size
Stock Limit per Group	Stock Limit per Group
Campsite Obliteration	Campsite Restoration/Obliteration
No New Developments without Analysis	Trail Reconstruction*/Relocation*
Facility Removal	Facility Development*/Removal
No Trail Maintenance	Trails Maintained to Maximum Level III
Road Management	Trailhead and Road Management
Bear Country Camping Techniques	Bear Country Camping Techniques
	Open Fire Limitations
	Campsite Closure*
	Overnight/Site Specific Stock Limits*
	Equipment Requirements
	Relocate Outfitter Camps
	Supplemental Feed Requirements

*Actions to be implemented only when resource damage or safety hazard exists.

INFORMATION AND EDUCATION:
The Information and Education Action Plan is found in Appendix B. The Plan will be updated as needed by the Districts.

SAFETY:
Visitors will be self-reliant in the Wilderness. Search and rescue operations will be coordinated with the County Sheriff's Department. Use of motorized equipment in such operations will be in accordance with Forest Service Regional Policy.

VISITOR CONTACT:
Wilderness Rangers will perform the majority of on-the-ground work and visitor contacts.

B. Opportunity Class I Direction (Areas Without Trails)

1. Recreation Use

This Opportunity Class includes pristine areas of the wilderness that are without recreation trails. There may be game trails or other obvious ways or routes which have light use by backpackers but almost no stock use. There are many remote basins and valleys without fishable lakes. Fish stocking to develop a fishery, has been attempted at many lakes in this class without success. The opportunity for solitude is high, and one would not normally expect to see other groups. There is little evidence remaining from recreation use in these areas.

2. Resource Protection

RECREATION IMPACTS:
Normally, evidence of campsites will be obliterated and the site returned to a natural appearance. Campsites may be allowed to remain where repeated use is expected.

DEVELOPMENTS:
Generally, there will be no construction of trails or other facilities within this class. Requests for research or mineral development facilities will be evaluated on a case-by-case basis; permanent facilities are discouraged. Existing travelways will be left in place, but not maintained or marked. Fish stocking does not currently occur and is not desirable within this area. Existing facilities, except significant cultural resources, will be removed.

3. Management Actions

INFORMATION/EDUCATION:
Areas within Class I will not be promoted in maps or wilderness literature. There will be no signs used in these areas other than wilderness boundary markers. Visitors may encounter mining claim corner markers. Education programs speaking to these areas will use a no-trace camping theme.

SAFETY:
Visitors shall be self-reliant in this area. Search and rescue operations will be coordinated with the County Sheriff's Department in emergency situations. Use of motorized equipment in such operations will be in accordance with Forest Service Regional Policy. There will be no developments or signing which would imply agency responsibility for visitor safety.

VISITOR CONTACTS:
Wilderness Rangers will not normally visit these areas except to spot-check for and correct specific problems.

C. Opportunity Class II Direction (Trails and Destination Areas)

This Opportunity Class is a delineation of trail corridors and more heavily used lake basins. Most lakes in this class are stocked with fish and have relatively easy access. These basins are very scenic, wildlife is often seen, and flowering plants are abundant. The lake basins and the trail corridors accessing them total less than 15 percent of the Wilderness acres, but account for most of the recreation use.

Research and observation in the Cabinets lead to this general observation about Cabinet Mountains Wilderness visitors: the majority of people take hikes of short duration, usually on a summer weekend or holiday, and more often than not, fishing is a key activity (See Appendix A).

Hiker use is steadily expanding in terms of geographical dispersion. Use has resulted in creation of new sites, expansion of camp areas, vegetation loss, tree damage, and human waste problems.

Use of stock has traditionally been light and accounts for less than 10 percent of total wilderness use. Stock use can be more evident than hiker use, resulting in soil and vegetation damage near campsites and lake shores, and along trails. At sites where there is a history of horse use, bare compacted soil is expanding, and tree death occurs due to girdling and root exposure.

Easy access and good fishing are important factors in generating use, particularly when combined. Good fishing typically occurs several years after successful stocking. Current fish stocking will continue in some lakes under the terms of the Memorandum of Understanding between the Forest Service and Montana Department of Fish, Wildlife and Parks (Appendix D).

Campsites in Class II have developed from repeated visitor use of the same place, and they occasionally occur in locations which impact both the biological and social environment. A typical lake basin in the Cabinets has three to five recognizable campsites.

Another impact on the quality of a visitor's experience is the loss of solitude suffered from a number of other people being at or near the same place at the same time. Given the enclosed nature of the lake basins in Class II, the long term solution to greater numbers of people impacting each other's visits is to use management techniques that attempt to stabilize the number of visitors. Management will seek to improve the quality of the visit to popular destination areas without using a permit system for all visitors.

1. Recreation Use

USE/EXPERIENCE:
Use of these areas will not be promoted. Management activities which maintain or enhance the wilderness resource, solitude, or primitive forms of recreation will be implemented. A list of appropriate management actions can be found in the preceeding section III.A., General Direction (Page 12). A decision to initiate any of these actions will be based upon a site-specific need.

Lakeshores are particularly sensitive to recreation use. Where sanitation, space limitations and soil erosion indicate, restrictions on overnight use and/or stock use will be implemented.

COMMERCIAL USE:
Commercial use will be managed on a case-by-case basis via the special use permit process. Areas allocated for commercial camping will require precise location and prior approval. Maximum wilderness party size and stock number restrictions, as well as all other regulations, apply to commercial use.

2. Resource Protection

RECREATION IMPACTS:
Use of open fires creates impacts in many ways. It results in blackened rocks, soil sterilization, firewood depletion, and damaged vegetation. Wood suitable for camp and cookfires, which is dead and down, is very finite in the high basins of the Cabinets. At some sites visitors have defaced live trees and snags in their efforts to secure wood. This causes a degradation of the visual quality and the wilderness experience. In certain areas, specified in the action plan, open fires will be prohibited. The use of stoves will be promoted as the alternative.

At Leigh Lake, use patterns are such that overnight camping is no longer appropriate. A Combination of factors such as particularly easy access, limited camping space, and heavy day use occur here. In this area, day use activities will be emphasized and overnight camping will prohibited.

When unnecessary or poorly located sites appear near existing sites, the use of existing sites will be promoted by trailhead signing. Closed sites may be posted if trailhead signing is ineffective.

New sites may be allowed if it can be shown that opportunities for solitude will be improved. New sites will also be used to minimize resource impacts by redirecting use, or to provide an alternative to poorly located sites.

In exceptionally fragile environments and areas of limited space, people and stock use may be restricted.

Individual site inventories will be completed to provide the basis for quantitative standards and ultimately management actions. Typical forms and instructions for their use are found in Appendix F.

DEVELOPMENTS:
Within the Wilderness signing will be used when needed to meet a wilderness objective and not as a convenience to the visitor. Signs that may be permitted include wilderness boundary signs, directional signs at trail junctions, and administrative signs. Internal signing of trail junctions will occur only when maps cannot adequately serve the wilderness user. Trail signs will display the trail name or number, not the destination or distance.

Fish stocking of lakes within this zone will adhere to the Memorandum of Understanding (Appendix D). Annual communication between the agencies is essential to the fulfillment of this agreement.

Wilderness latrines will be acceptable in very few situations, such as where high use in a confined area creates sanitation problems. The assumption is that in certain areas the proliferation of human waste "back in the bushes" may increase faster than natural processes can decompose it. Placement of such facilities would protect wilderness experiences in addition to water quality.

Facilities for stock users may be installed when resource degradation indicates the need and other management actions have proven ineffective.

Generally, facilities will only be constructed as a final alternative to minimize resource damage.

3. Access

TRAILS:
Trail relocation will be allowed when portions of trails are suffering significant resource damage, pose unusual safety hazards, or are impacting habitat effectiveness for grizzly bear. Trails will be maintained to a maximum of Level III (Appendix E).

4. Management Actions

INFORMATION/EDUCATION:
Maps and literature will be informative rather than promotional. The Wilderness Education Action Plan (Appendix B) will be used as a means of informing users of the intent and features of this plan, as well as techniques of low impact camping and the proper use of wilderness. District wilderness managers will accomplish their portion of the Action Plan and update it as needed.

Trailhead signs will be used to implement portions of this plan. General wilderness information will be kept to a minimum to avoid competition with the more pertinent site specific information.

There may be occasions when it is necessary to put discreet messages at sites within the wilderness to redirect or restrict use. These will be used only after trailhead signing has been shown to be ineffective.

SAFETY:
Visitors will be self-reliant in this area. Search and rescue operations will be coordinated with the County Sheriff's Department in emergency situations.

VISITOR CONTACT:
Opportunity Class II areas will be the target of most management visits. Because there are a large number of access points, visitors will encounter management personnel infrequently--primarily in the more heavily-used areas on weekends and holidays. Regulatory information will be clarified for visitors. Serious violations will be referred to Forest law enforcement personnel or local and state agencies.

IV. SITE-SPECIFIC ACTION PLAN

This Action Plan details the actions necessary to fulfill the objectives of the Cabinet Mountains Wilderness Action Plan on a site specific basis. The Action Plan is meant to be dynamic, and will be reviewed and updated periodically as objectives are established.

A. Opportunity Class I: Specific Area Direction

Management Actions: The Forest Service as trail manager does not plan to maintain or sign the following trails:

- Klatawa Lake*
- Mill Creek*
- Williams Creek*
- Libby Creek*
- Ibex Creek
- Engle Lake (alternate route 926)*
- Dad Peak (alternate route 987)

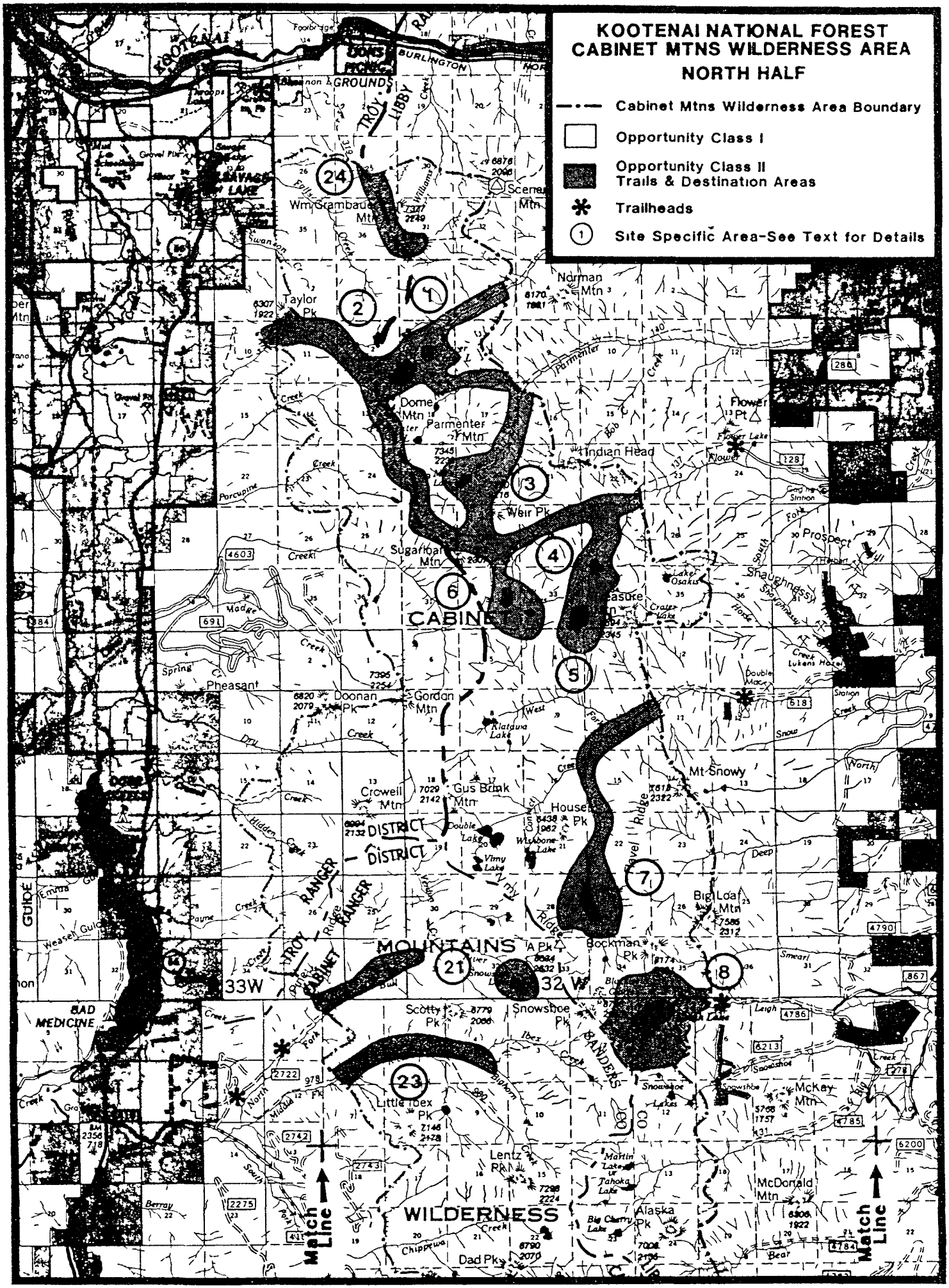
(* indicates trails that are not displayed on the following maps.)

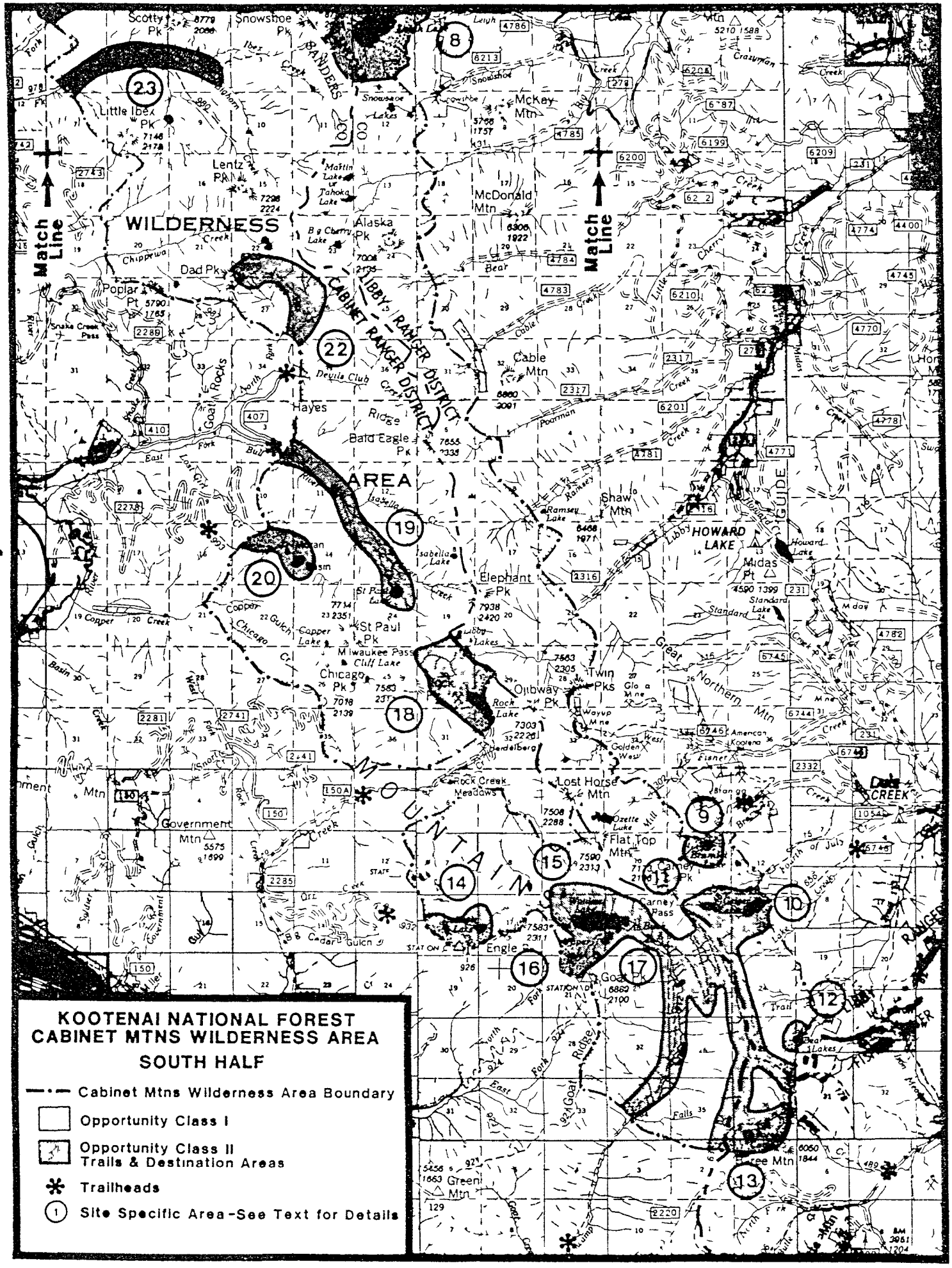
These trails have had little or no recent maintenance and use is very low.

Any work in other locations that may be proposed by volunteer or other groups will be coordinated with the Forest Service.

Coordinate the opportunity for removal of the Bald Eagle Peak snowcourse in Poorman Creek with the Soil Conservation Service.

Maps displaying the Opportunity Areas are on the following 2 pages.


KOOTENAI NATIONAL FOREST
CABINET MTNS WILDERNESS AREA
NORTH HALF
Cabinet Mtns Wilderness Area Boundary
Opportunity Class I
Opportunity Class II
Trails & Destination Areas
Trailheads
Site Specific Area-See Text for Details
Wm Grambauer Mtn
Scenic Mtn
Taylor Pk
Norman Mtn
Dome Mtn
Parmenter Mtn
Indian Head
Flower Pt
Weir Pk
Sugarloaf Mtn
Prospect
Pheasant
Doonan Pk
Gordon Mtn
Mt Snowy
Crowell Mtn
Gus Bank Mtn
Big Loaf Mtn
Bockman Pk
Scotty Pk
Snowshoe Pk
Little Ibex Pk
McKay Mtn
Lentz Pk
McDonald Mtn
Alaska Pk
Dad Pk
CABINET
MOUNTAINS
WILDERNESS
TROY RANGER DISTRICT
BURLINGTON NORTHERN
BAD MEDICINE
Match Line
Match Line



KOOTENAI NATIONAL FOREST
CABINET MTNS WILDERNESS AREA
SOUTH HALF

B. Opportunity Class II: Specific Area Direction

1. LOWER CEDAR LAKE BASIN

Current Situation: The basin is accessed by five miles of mainline trail from a well-signed trailhead. A directional sign to Cedar Lakes is located along U.S. Highway 2. Recreation use is high; day hiking, backpack camping and fishing are primary activities. The fishery is self-sustaining. Five existing campsites are found near the lake. Nearly half the users originate from outside the local area, often in parties exceeding eight people. Stock use is increasing, as the basin is along a popular horse route to Upper Cedar Lake.

Problems:
- Five campsites in close proximity.
- Campsite impacts are moderate and trending toward severe.
- Vegetation loss, bare soil, tree damage.
- Loss of solitude.

Management Actions:
- Obliterate two minimally impacted campsites.
- Restore three moderately impacted campsites.

2. UPPER CEDAR LAKE BASIN

Current Situation: Recreation use of this basin is high with nearly half of the visitors originating from outside the Libby-Troy area. The basin is frequented by large organizational groups and receives the heaviest stock use on the east side of the Cabinets. Backpack camping and fishing dominate activities. The fishery is self-sustaining. Five campsites are found near the lake outlet. The area is one mile above Lower Cedar Lake by mainline trail. The basin is the start of alternative routes to Parmenter Creek, Taylor Peak and the Cabinet Divide.

Problems:
- Campsites are moderately to severely impacted.
- Vegetation loss, bare soil, tree damage, manure accumulation
- Loss of solitude.
- Stock use within high-water mark of lake.

Management Actions:
- Rehabilitate one severely impacted campsite.
- Restore three moderately impacted sites.
- Restrict stock use on one site within high water mark of lake.

3. MINOR LAKE BASIN

Current Situation: Recreation use of this basin is low and originates almost totally from the local area. The basin is accessed by 8 miles of mainline trail from a poorly known trailhead located on the residential fringe of Libby. Backpack camping and fishing are prime activities, and stock use is infrequent. Flower and Cedar Creeks are accessible by trail from this basin. The fishery is self-sustaining. 3 campsites are located in close proximity to the lake outlet.

Problems:
- Vegetation loss, bare soil and tree damage.
- Lakeshore campsite is severely impacted

Management Actions:
Rehabilitate one severely impacted campsite.
Restore one moderately impacted campsite.

4. LOWER HANGING VALLEY BASIN

Current Situation: The basin is accessed by four miles of trail of which the last mile and a half is a very steep marked route. The trailhead and access route to it are well signed. Recreation use is high. Day use hiking and fishing dominate, and stock use is not possible. The fishery is self-sustaining. Three campsites are located near the lake outlet. The basin contributes to the Libby municipal water supply.

Problems:
- Campsites moderately impacted.
- Vegetation loss, bare soil and tree damage.
- Unsightly marking of route.

Management Actions:
- Obliterate one minimally impacted campsite.
- Restore two moderately impacted campsites.
- Trail access will continue as a marked route and not be improved.
- Painted route markers will be disposed of.

5. UPPER HANGING VALLEY BASIN

Current Situation: Recreation use of this basin is high and dominated by backpack camping and fishing. The basin is one mile by easy trail from Lower Hanging Valley. The fishery is self-sustaining. Four campsites are located near the lake outlet. Trail access dead ends at this basin, cross country travel to Sky Lakes basin occurs. In Libby municipal water supply area.

Problems:
-Campsites moderately impacted.
-Vegetation loss, bare soil.

Management Actions:
-Restore three campsites.
-Obliterate one minimally impacted campsite.

6. SKY LAKES BASIN

Current Situation: This high recreational use basin is accessed by six miles of mainline trail from a well signed trailhead. Major activities are backpack camping and fishing. Large groups are commonly encountered during peak use periods. Overnight stock use is infrequent. Lower Sky Lake is stocked with westslope cutthroat trout at five year intervals. Four campsites are in close proximity to the lake. The basin is the origin of the Libby municipal water supply.

Problems:
- Campsites are moderately to severely impacted.
- Vegetation loss, bare soil, tree damage and large camp areas.
- Numerous fire rings.
- Loss of solitude.
- Campsites at the lakeshore are potentially polluting the lake .

Management Actions:
- Rehabilitate one severely impacted site.
- Restore two moderately impacted sites.

7. GRANITE LAKE BASIN

Current Management Situation: Recreation use of this basin is very high. Backpack camping and fishing are frequent activities. The basin is accessed by six miles of gentle mainline trail from a well signed trailhead. Access routes to the trailhead are also signed. Overnight stock use is infrequent. Nearly forty percent of the users originate from outside the local area and large groups are common. This is the only Wilderness lake known to have a native fishery prior to stocking efforts. Four campsites are located in close proximity to the lake.

Granite Creek Falls is located two and a half miles from the trailhead. It receives heavy, local day-use.

Problems:
- Campsites at the lake are moderately impacted.
- Campsite at the falls is severely impacted.
- Vegetation loss, bare soil, tree damage.
- Loss of solitude.
- Exotic weeds introduced.

Management Actions:
- Obliterate one minimally impacted campsite at the lakeshore.
- Restore two moderately impacted campsites at the lakeshore.
- Temporarily close and rehabilitate campsite at the falls and provide an alternate campsite.
- Inventory weed species and extent of infestation.

8. LEIGH LAKE BASIN

Current Situation: Recreation use of this basin is the highest within the Wilderness. Day use activities dominate and foot travel is currently the only safe means of access. Fishing is not a significant attraction. Five campsites are located in close proximity to the lake. Some overnight use occurs. Travel through this basin is the most common access to Snowshoe Peak summit. It is common for 35 to 40 day visitors to be in close association during peak use. Steep, rocky headwalls with few trees surrounding the lake make apparent the sights and sounds of persons present. The basin is accessed by one an a half miles of steep trail from a signed trailhead.

Problems:
- Loss of solitude during peak use periods.
- Campsites are moderately impacted and trend toward severe.
- Vegetation loss, bare soil, tree damage.
- Numerous fire rings.
- Limited camping space results in co-mingling of day users in campsites.

Management Actions:
- Prohibit overnight camping within the basin.
- Prohibit stock use of trail and basin for safety reasons.
- Restore campsites.
- Identify alternative campsites away from the lake.

9. BRAMLET LAKE BASIN

Current Situation: Recreation use of this basin is moderate. Day use activities and access by hiking dominate. Stock users visit the area infrequently. Fishing is not a significant attraction although the fishery is self-sustaining. Four campsites are located in close proximity to the lake. Some overnight use occurs. Access to the lake is one and a half miles by gentle trail from a signed trailhead. The last two miles of road to the trailhead are very rough.

Problems:
- Campsites are moderately impacted.
- Vegetation loss, bare soil.

Management Actions:
- Obliterate the two minimally impacted campsites.
- Restore two moderately impacted campsites.
- Discourage overnight stock use.
- Make no improvements to access road.

10. LOWER GEIGER LAKE BASIN

Current Situation: Recreation use of this basin is very high. Day use activities, fishing and hiking dominate. Some overnight use occurs. Stock users visit the basin infrequently. The basin is accessed by one and a half miles of gentle trail from a signed trailhead. The fishery is self-sustaining. Five campsites are located in close proximity to the lake.

Problems:
- Campsites are moderately to severely impacted.
- Tree damage and death from open fire use, firewood depletion.
- Site enlargement and root exposure from overnight stock use.
- Loss of solitude.
- Vegetation loss and bare soil.

Management Actions:
- Temporary closure and rehabilitation of a severely impacted site.
- Prohibit use of open fire.
- Restoration of two moderately impacted sites.
- Obliterate two minimally impacted campsites.

11. UPPER GEIGER LAKE BASIN

Current Situation: Recreation use is high and day use activities dominate. Access by hiking an additional mile of mainline trail from Lower Geiger Lake is the most common route. The upper basin may also be accessed by the Fourth of July, Swamp Creek and Cabinet Divide Trails. Overnight stock users visit the basin occasionally. Fishing is not a significant attraction here. Four campsites are in close proximity to the lake.

Problems:
- Campsites are moderately impacted.
- Vegetation loss, bare soil, tree damage.
- Stock use of wet meadow at lake outlet.

Management Actions:
- Restore two moderately impacted campsites.
- Obliterate two minimally impacted campsites.
- Evaluate discontinuing maintenance of Fourth of July trail.
- Restrict stock use from one site within the high-water mark.

12. BEAR LAKES BASIN

Current Situation: Recreation use of the basin is low. Day use hiking activities dominate but overnight visits are common. Horse use to and through this area has been increasing as a result of outfitter and organized group activities. Big and Little Bear Lakes are stocked with fish at five-year intervals. Three campsites are located in close proximity to the lakes. Nearly all users originate from the local area. Access is by three and a half miles of steep trail from a signed but hard to find trailhead. This trail ties to the Cabinet Divide Trail.

Problems:
- Campsites are moderately impacted.
- Campsite impacts are rapidly increasing.

Management Actions:
- Restore two moderately impacted campsites.
- Obliterate a minimally impacted campsite at Big Bear Lake.
- Work with private land based outfitters to reduce impacts.

13. BAREE LAKE BASIN

Current Situation: Recreation use of this basin is moderate with day use hiking, fishing and berry picking the most common activities. Overnight stock users visit the basin occasionally. Nearly all of the recreationists originate from the local area. Access to the basin is by three miles of gentle trail from a signed but poorly known trailhead. The trail continues to the Cabinet Divide trail. An administrative cabin and a Soil Conservation Service snowcourse are near Baree Lake. The lake is stocked with west-slope cutthroat trout at four year intervals. Nine campsites are located in close proximity to the lake.

Problems:
- An excessive number of campsites
- Campsites are moderately impacted.
- Vegetation loss, bare soil, numerous fire rings.
- Public use of administrative cabin.

Management Actions:
- Close and rehabilitate the campsite associated with Baree cabin.
- Restore three moderately impacted campsites.
- Obliterate five minimally impacted campsites.
- Continue actions to make cabin unusable.

14. ENGLE LAKE

Current Situation: Engle Lake is approximately three miles from the trailhead of Trail 932 (two trails currently access the lake; Trail #932 and Trail #926.) Three campsites are located around the lake with light to moderate use by both backpackers and stock-use campers. Fishing is a primary attraction. Resource degradation is minimal. The lake is stocked with west-slope cutthroat trout at four-year intervals.

Problems:
- Maintenance of two trails is unwarranted.
- Forage around the lake is limited.

Management Actions:
- Discontinue maintenance of Trail 926 in McKay Cr. (not displayed on map).
- Encourage use of supplemental weed-free feed.
- Obliterate new camps.

15. WANLESS LAKE

Current Situation: This lake receives an increasingly high amount of overnight use by both hikers and stock users. It is approximately six and a half miles from a well known trailhead. Stock supported use occurs regularly. There are seven campsites located around the lake. Stock use is heavy at two of the camps located within 50 feet of the lake. One other camp within 50 feet of the lake receives heavy hiker use but is inaccessible by stock.

Problems:
- Three severely impacted campsites adjacent to the lake.
- Tree damage, exposed roots, bare soil, manure accumulation.
- Loss of solitude.
- Stock use adjacent to lake is causing resource damage.

Management Actions:
- Prohibit stock beyond Upper Wanless Lake 4.
- Rehabilitate severely impacted campsites along the lakeshore.
- Obliterate one minimally impacted campsite and any new campsites.
- Provide area for stock holding at Upper Lake 4.

16. UPPER WANLESS LAKES

Current Situation: Each of the four upper Wanless lakes have at least one campsite. Stock use and overnight camping are popular due to the six mile hike from the trailhead. Stock-users camping is heavy at Lake 3, where a hitchrail is located, and much less at each of the others. Backpack camping at the other lakes is light. These lakes have more level ground away from the lakeshore than does main Wanless, however forage is still limited. A newly issued outfitter/guide permit allows for a camp at Lake 1. Lakes 1 and 2 are stocked at five year intervals with west-slope cutthroat trout.

Problems:
- Lake 3 campsite is severely impacted.

Management Actions:
- Rehabilitate campsite at Lake 3.
- Encourage use of supplemental feed through education program and signing at trailhead.
- Obliterate new campsites.
- Provide for stock holding at Upper Lake 4.

17. BUCK LAKE

Current Situation: This lake is approximately 7 miles up the Swamp Creek Trail. Current use is light to moderate. One campsite has been established which is suitable for both backpack or stock-use camping. An alternate route from the lake leads to the Cabinet Divide Trail. A newly issued outfitter/guide permit allows for a camp at Buck Lake.

Problem:
- Stock use of wet meadow.

Management Actions:
- Encourage use of supplemental stock feed by education program.

18. ROCK LAKE

Current Situation: Increased mineral activity and potential mine development may alter use patterns and wilderness characteristics. The present trailhead is located at the road closure approximately four miles from the lake. The access route follows a finger of non-wilderness that extends deep into the Wilderness, enclosing past mining facilities. Heavy day use and light stock use is presently occurring. Four campsites are located in close proximity to the lake.

Problems:
- Mineral activity may alter use.
- An excess number of campsites.
- Tree damage, numerous fire rings, bare soil, firewood depletion.

Management Actions:
- Sign trailhead to indicate level of mineral activity.
- Obliterate one minimally impacted campsite.

19. ST. PAUL LAKE

Current Situation: St. Paul Lake is approximately four miles from the trailhead. There are four campsites around the lake, one of which is located below the highwater mark. Hiker and stock use are moderate to high. Fishing is a major attraction. Much of the trail follows the East Fork of Bull River and crosses boggy areas. The lake is stocked at five year intervals with west-slope cutthroat trout.

Problems:
- Campsite below highwater mark may be polluting the lake.
- Trail is difficult to maintain and resource degradation is occurring in boggy areas.
- No suitable stock camps or forage areas.

Management Actions:
- Evaluate trail condition and recommend procedures to resolve resource degradation.
- Restrict stock use from campsites in high water mark.
- Encourage use of campsites along dry ridge.

20. MORAN BASIN

Current Situation: Formerly this enclosed basin received high use due to the short trail length of one and a half miles and good fishing opportunities. The trailhead access road was closed and current route length is 11.5 miles. This distance generates little day use and mostly overnight camping. Stock use will remain relatively unaffected. The lake is stocked at four year intervals with west-slope cutthroat trout. There are two campsites located in close proximity to the lake.

Problems:
- Two moderately impacted campsites adjacent to each other.
- Trail 993 into the basin floor is very steep, suffering erosion.

Management Actions:
- Evaluate reconstruction of Trail 993 where resource damage is occurring.
- Alternate routes will not be maintained.
- Obliterate one campsite and establish a new site in a more desirable location.

21. SNOWSHOE LAKE

Current Situation: Snowshoe Lake is five miles from the trailhead. Backpack camping and day use is moderate due to good fishing opportunities and scenic quality. The last two and a half miles from Verdun Creek to the lake are over a game trail that is not maintained. Stock use is practically non-existent due to steep sections and difficult travel the last half of the route. Three moderately impacted campsites are located around the lake with a fourth at Verdun Creek. Resource degradation has been minimal.

Problems: None

Management Actions:
- Obliterate any new campsites.
- No trail maintenance beyond Verdun Creek.

22. DAD PEAK

Current Situation: Two trails access Dad Peak and together form a loop. Road 2289 was closed, adding approximately three miles to the length of trail 987. This route historically had little use and has further declined with the road closure. The more popular route to Dad Peak is via Road 407 to trail 966. This trail follows old logging skidroads outside of the Wilderness and traverses old-growth timber stands within the Wilderness. Stock use is non-existent and backpack camping is moderate.

Problems:
- Alder encroachment along skidroads.
- Continuous windthrow of old-growth timber.
- Confusion about access routes.

Management Actions:
- Discontinue any maintenance on Trail 987.
- Maintain Trail 966.
- Provide information board at trailhead.

23. MIDDLE FORK BULL RIVER

Current Situation: This drainage is accessed by trail 978 which is maintained from the trailhead on Road 2722 for 4.6 miles. This trail does not lead to a specific destination but merely accesses the area for hunting and other dispersed recreational activities. Three minimally impacted campsites are located along the length of the trail. Both stock users and hikers utilize this trail.

Problems: None

Management Action:
- Continue with routine trail maintenance
- Consider possible trail relocation at lower end to combine trailhead with the trailhead for trail 972.

24. GRAMBAUER MOUNTAIN

Current Situation: Two trails access Grambauer Mountain. Trail 649 originates in Cedar Creek and travels 8 1/2 miles to Grambauer Mountain. Trail 319 originates near Shannon Lake and climbs 6 miles to the Mountain. Each route has a history of light use. A portion of the 649 trail, 3 miles from road 402 to Scenery Mountain receives moderate day use, with the fire lookout being the destination.

Problems: None

Management Actions:
- Trail 319 from Shannon Lake to Grambauer Mountain will be managed as a secondary trail, with maintenance every three years.
- Trail 649 from Scenery Mountain to Grambauer Mountain will be managed as a way trail with maintenance every five years.
- Trail 649 from Cedar Creek to Scenery Mountain will be managed as a secondary trail with maintenance every three years.

CABINET MOUNTAIN WILDERNESS ACTION PLAN

APPENDICES

CABINET MOUNTAIN WILDERNESS ACTION PLAN

APPENDIX A

BACKGROUND

1. Geography/Ecology

The Cabinet Mountains Wilderness occupies the upper elevations of the east range of the Cabinet Mountains in Northwest Montana. The Cabinets are a 40-some mile long range of glaciated peaks and valleys with two main divides trending north and south. These two ridges are divided by two streams; Lake Creek flowing north to the Kootenai River; and the Bull River flowing south to the Clark Fork River. Across these streams from the Cabinet Mountains Wilderness lies the proposed Scotchman Peaks wilderness which encompasses much of the west Cabinet range.

While much of the lower elevation landform is outside of the wilderness boundary, there is still over 5,000 feet of relief in the wilderness. Snowshoe Peak in the central portion is highest at 8,712, with other nearby peaks over 8,000 and many throughout the range over 7,500. This relief is quite dramatic when seen from the surrounding valleys of Libby, Troy, and Noxon, which are not much over 2,000 feet.

The Cabinets are a north/northwest trending range of mountains that are largely composed of over 27,000 feet of Precambrian sediments of the Belt Supergroup. Since their deposition, they have been intruded by granitic stocks and thrusted eastward to their present location. There have been recent discoveries of world-class silver-copper deposits in this area within the Revett Formation of the Belt Supergroup. Two of these deposits are located within the southern portion of the Cabinet Mountains Wilderness. These deposits are owned and controlled by ASARCO Inc. and U.S. Borax and Chemical Corporation and have a gross in-place value of several billion dollars.

The Cabinet Mountains have been extensively glaciated. Alpine glaciation is dominant at the high elevations resulting in sharp ridges, cirque lakes, wet meadows, hanging valleys, U-shaped valleys, scoured sideslopes, and filled valley bottoms. These land building processes have also created many streams and over 50 lakes. Many of the peaks have exposed rock flanks and rock slides at their base, but over most of the range there is enough soil to support plant life of some sort. Other than in the valleys, the soils are very shallow and rocky and usually less than 1 foot deep. Much of the Wilderness has a shallow brown loess soil deposited by ancient volcano activity to the west. This loess is rich in organic matter, has a natural fertility, and holds moisture needed for plant growth. The soils are quite resistant to erosion and have low infiltration and percolation rates.

The vegetation that grows in these soils is abundant and varied. From the delicate little harebells blooming forth from rock fissures in September to the lush valley bottom stands of old growth cedar and hemlock, something grows on nearly every acre of the wilderness. Most widespread are the smaller plants, forbs and brush species. Alder, menziesia, serviceberry, huckleberry, mountain ash, ninebark, ceanotheus and several other woody plants grow beneath the tree canopy, in avalanche chutes, and open brush fields. Trees listed in general

elevation order include Western red cedar, western hemlock, grand fir, and Engleman spruce in the lower and/or cooler moist areas; Douglas fir, Western larch, Western white pine and lodgepole pine at the mid elevations; juniper and ponderosa pine on drier and sunnier sites; and mountain hemlock, white bark pine, and alpine larch in the high basins and exposed ridge tops.

There is a colorful range of wildflowers throughout the Cabinets. A collection of these gathered in 1976 from within the wilderness boundaries includes over 130 species and is considered incomplete.

The climate in the Cabinets promotes the abundant growth of all this vegetation. Although summers are short, they are mild and relatively moist. There is sometimes frost on summer nights (it can occur every month of the year), but winters are not particularly cold, and the insulation of snowcover which often accumulates over 800 inches in depth protects plant life. Annual precipitation varies from 30 inches on some lower slopes to over 110 inches along the higher ridges.

2. History

The Cabinet Mountains Area has been in use by historic peoples since the 1880's and probably by prehistoric people as well. Two resources have dominated the use pattern. The earliest and most extensive historic use has been mining activity. There are six cabins present within the boundary of the Wilderness. The four that have been recorded are associated with mining, and the other two are most likely mining related. These cabins tend to be unique in their architectural design; adaptations to the problems associated with high altitude living. A good example would be a cabin in the Chicago Peak area which has a door on the roof only, indicating winter occupation. Other mining features include adits, discovery pits, shafts, and can also display unique characteristics in construction.

The Cabinet Mountains are also well suited to lookout points for fire detection. Of four lookouts that once stood in the area, only Scenery Mountain remains standing. Two tent camps were set up on mountain tops as temporary patrol stations. The only other known site within the Wilderness boundary is the Granite Creek Ranger Station. Little information has been collected beyond its general location.

The prehistoric activity in the Wilderness area can only be speculated upon as there has been no cultural resource inventory done to assess potential. In order to project prehistoric resource use of the area, one must consider the desirable resources that were unique to that habitat. One of those resources was mountain goat, reported to have been both a food source and prized for its pelt by historic Kutenai Indians (Turney-High 1974:40). Another anthropologist, Claude Schaeffer, refers to the mountain goat as "a source of food to both the Lower and Upper Kutenai" (1940:13). The animal was hunted in late summer (Turney-High 1974:40). The artifact assemblage that would represent hunting activity could include projectile points, flint knapping tools; i.e., antler, pecked cobbles, and processing tools; i.e., stone knives, scrappers. It is possible that these tools found in lithic scatters would be present throughout the area and in concentrations in areas conducive to the placement of hunting camps.

Another valuable resource that is concentrated in the Wilderness area is huckleberries. The Kutenai Indians considered berries to be "an important part of the food quest" (Turney-High 1974:34). This resource was processed in two ways; "merely spreading the berries on a clean robe in the sun until ready" (Turney-High 1974:13) and molded into cakes (Schaeffer 1940:44).

The tool used to pound the berries would have been similar to a round stone, the surface of which would show marks of grinding. There is no reason to believe that the areas of concentrations of huckleberries has changed drastically since the last glaciation (personal communication, Al Christensen 1984). These areas should be surveyed for evidence of berry picking/processing. Camp sites may have been established during the time prehistoric peoples were engaged in this activity, probably close to the area of the activity.

There is a potential conflict between Cultural Resource Law and Wilderness Law. Regional direction requires removal of structures not necessary to manage for the benefit of wilderness. Cultural Resource law directs federal agencies to protect significant cultural resources when possible, to interpret for the public.

The Cabinet Mountains Wilderness was originally classified on April 14, 1935, as the Cabinet Mountains Primitive Area, and was measured at 88,786 acres. The area was reclassified as the Cabinet Mountains Wild Area on June 26, 1964, with an area of 94,360 acres. With the passage of the Wilderness Act on September 3, 1964, the area became a unit of the National Forest Wilderness Preservation System.

Use of the area within the Wilderness boundaries before the arrival of white man was probably infrequent at most. In the 1880's and 1890's prospectors were laying claims in the Libby Creek valley adjacent to the Wilderness, and probably explored most of the canyons during those years. Mineralization was discovered in several of the glaciated valleys, especially in the southeast part of what is now the Wilderness. This mineralization was associated with what has become known as the Snowshoe Fault--a belt of minerals trending north and south along the east flank of the Cabinets. Mining at some scale has occurred along this fault sporadically since the turn of the century.

The present Wilderness boundary along much of the east flank and also the southwest portion of the Cabinets was basically drawn along this zone of mineralization. In the 1960's a renewed interest in these minerals generated a new wave of exploration. Following a rich find of strata bound copper and silver across the valley in the west Cabinet range in the Mt. Vernon area, a mine and mill were constructed, and are currently in operation there.

In 1979, ASARCO Inc. initiated core-drilling activities inside the Wilderness boundary in the Chicago Peak-St. Paul Peak area. The ore body delineated has proved to be richer than the Mt. Vernon-Troy project and in May 1984 the Forest received an operating plan from ASARCO for a mine and mill in the Rock Creek drainage adjacent to the Wilderness. U.S. Borax and Chemical Corporation has also been core drilling within the Wilderness in the St. Paul Peak-Rock Lake area since 1981. As with ASARCO, Borax has discovered substantial silver-copper deposits adjacent to the Wilderness. Due to proximity and topography, some of the sights and/or sounds of mine developments may affect the Wilderness from

without, and there could be some modification, due to the mining process, within the boundary itself.

There has been a relatively steady increase in recreation use since nearby towns grew in population and visitors from other areas began to discover the area. A combination of scenic splendor and easy access in many areas has concentrated much of the recreation use in a small percentage of the area.

Granite Lake is the only lake within the Wilderness known to have historic populations of fish, probably native to the lake. By 1970 fish had been introduced in nearly every lake that could sustain populations. These lakes are now the focal point for a great share of the recreation use of the Cabinets. Some of the lakes have suitable habitat for fish reproduction, but the growth rate is often slow. Repeated stockings in some lakes by the State of Montana has led to a pattern of use within the Wilderness.

These lakes and other parts of the Wilderness are accessed by trails, most of which were constructed for recreation use. Many trails were originally constructed to a fairly high standard, by crews using pack stock. Location and design were frequently a matter of finding the best way to a lake or other feature, and then terminating. Most of this recreation access was in place before passage of the Wilderness Act in 1964, when the concept and philosophical intent of wilderness was spelled out.

Historically, the management of the Cabinet Mountains Wilderness has consisted primarily of maintaining the trails, erecting signs at entry points, and limited site cleanup and personal contact via one or two wilderness rangers in the summer season.

In the past several years there has been a wilderness education program in the sixth grade of local schools, with a low impact camping emphasis. Other, more indirect, management has included the passive promotion of recreation use of the Wilderness through printed materials, response to visitor inquiries, audio visual presentations, and a general attitude linking wilderness and recreation.

3. Current Use and Management

Recreation use in parts of the Wilderness has risen steadily over past decades. Perhaps as much as 90 percent of the use occurs over a very small number of the total acres--probably less than 10 percent of them. Exact numbers are unknown, since not all visitors sign in at trail head registration boxes. There has not been any means of recording nontrail or winter use.

The most accurate portrayal of the kind and amount of use received in the Cabinets comes from registration cards, and a 1970 research study by Robert Lucas of the Intermountain Forest and Range Experiment Station. Some of the figures from that study help create a picture of recreation visitor use in the Cabinets:

90% are on foot
7% ride horses
74% of the use is by groups of 4 people or less
89% of the visits are in summer
73% are on weekends
58% travel less than 5 miles total
75% are Montana residents

Outside the activity of hiking, which most visitors obviously engaged in to get into the Wilderness, the two most common activities pursued by these visitors were fishing (61%) and photography (45%).

Although these figures date to 1970, general use patterns are thought to be similar today, and some conclusions can be drawn, or at least inferred. The short average length of stay is in part generated by day use by local residents. This and the high percentage of visitors going to fish may be considered to form a picture of what may be a significant identifiable type within the visitor population--the local weekend fisherman.

Many of the camp sites within the Wilderness were initially used by this user group, beginning when visitors were much fewer in number and similar in the experiences they sought. These camp sites were most often the flatest, driest ground available near a lake.

As use has increased, these sites have expanded and multiplied, to the point where now every lake within the Wilderness that has fish has evidence of visitor use at some point along its perimeter; many lakes have several such sites.

Visitors desiring more solitude or having less desire to fish are often relegated to camping in the same areas around lakes, as there is often no other site obviously available, and vegetation and topography in most valleys of the Cabinets make finding a camp site difficult.

There are approximately 30 trails within the Wilderness which together total about 125 miles. These tend to be short, move into the Wilderness east and west--its shortest dimension--and most often terminate in a subalpine basin. There are almost no loop trails within the Wilderness, so recreationists in a given area are both coming and going on the same trail, creating more exposure to each other.

Some of the more popular trails show signs of trail side camping and other use, but for the most part, the area off each side of the trail between trail head and destination have almost no use and offer more solitude than the basin at the trail's end.

Overall use of the wilderness off the trail or outside of a few hundred yard radius of lake shore camp sites is very light; much like those areas without trails or lakes. Opportunities for solitude in these areas are not always

maximized, however, because both the valley trail and the basin camp sites tend to be topographic focal points for the surrounding terrain, and recreationists along the trail may impact a much wider area as far as sight and sound. The well-used lakes are often situated in amphitheater-like basins, so that sight and sounds emanating from their shorelines may impact much larger areas.

Nearly all the trails within the Wilderness boundary are less than five miles long. These short trail experiences coupled with an acute lack of forage lead to low levels of use by recreationists with saddle or pack stock. While total numbers are low, local impacts are sometimes disproportionately high from horse use, due to fragile campsite environment.

Because access is easy for both hiker and stock user, they both use the same areas. Much of the local use is day trips. Those that do bring in stock for extended periods sometimes picket the animals in a place with very limited forage--often the shoreline of a lake or a wet meadow nearby. Outside of these areas there is virtually no forage, and feed is sometimes imported.

Several decades of recreation use have left their mark on the Cabinets. Both hiker and stock have created long term damage to native soils and plants in certain, confined areas. Common forms of damage stemming from stock use include the loss of trail tread from stock stepping along the outer edge and the loss of vegetation and compaction of soil associated with keeping stock in and around camp sites, stream sides, and lake shores. Hikers also damage vegetation and compact soils in areas of concentrated use, and deface trees for use as fire fuel.

Recreation use impacts upon the Cabinet Mountain Wilderness seem to be worst when viewed from the standpoint of scenic or aesthetic impacts to the visitors' experience. At this point in time, the actual physical elements of vegetation, rock, soil, and water are in pristine condition over the vast majority of Wilderness acres.

Winter use within the Wilderness is increasing. Before the 1970's an occasional snowshoer traveled into the Cabinets to trap or just to see the countryside. Cross-country skiing is now occurring on a fairly regular basis in several areas, especially the southern third of the wilderness, where access routes to upper basins are less avalanche-prone. Snow fall in the Cabinets is frequent enough that tracks left by one party are usually obscured before they are seen by other visitors. Perhaps the only lasting physical impact of winter recreation use would be the cutting of wood for fires. Such cutting and gathering becomes evident as high stumps after the snow recedes.

Other uses of the Wilderness include water related activities such as swimming (and possibly some diving and boating in inflatable craft) and viewing scenery and wildlife from aircraft. The primary affect of these uses is their impact on other visitors' experience.

Management of the Cabinets is currently accomplished in two forms: direct physical manipulation such as trail maintenance, site cleanup, and some rehabilitation; and both direct and indirect information and education efforts.

In past years the Wilderness trails have been a priority for Forest trail maintenance dollars, and the trails have been kept at a relatively high standard. More recently, the emphasis has shifted somewhat to other trails and especially National Recreation Trails. Even with less maintenance, many Wilderness trails are the most heavily used trails on the Forest, and tend to remain more open and clear through repeated use.

Public education, light trail maintenance work, litter pickup along the trail and in and around camp sites, and some rehabilitation are accomplished by "wilderness guard" summer employees.

There are usually two of these field going personnel at work in the Wilderness, one at Libby District and often one at Cabinet District. Besides maintenance of the physical setting, these people make individual contacts with visitors and promote proper use of the Wilderness.

Information and education dealing with Wilderness is also managed outside the Wilderness. Trailhead signs and notices which carry Wilderness use messages are posted outside the boundary, and similar messages are given the general public via radio spot announcements, the map/brochure, other printed material, and responses to written and oral visitor inquiry. Another important contact point is the annual presentation of backcountry ethics slide shows to public school students. There are occasional contacts with organized user groups, and presentations to service clubs and organizations.

CABINET MOUNTAIN WILDERNESS ACTION PLAN

APPENDIX B

WILDERNESS INFORMATION AND EDUCATION ACTION PLAN

Key issues identified during scoping sessions include:

1. Lack of Understanding - a confusion with many users as to the purposes of wilderness and its management.

2. Campsites - the persistent thinking that many users should "develop" their own campsites.

3. Solitude - lack of sensitivity towards other peoples' backcountry experience.

4. Overuse - the concentration of too many visitors, particular at lakeshores.

5. Trails - visitor attitudes towards trail standards, "destination access," use of trails, and conflicts between different users (stock users - backpackers, etc.).

General public information will be dispersed through local medias of newspaper and radio. In addition, there are several organized groups and individuals targeted for personal contact:

Backcountry Horsemen, Saddle Clubs, Scouting Groups, 4-H Horse Groups, Hunter Safety Groups, Rod/Gun Clubs, Outfitter and Guides, Public School Classes (Grades 5 & 6)

The following schedule is meant to be dynamic. It is very important that wilderness/backcountry managers respond to specific needs when they arise. These actions will form the basis for what will be a growing program, leading to a public well informed in the low impact recreation use of Forest lands.

ACTION PLAN

Action Item	Responsibility	Key Issues	Time
1. Public Service Announcements	D-5, D-7	Pack in/Pack out Solitude Campsite Selection Overuse	June-Sept.
2. Newspaper	D-4 D-5 D-7 SO	Trail Crew/Use Rec. Opportunities Trout Creek NRT Mix wilderness understanding and mining activity	Summer

Action Item	Responsibility	Key Issues	Time
3. District Orientation	D-5, D-7	Understanding of wilderness	June
4. Wilderness Ranger Workshop (Trail Crews)	D-5, D-7	All Key Issues	June
5. Brown Bag Seminar	SO Districts	All Key Issues	Yearly
6. Reprint Forest Map	SO	Improve back message	1987
7. Trail Head Messages	D-5, D-7	Focus on key problems	ongoing
8. School Presentations,5th/6th Grade	D-4, D-5	All Key Issues	Spring
9. School Presentations,Full School	D-7	MU issues, wilderness message	Spring
10. Service Groups Presentations	D-4, D-5, D-7	Rotary, Lions, Kiwanis	Yearly
11. Huckleberry Festival	D-7	General Message	August
12. Plan techniques on how to present 5 key issues	SO	(Program Plan)	Summer
13. Sanders Co. Fair	D-7	Display on backcountry ethics	Summer
14. Receptionist Training	D-4, D-5, D-7 SO	Orientation/awareness session on wilderness	Spring
15. Horse Groups CBCH Libby Saddle Club 4-H	D-5	Wilderness awareness Low impact techniques Other rec. opportunities	Spring
16. Hunter Safety Program	SO	Wilderness awareness	
17. ROG	Districts	Promote alternatives	Yearly
18. Environmental Education	Districts	All key issues	Spring

Cabinet RD HCR 2, Box 210
Trout Creek, MT 59874

REPLY TO: 2630
2340

Date: January 14, 1986

SUBJECT: Cabinet Mtns. Wilderness Plan Biological Evaluation

TO: Wilderness Plan Committee

INTRODUCTION

This evaluation will briefly address the potential effects that implementation of the wilderness plan could have on threatened and endangered species. Through numerous contacts with the U.S. Fish and Wildlife Service, relating to site specific projects and to the draft Kootenai Forest Plan, it is felt that the grizzly bear (*Ursus arctos horibilis*) is the only threatened or endangered species to occupy wilderness lands, and thus will be the only species addressed in this evaluation. The Cabinet Wilderness has been identified as essential habitat for grizzly bear recovery, and is designated as Situation 1 lands where grizzly habitat maintenance and conflict minimization will receive the highest priority.

PROJECT DESCRIPTION

The Cabinet Wilderness Plan sets forth Forest Service goals,objectives, and management actions as they pertain to the wilderness, both in a general sense and on a more site specific nature (reference Section IV: Action Plan). In general, the plan calls for maintaining the wilderness in as pristine a state as possible, while still allowing human use to take place.

EVALUATION

Nothing in the wilderness indicates that there is any deviation from the intent of the draft Forest Plan toward grizzly bear management. Action items would serve to minimize the impact of humans on grizzly habitat. Specific management actions which would minimize impacts to the grizzly bear and its habitat include:

1) not improving access roads
2) discontinued maintenance of some trails
3) elimination of fish stocking at some lakes

By following the above items, possible displacement of grizzly bears might be lessened to some degree in areas where these actions occur because human use would be potentially less due to poorer access and less desirable destinations.

There is nothing to indicate that the present management of the wilderness is affecting the conservation of the grizzly bear. By following a management plan which should balance increasing demands for wilderness opportunities by people with the emphasis of not publicizing the opportunities and not enhancing access, future impacts on the grizzly should remain similar to present management impacts.

RECOMMENDATIONS

The following recommendations are given, which if followed, could aid in the recovery of the grizzly bear, particularly when grizzly population densities increase closer to the recovery level.

1) List as potential management actions for possible use in the future should situations warrant: a) area closures (36 CFR 261.57(a)); and b) regulations (36 CFR 261.70(a)(4)) to minimize human/grizzly conflict situations by using recognized safe camping practices. These could include (but are not limited to) proper storage and disposal of foods/garbage, and required distances for sleeping from eating areas.

CONCLUSIONS

Implementation of this plan should not have any adverse effect on the grizzly bear. The overall intent of the plan is to minimize the impacts of humans on the wilderness, which in turn will minimize impacts on the grizzly bear. A non-jeopardy opinion has already been given for the draft Forest Plan. Because this plan further defines the Forest Plan direction, and no adverse effects are anticipated, formal consultation with the FWS is not recommended at this time.

Bruce G. Haflich

BRUCE G. HAFLICH
Wildlife Biologist
Cabinet Ranger District

APPENDIX D

2611.1--12
(Montana)

TITLE 2600 - WILDLIFE MANAGEMENT

FISHERIES MANAGEMENT

The following policies and guidelines are intended to provide for a sound fisheries management program in wilderness and primitive areas.

ANGLING

Policy

Angling is a legitimate wilderness and primitive area activity subject to State laws and regulations that are enforceable by State wildlife officers and all other duly commissioned persons.

POPULATION SAMPLING

Policy

Scientific sampling of fish populations is recognized as an essential procedure in the maintenance of balanced fish populations in wilderness and primitive areas.

Guidelines

Population sampling involving gill netting, electrofishing (nonmotorized), or other standard methods complying with sections 4(c) and (d) of the Wilderness Act falls under the provision for studies. Timing shall be coordinated to avoid heavy public-use periods.

CHEMICAL TREATMENT

Policy

Chemical treatment may be necessary to prepare waters for the reestablishment of a native species, to reestablish an endangered or threatened species, and to correct undesirable conditions resulting from the influence of man.

Guidelines

1. All Federal and State laws, regulations, and executive orders relative to the use of pesticides shall be strictly adhered to.

2. In the selection of a pesticide, preference shall be given to those that can be readily detoxified, e.g., derris which can be detoxified with potassium permanganate, particularly when used in streams or other waters with downstream connections.

3. Chemical treatment operations should be scheduled during periods of low human use.

4. Fish removed shall be immediately disposed of in a manner agreed to by the Montana Department of Fish and Game and the USDA-Forest Service.

SPAWN TAKING

Policy

The collection of fish spawn shall be permitted from wilderness and primitive areas when alternative sources are nonexistent or unreliable or where spawn taking was an established practice prior to the area being officially designated, subject to the guidelines below.

Guidelines

1. Collection and removal of spawn shall not involve the use of motorized equipment within the boundaries of the area.

2. Techniques and facilities necessary to spawn taking operations and in existence prior to the designation of the area may continue to be used as provided for in the approved management plan.

3. Facilities for spawn taking stations established subsequently to designation must be of a temporary nature and be completely removed after the termination of each season's operation.

4. A decision to no longer permit spawn taking where it was an established practice prior to designation of the area will be made jointly by the Montana Department of Fish and Game and the USDA-Forest Service.

FISH PLANTING AND TRANSPLANTING

Policy

Planting or transplanting of fish may be conducted by the State agency, using means appropriate for wilderness or primitive areas, when any one of the following criteria is met: (1) to reestablish or maintain an indigenous species, (2) to restore an endangered or threatened species, or (3) to maintain or enhance recreational values as identified in the management plan.

Barren lakes and streams may be considered for stocking after it has been mutually agreed to that there will be no appreciable loss of scientific values or adverse effects on wilderness resources.

Alterations in fish planting programs shall not be made for the purpose of reducing the impact of overuse except as part of a cooperative effort between the Forest Service and the State Fish and Game Department to adjust such use.

Numbers of fish and time of planting will be determined by the State agency. Species selected for planting will be in accordance with the guidelines below.

Guidelines

1. The Fish and Game Department shall make fish stocking schedules available to the Forest Service, indicating what species and numbers are planned for each water within a wilderness or primitive area.

2. Stocking rates shall be adjusted to minimize the likelihood of exceeding the biological capabilities of the water being stocked so as to reduce the chance of producing a stunted population and to minimize the likelihood of attracting overuse to the detriment of wilderness or primitive area resources.

3. Preference in the selection of species for planting will be given to: native species (for purposes of this document, species of fish traditionally planted prior to designation may be considered native); endangered or threatened species of fish if there is likelihood for survival and if the species or subspecies has an overall distribution pattern encompassing the transplant site; and species likely to spawn successfully under the conditions characteristic of the water being considered.

AERIAL FISH PLANTING

Policy

Aerial planting of fish shall be a permitted practice for those waters in wilderness and primitive areas where this was an established practice before the area was classified as a wilderness or primitive area, or other practical means are not available.

2611.1--15
(Montana)

TITLE 2600 - WILDLIFE MANAGEMENT

Guidelines

1. Same as guideline No. 1 under Fish and Wildlife Research.

2. As justification for aerial stocking, the Fish and Game will supply the Forest Service a list of those waters which stocking with aircraft was an established practice prior to designation, indicating the type of aircraft as fixed-wing or helicopter, which will become a part of the management plan.

3. For those waters not on an aerial stocking schedule, the Fish and Game shall demonstrate in writing to the Forest Service the need for use of aircraft.

APPENDIX E

2353--9

Title 2300 - Recreation Management

359A Trail Maintenance - Level 0

All available and usable system trails not maintained in the current year. Includes all available and useable system miles not included in Codes 359B-D.

359B Trail Maintenance - Level I

Minimal clearing to be usable. Minimal level of route marking/ signing, structure repair and clearing of obstacles to provide for public safety. The normal level of maintenance for way or primitive trail. Unit of work is miles of trail maintained

359C Trail Maintenance - Level II

Maintenance to an intermediate standard with acceptable public safety, needed repair of structures, prevention of accelerated resource damage, and minimally adequate signing. The normal level of maintenance for secondary trails. Unit of work is the miles of trail maintained.

359D Trail Maintenance - Level III

Trails maintained at the planned design standard for public use and safety. May require tread stabilization brushing, etc. Structures and signing to planned standards. Includes grooming for snow trails. The normal level of maintenance for mainline trails. Unit of work is miles of trail maintained.

Exhibit 1

Hiker Trail Guide

	Easiest	More Difficult	Most Difficult 1/
Grade			
Max. Pitch Grade	20%	30%	+30%
Length	100'	300'	500'
Clearing 2/			
Width	43"	36" to 48"	36"
Height	8'	8'	8'
Tread 3/			
Width	18" to 24" Obstacle-free.	12" to 18" If needed, depending on volume and drainage.	12"
Surface	Spot gravel surfacing.	Not surfaced--leave roots, imbedded rocks, and some logs.	No graded tread except on side slopes over 50% where safety or resource damage is a problem.

1/ Upper limit of grade and pitch length for most difficult trails depends on soil type, amount of rock, vegetation type, and other conditions affecting stability of the trail surface.

2/ Curve alignment to avoid cutting large trees.

3/ Increase tread width 6 inches on switchbacks or where side slopes exceed 60 percent.

2.31b--3

TRAILS MANAGEMENT HANDBOOK

Exhibit 1

Pack and Saddle Trail Guide

	Easiest	More Difficult	Most Difficult 1/
Grade			
Max. Pitch Grade	15%	25%	+30%
Length	200'	300'	500'
Clearing 2/ Width	8'; 6' between large trees. Pack clearance must be 3' from a point 30" above grade of tread.	6' Pack clearance must be 3' from a point 30" above a grade of tread.	3' to 4' wide
Height	10'	8'	Maximum 8'
Tread 3/ Width	24"	24"	18"
Surface	Surfacing as needed for stability. Reinforce cross drains with logs or rocks on steep gradients (greater than 10%). Special emphasis on puncheon or turnpikes in bog holes. Construct extra trailbed width in steep terrain.	Leave roots and imbedded rocks. Cross drains permanent with natural roots, rocks, or imbedded logs.	Not graded except on side slopes greater than 30%.

1/ Assume pack animals normally are not accommodated on most difficult trails, so less clearing width is needed. Same holds true for day-use horse trails. The upper limit for most difficult saddle animal trails depends on the soil type, amount of rock, vegetation types, and other conditions affecting stability of the trail surface. The skill of the rider and the condition of the animal also are important considerations.

2/ Along a precipice or hazardous area, the trail clearing width should be at least 48 to 60 inches to provide safety to the riders and their animals.

3/ Increase tread width 12 inches on switchbacks. Tread width on special sections, such as fords or turnpikes, should be at least 36 inches.

APPENDIX F

Notes on How to do the Campsite Inventory

To do in the field

1. Document the exact location of the campsite being examined. Place a dot and a unique number depicting its location on a topographic map.

2. Fill out the inventory form. Items needing more explanation are as follows:

(2). UTM coordinates are the blue tick marks and black numbers around the edge of the map. Numbers along the top and bottom locate the site's position east (E) of a meridian. Use four digits. This means subdividing the distance between blue ticks into tenths. Use five digits for the north (N) coordinates along the sides of the map. Again, this involves subdividing the distance between blue ticks into tenths.

(16) and (17). Estimate about how far you would have to go to get enough firewood or forage to spend the night.

(19) and (20). Estimate percent cover of vegetation and mineral soil (not covered by either vegetation or litter), both on the campsite and an adjacent area similar to the campsite. The idea is that the comparative area is similar to what the campsite would have looked like before it was used. The coverage classes (1 to 5) will be used to rate (21) and (22) below. For example, if campsite vegetation is class 2 (6-25%) and comparative vegetation is class 4 (51-75%), there is a difference of two coverage classes and item (21) would receive a rating of 3.

(23) and (24). Count the number of trees either scarred/felled or with roots exposed and then make a rough estimate of what percentage of all the trees have been damaged in this way.

(23). A tree is badly scarred if scars total more than 1 foot^2.

(27). Social trails are informal trails leading from the campsite to water, the main trail, etc. A well-worn trail has lost most of its vegetation.

(29). Barren core area is the area around the center of the site that is almost completely devoid of vegetation.

(31). Include feelings about the site's attractions, condition, and how you think it should be managed.

3. Take several photographs of the site including any unique features that might be useful in relocating the site. The idea here is to help future evaluators make certain that they are looking at the same site. Note the roll and exposure number after item (30) photo record. If possible, including index cards with the site number on it in one of the photographs will help link the photographs to the right site.

4. Search systematically for all of the sites in any given area, rather than just selecting certain sites. Draw a line on the topographic map of the areas in which all sites have been inventoried.

To do in the office

1. Estimate distance to the nearest trailhead (item 9).

2. Using the topographic map with campsites located on it, count the number of other campsites within 1/4 mile of the site (item 13).

3. Calculate the impact index. This can be done in many different ways. This might be the total of the ratings for items 21 to 29 or a mean of these ratings. This assumes that each of these impact parameters is of equal importance. Since this is probably not the case, it might be preferable

to weight these ratings. My own personal opinion is that cleanliness and development should be weighted less than other parameters (perhaps multiply their ratings by 0.5) and mineral soil increase, root exposure, and camp area should be wieghted more (perhaps multiply their ratings by 2). Again, either the sum of ratings or a mean can be used as the impact index. Managers have considerable flexibility in deciding how this overall impact index should be calculated.

4. To be of most use, it would be worthwhile to place all of the campsites inventoried on one map. The impact index could be broken down into about four classes. The sites on the map could then be color coded to match their impact class. Thus, the map would depict where the sites were located and their overall condition.

5. Store the forms with the photographs for each site. When the sites are reexamined, earlier forms, photos, and the original topographic map should be taken into the field.

BOB MARSHALL - GREAT BEAR - SCAPEGOAT WILDERNESS COMPLEX - CAMPSITE INVENTORY

GENERAL SITE DESCRIPTION

(1) SITE NUMBER: _____

(2) UTM COORDINATES: 12 _ _ _ _ E _ _ _ _ _ N

(3) USGS QUADRANGLE: _____

(4) DATE CODED: _ _ (Month) _ _ (Day) _ _ _ _ (Year)

(5) CODED BY: (Name) _____

(6) ELEVATION: (To nearest 100 ft) _____

(7) VEGETATION: (Circle one)

1 - Closed forest 3 - Nonforested, densely vegetated

2 - Open forest 4 - Nonforested, sparsely vegetated

Dominant species _____
Habitat type, if known _____

(8) LANDFORM: (Circle one)

1 - Floodplain 2 - Other valley bottom 3 - Cirque basin

4 - Sideslope 5 - Ridgetop 6 - Other _____

(Do in office)
(9) DISTANCE TO CLOSEST TRAILHEAD: _____(miles)

(10) DISTANCE TO CONSTRUCTED TRAIL: _____(feet)

Screening: 1 - Complete
(circle one) 2 - Partial
3 - None

(11) DISTANCE TO WATER: _____(feet)

Type: 1 - River/creek 3 - Spring

2 - Lake 4 - Other _____

(12) DISTANCE TO CLOSEST CAMPSITE: _____(feet)

Screening: 1 - Complete
(circle one) 2 - Partial
3 - None

(Do in office)
(13) NUMBER OF OTHER CAMPSITES WITHIN 1/4 MILE: _____

(14) MAXIMUM PARTY SIZE ACCOMMODATED: (Circle one)

1 - 1-2 3 - 7-10 5 - more than 15

2 - 3-6 4 - 11-15

(15) TYPE OF USE: (Circle as many as apply)

1 - Foot 3 - River

2 - Stock 4 - Outfitter

(16) CLOSEST FIREWOOD SOURCE: (Circle one)

1 - One-site 3 - 100-300 feet 5 - >1/4 mile

2 - <100 feet 4 - 300 ft-1/4 mile

(17) CLOSEST FORAGE SUPPLY: (Circle one)

1 - On-site 3 - 100-300 feet 5 - >1/4 mile

2 - <100 feet 4 - 300 ft-1/4 mile

(18) FACILITIES: (Write number of each type in blank)

1 - Fire ring_____
2 - Primitive seat_____
3 - Constructed seat_____
4 - Table/shelf/counter_____
5 - Meat rack_____
6 - Hitchrail_____
7 - Corral_____
8 - Toilet_____
9 - Other_____

IMPACT EVALUATION	ON CAMPSITE	ON UNUSED COMPARATIVE AREA
(19) VEGETATION COVER: (Be sure to compare similar areas, same species, slope, rockiness, and canopy cover)	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%
(20) MINERAL SOIL EXPOSURE: (Percent of area that is bare mineral soil)	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%	1 - 0-5% 2 - 6-25% 3 - 26-50% 4 - 51-75% 5 - 76-100%

	Rating (Circle one category) 1	2	3	Calculation of impact index (do in office)
(21) VEGETATION LOSS:	(no difference in coverage)	(Difference one coverage class	(Difference two or more coverage classes)	
(22) MINERAL SOIL INCREASE:	(No difference in coverage)	(Difference one coverage class)	(Difference two or more coverage classes)	
(23) TREE DAMAGE: No. of trees scarred or felled____ % of trees scarred or felled_____ (est.)	(No more than broken lower branches)	(1-8 scarred trees, 1-3 badly scarred or felled)	(> 8 scarred trees, >3 badly scarred or felled)	
(24) ROOT EXPOSURE: No. of trees with roots exposed____ % of trees with roots exposed_____ (est.)	(None)	(1-6 trees with roots exposed)	(> 6 trees with roots exposed)	
(25) DEVELOPMENT:	(No more than 1 scattered fire ring)	(1 fire ring with or without primitive log seat)	(> 1 fire ring or other major development)	
(26) CLEANLINESS: No. of fire scars_____	(No more than scattered charcoal from 1 fire ring)	(Remnants of >1 fire ring, some litter or manure)	(Human waste, much litter or manure)	
(27) SOCIAL TRAILS: No. of trails____	(No more than 1 discernible trail)	(2-3 discernible, max. 1 well-worn	(> 3 discernible or more than 1 well-worn)	
(28) CAMP AREA Estimated area_____ (ft^2)	(< 500 ft^2)	(500-2000ft^2)	(> 2000 ft^2)	
(29) BARREN CORE CAMP AREA: Estimated area_____(ft^2)	(< 50 ft^2)	(50-500 ft^2)	(> 500 ft^2)	

(30) PHOTO RECORD_____

(31) COMMENTS: (Details about location of site, impacts, management suggestions, etc.)

_____

_____

_____

(32) IMPACT INDEX _____

KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX TWENTY FOUR

OUTFITTER AND GUIDE POLICY

Appendix 24

Outfitter and Guide Policy for the Kootenai National Forest

The following situations and assumptions were used in the development of policy regarding the issuance, renewal and administration of outfitting and guiding permits on all areas of the Forest:

1. Forest Service policy does not provide for special-use permit issuance merely to satisfy economic advantage or benefit. Permits are issued to afford the public certain quality recreational experiences otherwise not available on the National Forest without the use of outfitters or guides.

2. The public presently has adequate access to much of the Forest, particularly when the access is compared to the Forest Plan management emphasis for specific areas. Those few areas with inadequate access will be identified for priority right-of-way acquisition efforts.

3. Although existing outfitters are using permitted capacity on most permits, it has been determined if a need or demand existed, the existing outfitters could meet that demand. There is an adequate number of outfitters to meet the hunting-related recreation experiences.

4. The potential for conflicts between outfitters and non-outfitter users is increasing.

5. There appears to be no biological need to utilize more outfitters to increase harvest levels of big game.

6. Private lands are being leased, subdivided, logged or otherwise made less usable by the public thereby making National Forest System lands increasingly important for public use.

Therefore, the following policy will become effective immediately on all portions of the Kootenai National Forest:

1. No new or additional permits for outfitter and guide services will be issued for hunting or fishing activities, except as provided in Item #5 below.

2. In the event of relinquishment or termination of existing permits or sale of a business, the permits will be evaluated for reissuance, adjustment or reallocation of service days, or permit elimination in accordance to national policy.

3. Non-hunting and non-fishing permits will be considered on a case-by-case basis.

4. A permit holder with at least the previous two (2) years of "acceptable" performance may make a one-time request within one (1) year of implementation of this policy to increase his/her day-use service day allocation up to 10 percent, except for permits where a day-use service day limitation has already been established. This increase will be based on the average of the two (2) highest years of annual actual use authorized under permit during the previous five (5) years prior to implementation of this policy. A permit holder without the two (2) previous years of "acceptable" performance will become eligible for the increase by completing two (2) consecutive years of "acceptable" performance. The basis of their increase will be the same as mentioned above. Until this increase is allocated, the amount of service days to be authorized will not exceed the amount of the average of the two (2) highest years of annual actual use authorized under permit prior to implementation of this policy. This 10 percent increase does not restrict the addition of reallocated use in Item #2 above.

5. With the improved fishing opportunities on Lake Koocanusa, the need for fishing outfitters is now established. On the Fisher River Ranger District this need can be met by current permittees. On the Rexford Ranger District two (2) permits may be issued and service day limits set at the discretion of the Ranger without modifying this policy.

6. Deviations from this policy may be made only by further analysis and decision of the Forest Supervisor.

7. This policy will be reviewed at the end of three (3) years following implementation.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

R-1
Missoula, Montana

R-4
Ogden, Utah

Forest Service Handbook 2509.22
SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

FOREST SERVICE HANDBOOK
MISSOULA, MONTANA
OGDEN, UTAH

May, 1988

FSH 2509.22 - Soil and Water Conservation Practices Handbook

Transmittal Sheet

POSTING NOTICE. Amendments to this title are numbered consecutively. Check the last transmittal received for this title to see that the above supplement number is in sequence. If not, order intervening supplements at once on form 1100-6. Do not post this supplement until the missing one(s) is received and posted. After posting retain this transmittal until the next supplement to this title is received. Place it at the front of the title.

Page Code	Superseded	New (No. of Sheets)
(Entire Handbook)		
Title Page	-	1
Contents		
00--1	-	1
Zero Code		
00--2 thru 05--7	-	6
(Entire Chapter)		
0--1 thru 18.06	-	51

Digest:

Establishes a new handbook to develop site specific soil and water conservation practices for use on National Forest System lands in R-1 and R-4 to comply with direction in the Clean Water Act.

JOHN W. MUMMA
R-1 Regional Forester

J. S. TIXIER
R-4 Regional Forester

SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

Contents

SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

ZERO CODE

Contents

SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

01 - AUTHORITY. The Clean Water Act of 1972 (Public Law 92-500), as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4), was intended by Congress to provide a means to protect and improve the quality of the water resources and maintain their beneficial uses. The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution. To provide environmental protection and improvement emphasis for water and soil resources and water-related beneficial uses, the National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) were developed. Soil and water conservation practices were recognized as the primary control mechanisms for nonpoint sources of pollution on National Forest System lands. This perspective is supported by the Environmental Protection Agency (EPA) in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

Federal agency compliance with water Pollution control mandates is addressed through Section 313 of the Clean Water Act and in Executive Order 12580 of January 23, 1987. Agency compliance is to be consistent with requirements that apply to "any nongovernmental entity" or private person. Compliance is to be in line with "all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution". To comply with State Water Quality Standards, the Forest Service is required to apply water quality practices in State Forest Practices Regulations, where applicable, reasonable land, soil, and water conservation practices, or specialized best management practices. All these types of practices are designed with consideration of geology, land type, soil type, erosion hazard, climate, cumulative effects, and other factors in order to fully protect and maintain soil, water, and water-related beneficial uses, and to prevent or reduce nonpoint source pollution.

02 - OBJECTIVE. The objective of this handbook is to present a process to develop site specific conservation practices for use on National Forest System lands to minimize effects of management activities on soil and water resources, and to protect water-related beneficial uses. It describes the application, monitoring, evaluation, and adjustment of these conservation practices. This handbook is also to provide examples of soil and water conservation practices which have been tested and have provided protection in specific situations, and that can be utilized or adapted in developing site specific conservation practices. Additionally, this handbook is a supplemental document to all Forest Plans.

03 - POLICY. The Forest Service must be responsive to the environmental intent and directives provided in the Clean Water Act, as amended, State water quality goals and standards, and other environmental legislation. As part of its land stewardship policy, the Forest Service's management actions must be carried out in a manner which protects the soil and water resources. The Forest Service will continue to coordinate all management actions affecting water quality and beneficial uses with State water quality agencies and will provide leadership in nonpoint source pollution control for Forest Management.

In accordance with the Multiple Use-Sustained Yield Act and other legislation (RPA, NFMA, etc.), National Forest System lands are to be managed for multiple uses. Maintenance of soil and water resources and protection of water-related beneficial uses are among those multiple uses. Use of soil and water conservation practices are a means to ensure protection of those resources and uses, while achieving other resource objectives. Application of soil and water conservation practices translates, in essence, to good land stewardship.

Pursuant to Section 208 of the Clean Water Act, all agencies which are responsible for carrying out any portion of a State Water Quality Management Plan to minimize nonpoint source pollution must be designated as a Water Quality Management Agency. The Forest Service has been recognized as the Designated Water Quality Management Agency for National Forest System lands in the Northern and

Intermountain Regions. This handbook has been prepared to provide the Forest Service with a means to meet requirements for obtaining and maintaining this designation.

04 - RESPONSIBILITY.

1. Regional Forester. The Regional Forester shall:

   a. Provide program guidance in soil and water conservation practices.

   b. Provide soil and water conservation practices training and materials.

   c. Coordinate with appropriate State and other Federal agencies involved in water-related beneficial uses, watershed, management, and best management practices.

   d. Monitor and evaluate on a regional basis the implementation and effectiveness of soil and water conservation practices.

   e. Notify the State of the results of monitoring and evaluation.

2. Forest Supervisor. The Forest Supervisor shall:

   a. Train appropriate Forest personnel in development and use of soil and water conservation practices.

   b. Coordinate with appropriate State and other Federal agencies involved in water quality regulation, management of water-related beneficial uses, watershed management, and best management practices.

   c. Develop and improve soil and water conservation practices with respect to changing technologies and Forest Service direction.

   d. Notify the Regional Forester of any development or improvement of soil and water conservation practices

   e. Monitor the implementation and effectiveness of site specific, soil and water conservation practices and suggest any necessary adjustments.

3. District Ranger. The District Ranger shall:

   a. Develop and implement site specific, soil and water conservation practices.

   b. Develop and implement site specific, soil and water conservation practices on all resource management projects.

   c. Monitor the implementation and effectiveness of site specific, soil and water conservation practices and provide any necessary adjustments.

05 - DEFINITIONS.

1 . LIST OF ABBREVIATIONS

APD	- Application for Permit to Drill
BLM	- Bureau of Land Management
BMP	- Best Management Practice
COR	- Contracting Officer's Representative
CFR	- Code of Federal Regulations
EA(R)	- Environmental Assessment (Report)
EO	- Executive Order
EPA	- Environmental Protection Agency
EIS	- Environmental Impact Statement
FAR	- Federal Acquisition Regulations
FERC	- Federal Energy Regulatory Commission
FS	- Forest Service
FSH	- Forest Service Handbook
FSM	- Forest Service Manual
ID	- Interdisciplinary
MOU	- Memorandum of Understanding
NEPA	- National Environmental Policy Act
NFMA	- National Forest Management Act and /or Regulations
ORV	- Off Road Vehicle
R-1	- Region 1 (Northern Region) of the USDA Forest Service
R-4	- Region 4 (Intermountain Region) of the USDA Forest Service
RPA	- Resource Planning Act
SA	- Sale Administrator
SCS	- Soil Conservation Service
STORET	- A storage and retrieval computer system for water quality data administered by the Environment Protection Agency
SPCC	- Spill Prevention Control and Counter Measure
SWCP	- Spill Prevention Control and Counter Measure
TSA	- Timber Sale Administrator

2. GLOSSARY OF TERMS

Area Transportation Plan. A plan that identifies the transportation facilities needed to manage the lands and resources for a given area.

Baseline Data. Data representative of a particular base period or concurrent control sample. Normally representative of the undisturbed, undeveloped state.

Beneficial Use. Actual or potential use that may be made of the waters of the state, including but not necessarily limited to domestic, municipal, agricultural, and industrial supply; power generation; recreation; esthetic enjoyment; navigation; preservation and enhancement of fish, wildlife and other aquatic resources.

Best Management Practice (BMP). A practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practical (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (40 CFR 130.2(q)).

Best Management Practices as defined by State regulation or agreement between the State and Forest Service include the following by state:

In Idaho:

-Idaho Forest Practices Rules and Regulations.
-Rules and Regulations and Minimum Standards for Stream Channel Alterations.
-Idaho Best Management Practices for Road Activities Handbook--Parts I and II.

In Montana:

-Best Management Practices for the Flathead River from the Flathead Drainage 208 Project, Appendix A (Only applicable to the Flathead National Forest).
-Best Management Practices (BMP's) for Forestry in Montana.

In Nevada:

-Handbook of Best Management Practices (Nondesignated Area, Water Quality Management Plan).

In Utah:

-Best Management Practices for Nonpoint Source Pollution Reduction in Waters of Summit, Wasatch and Utah Counties. -Best Management Practices for Nonpoint Source Water Pollution Control in Utah.
-Salt Lake County Water Quality and Pollution Control: Erosion-Sediment Control Handbook.
-Land Use vs. Water Quality - Wasatch Streams.

Carrying Capacity. (Recreation): the amount of recreation use an area can sustain without deterioration of site quality; (Wildlife): the maximum number of animals an area can support during a given period of the year; (Range): the maximum stocking rate possible without damaging the vegetation or related resources. Carrying capacity may vary from year to year on the same area due to fluctuating forage production.

Contract Provisions. Controls, constraints, and/or general direction included in Contracts offered by the Forest Service.

Cross Drain/Ditch. A man-made ditch or channel constructed to intercept surface water runoff and divert it before the runoff concentrates to erosive volumes and velocities.

Crowning. Forming a convex road surface which allows runoff to drain from the running surface to both sides of the road prism.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other action (40 CFR 1508-7).

Degraded Watershed. A basin which has suffered environmental damage, resulting in accelerated soil or vegetative loss or chemical contamination to the quantifiable detriment of other resources.

Designated Streams. A stream or portion of a stream identified as warranting special consideration in management decisions and project activities. See also Stream or Streamcourse.

Floodplain. The lowland and relatively flat areas adjoining inland waters that are covered by its waters during flooding.

Hazardous Substances. Materials which by their nature are toxic or dangerous to handle or dispose of, such as radioactive materials, petroleum products, pesticides, chemicals, and biological wastes.

In-Service. Pertains to activities, actions or personnel within the USDA Forest Service.

Interdisciplinary Team. A group of individuals from various disciplines or with different skills appropriate to resolve the issues or problems identified. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the identified issue or problem. The members of the team proceed to solution with frequent interaction, so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions.

Line Officer. Management personnel within the Forest Service Organization consisting of: Secretary of Agriculture, Chief of Forest Service, Regional Foresters, Forest Supervisors, and District Rangers. Refers to the line of authority and responsibility.

Log Landing. An area where logs are skidded or yarded prior to loading and transportation to a mill.

Mitigate. To offset or lessen real or potential impacts or effects through the application of additional controls or actions. Counter measures are employed to reduce or eliminate undesirable or unwanted results.

Monitoring. The periodic evaluation of resources or activities on a representative sample basis to establish long-term trends, assess the impacts of land management activities, determine how well objectives have been met, and check compliance with established standards.

NEPA Process. All measures necessary for compliance with the requirements of section 2 and Title I of the National Environmental Protection Act (NEPA).

Nonpoint Source Pollution. Diffuse sources of water pollution that originate from many definable sources and normally include agricultural and urban runoff, run-off from construction activities, etc. In practical terms, nonpoint sources do not discharge at a specific, single location (such as a single pipe). Nonpoint source pollutants are generally carried over or through the soil and ground cover via stormflow processes. Unlike point sources of pollution (such as industrial and municipal effluent discharge pipes), nonpoint sources are diffuse and can come from any land area. The following silvicultural activities are considered to be nonpoint sources of pollution: nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvest operation surface drainage, and road construction and maintenance from which there is natural runoff (40 CFR 122.27).

Normal Operating Season. A portion of a year when normal timber harvesting operations are expected to take place uninterrupted by adverse weather conditions.

Outsloping. Shaping a road to cause drainage to flow toward the outside shoulder (generally the fill slope), as opposed to insloping which encourages drainage to flow to the inside shoulder (generally the cut slope). Emphasis is on avoiding concentrated water flow.

Permittee. Individual or entity that has received a grazing or Special Use Permit from the Forest Service.

Pesticide. A general term applied to a variety of chemical materials including insecticides, herbicides, fungicides, and rodenticides.

Point Source. Originating from a discrete identifiable source or conveyance. Silvicultural point sources of pollution include the following: rock crushing, gravel washing, and log sorting and storage facilities where water is applied intentionally to the logs (40 CFR 122.27).

Purchaser. The entity which is awarded a USDA Forest Service contract after bidding, usually with competition. As used in timber, the entity which has purchased timber as identified in a timber sale contract.

Reclamation. Restablization of land denuded by land management activities.

Reforestation. The renewal of forest cover by seeding, planting, or natural means.
Revegetation. The replacement of vegetative cover which has been harvested or lost due to natural occurrences. Accomplished either through planting of nursery stock or seeding, or through natural processes.

Riparian Areas. Geographically delineable areas with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems.

Riparian Ecosystem. A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Rip Rapping. The use of large rock, boulders, concrete chunks or similar non-erosive, heavy objects as an armoring device.

Road Maintenance Plan. A documented schedule and program for upkeep of roads to provide a level of service for the user and protection of resources. There are five levels of maintenance: Level I being the least intense and Level V being the most intensive.

Rocking. The application of aggregate to a roadbed to provide strength and a more stable erosion resistant surface.

Sale Area Map. A map of suitable scale and detail to be legible which is part of a timber sale contract. The map identifies sale area boundaries and contract requirements specific to the sale.

Significant Disturbance. Disturbance of surface resources, including soil, water and vegetation, which has the potential to degrade water quality to a level requiring corrective action.

Site Preparation. A general term for removing unwanted vegetation, slash, and even roots and stones from a site before reforestation. It is generally accomplished by either mechanical, chemical, or biological means, or controlled fire.

Site Specific. Pertains to a discernible, definable area or point on the ground where a project or activity will (or is proposed) to occur.

Soil and Water Conservation Practices (SWCP). The set of practices which, when applied during implementation of a project, ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water-related beneficial uses are protected. These practices can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the States and thus are recognized as Best Management Practices (BMPs). Others are defined by the Forest interdisciplinary teams or described in Forest Service Manuals and Handbooks. Both kinds of SWCPs are included in the Forest Plans as Forestwide standards or are referenced in the plans. A third kind of SWCP is identified by the interdisciplinary team for application to specific management areas. These are included as Management Area Standards in the appropriate management areas in the Forest Plan. A fourth kind, site specific SWCPs, are based on project level evaluation and represent the most effective and practical means of accomplishing the soil and water resource goals and protecting the beneficial uses of a specific area. These site specific conservation practices supplement the Forest Plan for specific projects. In Idaho, these

site specific SWCP's are recognized as specialized Best Management Practices in the State's Water Quality Regulations. This handbook will aid in the development of the fourth kind of SWCP.

Soil Productivity. The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture, nutrients, texture, structure, organic matter, and length of growing season.

Special Use Permit. A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest System lands for some special purpose.

Specified Road. A forest development transportation system road that is identified in and to be constructed or reconstructed under a Forest Service timber sale contract.

Stream or Streamcourse. A natural channel with defined bed and banks. It may be perennial, intermittent, or ephemeral.

Streamside Management Zone (SMZ). A designated zone that consists of the stream and an adjacent area of varying width where management practices that might affect water quality, fish, or other aquatic resources are modified. The SMZ is not a zone of exclusion, but a zone of closely managed activity. It is a zone which acts as an effective filter and absorptive zone for sediment; maintains shade; protects aquatic and terrestrial riparian habitats; protects channel and streambanks; and promotes floodplain stability. The SMZ may be wider than the riparian area.

Wetlands. Those areas that are inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstances do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Windrowing. To pile slash or debris in a row along the contour of the slope.

CHAPTER 10 - SOIL AND WATER CONSERVATION PRACTICES DOCUMENTATION

Contents

10.10 - Introduction. Soil and water resources and water-related beneficial uses are best protected during land disturbing activities from nonpoint source pollution by use of site specific, soil and water conservation Practices. These are developed in an interdisciplinary process. This process places emphasis for maintenance and protection of these resources and uses on the application of the site specific practices, monitoring successes and failures, and adjusting the practices and/or evaluation criteria until the resources are protected. This handbook describes this process and provides some examples of proven soil and water conservation practices for consideration. To develop and implement site specific practices, design standards and risks, environmental effects, practicality, and institutional, political, social, economic, and technical feasibility must be considered. The subsequent discussion on the process in 10.1-10.4 is supported and additional described by W.C.Harper in "A Resource Agency's Perspective On Nonpoint Source Management" (Symposium on Monitoring, Modeling, and Mediating Water Quality, American Water Resources Association, May 1987, pages 641-652).

The soil and water conservation practices that are presented in this handbook are generally the initial development stage for site specific practices. They were compiled from Forest Service manuals, handbooks, contract and permit provisions, and policy statements. Their use or modification as more site specific conservation practices will directly or indirectly improve water quality, protect beneficial uses, reduce losses in soil erosion and productivity, and abate or mitigate management effects, while meeting other resource goals and objectives.

These soil and water conservation practices in this handbook are of three basic forms: administrative, preventive, and corrective. They are not detailed solutions for specific problems. However, in some instances, specific examples and practices are provided. For the most part, they are purposely broad to

ensure site specific adaptation prior to their use. In addition, they identify management requirements and considerations to be addressed prior to and during the formulation of alternatives and the project implementation of land management activities.

10.20 - Development Considerations. The effects of land management activities on soil and water resources and water-related beneficial uses vary considerably. The extent of these management effects on these resources and uses is a function of:

a. The physical, meteorologic, hydrologic, and biologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil type, vegetative cover, etc.).

b. The specific water-related beneficial use(s), the importance to various publics, and the sensitivity to management influences.

c. The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its real extent and magnitude.

d. The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant use vs. seasonal use, recurrent application or one-time application, etc.).

e. The season of the year that the activity occurs or is applied.

These factors vary within the National Forest System lands in the Northern and Intermountain Regions and from site to site. It follows then that the extent and kind of impacts are variable, as are the abatement and mitigation measures. No specific practice, method, or technique is best for all circumstances. Thus, the soil and water conservation practices presented in this handbook include such phrases as "according to design," "as prescribed," "suitable for," "within acceptable limits," and similar qualifiers. The actual specifications, designs, and site specific conservation practices must be the result of evaluation and development by professional personnel through interdisciplinary involvement in the NEPA process. This results in conservation practices that are tailored to meet local resource requirements and needs for site specific conditions.

Area universities and Research have generated much information that can be utilized for development of appropriate conservation practices. However, this information tends to be developed for a specific site. While such information is valuable, it should be used with caution when developing conservation practices. This information may not adequately reflect site specific conditions associated with other projects or locations, or consider spatial and temporal distribution of other land management activities.

Additionally, it is important to establish an acceptable level of risk associated with failure in developing site specific conservation practices. Since land managers must work with the natural environment, all its complexities, and therefore uncertainty, it is necessary to accept some level of risk with any design. An important but difficult task is to agree on an acceptable level of risk for given projects based on possible impacts on other resources, and the need to conduct the management activity for multiple uses. It must be recognized that acceptance of risk dictates that there will be some projects which will fail to meet an absolute standard. Through the process of monitoring, evaluation, and adjustment of SWCP'S, soil and water resources and water-related beneficial uses can be maintained and protected.

NEPA and Interdisciplinary Involvement.

The NEPA process and interdisciplinary involvement is critical for the development of site specific conservation practices. Direction for the NEPA process (environmental analysis and documentation) is

contained in Forest Service Policy and Procedures that are found in FSM 1950 and FSH 1909-15. They also provide direction to incorporate the interdisciplinary process in planning and decision making.

The soil and water conservation practices detailed in this handbook were utilized in Forest Planning in the Northern and Intermountain Regions and now supplement all Forest Plans. The interrelationships between Forest Planning and Forest Plan Implementation (project identification/organization, design/preparation, and execution/administration) are described in FSM 1922.5 and FSH 1909.12, and being further refined by informational and awareness efforts in both Regions. During Forest Plan Implementation, the Soil and Water Conservation Practices Handbook together with the Forest Plan are used by the interdisciplinary team to develop site specific conservation practices.

In NEPA, interdisciplinary involvement is essential to the success of the process. Interdisciplinary involvement is the use of a team of individuals who represent two or more areas of professional knowledge, learning, and/or skill. They concentrate on the same subject, such as development of conservation practices, to derive a common resolution or product. The team is not necessarily a fixed assortment of professionals. Team members represent the skills necessary to provide input for alternative formulation, evaluation, and conservation practice development. They are identified by either a core team of technical staffs, the Staff Officer, the Line Officer or a combination of all three. The final team composition is approved by the Line Officer with project approval authority.

The Forest Service utilizes interdisciplinary involvement to investigate problems, evaluate alternatives, analyze environmental considerations, develop site specific practices, and aid decision making. The responsibility for making the decision lies with the Line Officers (i.e., District Rangers, Forest Supervisors, etc.), not the team. The team's responsibility is to provide the responsible official with alternatives and evaluations needed to make a reasonable decision.

10.30 - Application. After development of site specific conservation practices, they are Implemented on the ground along with other specific requirements, controls, and considerations that were built into a project activity.

A training and information program for personnel that are involved in application of conservation practices is critical to ensure maximum effectiveness of the practice in maintenance and protection of soil and water resources and water-related beneficial uses. This training and information program should involve Forest Service resource staff, Line Officers, and State Water Quality personnel. It should cover resource protection, water quality and beneficial use management opportunities, cause and effect relationships, and the relevance of conservation practices, their legal aspects, and their application. In addition to Contracting Officers, Engineering Representatives, and certified Sale Administrators, disciplines involved in activities which have the potential to affect water quality, beneficial uses, and soil resources should be offered more intensive training.

10.40 - Feedback Mechanism. Following application of site specific conservation practices, trey are monitored and evaluated. Subsequent adjustments and modifications are made to the conservation practices and/or evaluation criteria until the soil and water resources and water-related beneficial uses are protected. This feedback mechanism is absolutely necessary to ensure sound land stewardship by the Forest Service.

Monitoring

Monitoring is the first step of the feedback mechanism. It is designed to answer questions about site specific conservation practice development, application, and effectiveness. Specific questions may be:

-Were the appropriate conservation practices included in the project?

-Did the project follow the plan?

-Are the conservation practices technically sound and appropriate for the specific site conditions?

-Is there a better conservation practice to apply which is technically sound, aconomically feasible, within institutional authority, and protects the resources?

-Were personnel, equipment, funds, or training lacking which resulted in incomplete or inadequate application?

-How effective were the site specific conservation practices in meeting the evaluation criteria?

Monitoring also is designed to seek answers about the appropriateness of practices in maintaining or protecting soil and water resources and water-related beneficial uses. Some questions may be:

-Are the practices protecting the soil and water resources and beneficial uses?

-Do the parameters that are monitored establish the right indices to indicate protection of resources or uses?

-Is there a cause and effect relationship between the conservation practices and soil and water resources and beneficial uses?

-Was the hydrologic risk that was built into the practice exceeded?

To monitor all aspects of site specific conservation practices, an appropriate mix of both extensive and intensive monitoring is needed and performed at established intervals. Extensive monitoring is the primary means that the Forest Service will use to evaluate the development, application, and effectiveness of conservation practices. It can be characterized by use of project reviews and collection of both quantitative and qualitative information on nearly all project activities. Intensive monitoring tends to be determination of cause/effect relationships and specific conservation practice effectiveness both on a representative sample basis. This type of monitoring obtains mostly quantitative information. Both extensive and intensive levels of monitoring are described and further discussed in Forest Service manuals and handbooks.

Evaluation

Evaluation is the second step in the feedback mechanism. To evaluate monitoring information and judge the effectiveness of site specific conservation practices, evaluation criteria must be defined. The Forest Plan standards and State Water Quality Standard Criteria have been developed to serve as the evaluation criteria. These criteria should be defined in quantitative terms, whenever possible. However, they should avoid instantaneous measurements given the dynamic nature of nonpoint source conditions. These criteria should recognize and consider the attributes and characteristics of the particular resource or use, natural variability and background, limits of acceptable change in magnitude and duration, transport mechanisms and pathways, time delayed effects, and risk.

In design of monitoring and during evaluation, certain elements in the application of soil and water conservation practices must be recognized and acknowledged. The first of these is that a certain risk of failure is inherent in each site specific conservation practice utilized. This risk is a balance between the value of the resources) to be protected and the cost of additional units of protection. Monitoring and evaluation must not only measure effects but must determine when a design failure point has been exceeded. This has been discussed earlier in this chapter (Development Considerations).

Another consideration is recognition that the link between land management activities and the resulting impacts on soil and water resources and water-related beneficial uses is not always well understood. Monitoring and evaluation must be designed to improve our knowledge of this link and to provide an early warning system where little research information exists for guidance. Where adequate research information exists for similar conditions, the use of site specific conservation practices that are designed and based on this information can be reasonably expected to protect the soil and water resources and beneficial uses. In this case, monitoring and evaluation need not be so intensive.

The use of sometimes inappropriate, State Water Quality Standard Criteria in evaluation is another element to recognize. With existing technology, it is extremely difficult to determine the natural background levels and variability to a level of precision and accuracy necessary for direct control by numeric, State Water Quality Standards. This difficulty is particularly evident when considering the tremendous temporal and spatial variability of soil and water resources and water-related beneficial uses. Because many existing water quality standards do not recognize this variability, they may be of limited value as an evaluation criteria for nonpoint source activities. For this very reason, State Water Quality Standards for nonpoint sources in conjunction with conservation practices are also monitored, evaluated, and adjusted, if necessary. Without any adjustment, there is a danger that site specific conservation practices will be required that are technically sound and feasible but are of little or no value in protecting soil and water resources and beneficial uses.

Adjustment

The last step of the feedback mechanism is adjustment. If monitoring and evaluation indicates evaluation criteria not being met, an adjustment of the site specific conservation practices are needed. This adjustment will vary dependent upon the type and severity of the impact to the soil and water resource or beneficial use. For minor or moderate impacts, the conservation practice will be redesigned or upgraded to assure the criteria are not exceeded. When the impact is major, the project activity will be reevaluated, redesigned, or dropped, or the application process for practices and other project requirements revised. Corrective actions to prevent or minimize the impact will be initiated immediately. Additionally, the appropriate evaluation criteria are reviewed for adjustment.

This feedback mechanism is an iterative type process. Through the continuous cycle of monitoring, evaluation, and adjustment of conservation practices and/or evaluation criteria , the site specific conservation practices will lead to achievement of evaluation criteria (i.e., State Water Quality Standards and Forest Plan standards) and protection of soil and water resources and beneficial uses.

10.50 - Format. The general format used to present each of the conservation practices in this handbook is as follows:

Heading	Context
PRACTICE	-Includes the sequential number of the practice and a brief title. The numbering of the activities does not have any intended significance.
OBJECTIVE	-Describes the desired results or attainment of the practice as it relates to soil and water resource or beneficial use protection.
EXPLANATION	-Further defines the brief title and expresses how the practice is applied. Describes criteria or standards used when applicable.
IMPLEMENTATION	-Describes where the practice is applies, who is responsible for application, direction and supervision, and when the practice is employed.

REFERENCES	-Identifies the Forest Service manual, Handbook, contract or permit provision, Code of Federal Regulation, policy statement and/or other references where the practice is further documented. The references listings are not all inclusive.

Soil and water conservation practices are grouped by management activity for ease of presentation and understanding. The activities are: (11) Watershed Management, (12) Recreation, (13) Vegetation Manipulation, (14) Timber, (15) Roads and Trails, (16) Minerals, (17) Range, and (18) Fire Suppression and Fuels Management. Although a practice might be shown under only one activity designation, it may apply to another activity. A number of the practices are referenced to more than one activity, and some apply to all activities.

11 - WATERSHED MANAGEMENT. Watershed management is the practice of protecting and maintaining soil and water resources and water-related beneficial uses. Management is oriented toward maintaining or enhancing watershed conditions favorable for optimum water yield and timing, water quality, and soil productivity. Watershed management includes the improvement of soil and water resources on National Forest lands damaged by catastrophic events or degraded by past use.

PRACTICE: 11.01 - Determination of Cumulative Watershed Effects

OBJECTIVE: To determine the cumulative effects or impacts on beneficial water uses by multiple land management activities. Past, present, or reasonably foreseeable future actions in a watershed are evaluated relative to natural or undisturbed conditions. Cumulative impacts are a change in beneficial water uses caused by the accumulation of individual impacts over time and space. Recovery does not occur before the next individual practice had begun.

EXPLANATION: The Northern and Intermountain Regions will manage watersheds to avoid irreversible effects on the soil resource and to produce water of quality and quantity sufficient to maintain beneficial uses in compliance with State Water Quality Standards. Examples of potential cumulative effects are: 1) reduced natural woody debris input to stream channels that may cause reductions in fish habitat; 2) excess sediment production that may reduce fish habitat and other beneficial uses; 3) water temperature and nutrient increases that may affect beneficial uses; 4) compacted or disturbed soils that may cause site productivity loss and increased soil erosion; and 5) increased water yields and peak flows that may destabilize stream channel equilibrium.

IMPLEMENTATION: As part of the NEPA process, the Forest Service will consider the potential cumulative effects of multiple land management activities in a watershed which may force the soil resource's capacity or the stream's physical or biological system beyond the ability to recover to near natural conditions. A watershed cumulative effects feasibility analysis will be required of projects involving significant vegetation removal, prior to including them on implementation schedules, to ensure that the project, considered with other activities, will not increase sediment or water yields beyond or fishery habitat below acceptable limits. The Forest Plan will define these acceptable limits. The Forest Service will also coordinate and cooperate with States and private landowners in assessing cumulative effects in multiple ownership watersheds.

REFERENCES: 40 CFR 1508.7; for portions of Montana--Montana Department of State Lands Cumulative Watershed Effects Cooperative; for Idaho Forests--Idaho Forest Practices Water Quality Management Plan, 1987; R. N. Coats and T. 0. Miller. 1981. Cumulative Silvicultural Impacts on Watersheds: A Hydrologic and Regulatory Dilemma. Envir. Mgt. 5(2):147-160.

PRACTICE 11.02 - Soil and Water Resource Monitoring and Evaluation

OBJECTIVE: To determine effects of land management activities on soil productivity and beneficial water uses; to monitor baseline watershed conditions for comparison with State standards, Forest Plan standards, and estimation of long-term trends; to ensure the health and safety of water users; to evaluate SWCPs effectiveness; and to determine the adequacy of data, assumptions, and coefficients in the Forest Plans.

EXPLANATION: The Northern and Intermountain Regions will manage watersheds to avoid irreversible effects on the soil resource and to produce water of quality and quantity sufficient to maintain beneficial uses in compliance with State Water Quality Standards. Monitoring and evaluation are needed as feedback mechanisms to compare the results of management activities and SWCPs on soil and water resources with previous conditions, desired end products, and State standards. To accomplish this, a comparison will be made, on a representative sample basis, of effects on soils and water over time. Previous monitoring and evaluation has included, for example:

a. Bulk density, soil disturbance, and/or tree growth to evaluate soil productivity.

b. Fecal coliform and pH to monitor swimming sites.

c. Sediment, turbidity, and water temperature to evaluate domestic water supplies.

d. Sediment, dissolved oxygen, water temperature, pH, cobble embeddedness, percent fines in substrate, and channel cross sections to monitor effects on fisheries.

IMPLEMENTATION: Forest Plans will provide watershed monitoring plans that are focused on beneficial water uses such as domestic supplies, recreation, and fisheries, and on soil loss and productivity. Regionally approved monitoring techniques will be used. Specific monitoring plans will be coordinated among adjacent National Forests and with State water quality agencies. Specific monitoring and evaluation plans will include such items as:

a. Monitoring objectives,

b. Review of existing data and information,

c. Location of monitoring sites,

d. Soil or water quality characteristics that are to be monitored and evaluated,

e. Type(s) or techniques) of monitoring,

f. Intensity of monitoring (frequency and duration),

g. Responsibilities and roles of monitoring personnel,

h. Methodology for analysis and evaluation,

i. Estimated cost, and

j. Report preparation.

When changes and effects from management activity are detected, the Forest Service will evaluate their significance and determine appropriate action. Where project level activities will not meet Forest Plan or State standards, they will be redesigned, rescheduled or dropped.

The EPA computerized STORET system is the accepted repository for water quality data collected to monitor and evaluate Forest programs and management activities. Water quality data will be placed in this computer system for storage, manipulation and review.

REFERENCES: FSM 1922, 2525, 2532, and 2554; SWCP Handbook 10.40 Feedback Mechanism; Land and Resource Management Planning Handbook, Chapter 6 (FSH 1909.12); 36 CFR 219; Solomon, R.A. and Avers, P.E., 1987. A Water Quality Monitoring Framework to Satisfy Legal Requirements. AWRA Symposium on Monitoring, Modeling, and Mediating Water Quality. pp. 231.242; Soil Monitoring Handbook (FSH 2509.18); State Water Quality Standards; for Idaho Forests--Idaho Forest Practices Water Quality Management Plan, 1987; SWCP 12.02, 12.03 and 13.09; S. L. Ponce. 1980. Water Quality Monitoring Programs. USDA, Forest Service, WSDG Tech. Paper - 00002. 66 pp.; for R-4--R-4 Technical Guide for Preparing Water Quality Monitoring Plans, USDA, Forest Service, 1981.

PRACTICE 11.03 - Watershed Improvement Planning and Implementation

OBJECTIVE: To improve degraded watershed conditions, to minimize soil erosion, and to improve water availability or quality.

EXPLANATION: Watershed improvement is a corrective measure. Factors considered in the evaluation of soil and water resource problems and subsequent improvement are: predicted changes in water quality and its associated effects on beneficial uses, downstream values, on-site productivity, threat to life and property, direct and indirect economic returns, and social and scenic benefits. Examples of watershed improvement measures are stream bank stabilization, debris removal, soil ripping, seeding, and fertilizing.

IMPLEMENTATION: This conservation practice is typically implemented through the development of a soil and water resource improvement inventory, the approval of cost effective plans, and the funding of the plan and subsequent improvement action. If a soil and water resource problem is observed and documented by Line Officers, an interdisciplinary team will assess each site, develop the necessary actions to correct the problem and integrate them into the Forest Planning process for funding and execution. The NEPA process will be followed in the planning and implementation of improvement measures. The actual implementation work may be done by Forest Service crews or contract. Effectiveness of improvement measures will be monitored and evaluated.

REFERENCES: FSM 2522; Watershed Improvement Handbook (FSH 2509.15); NFMA.

PRACTICE: 11.04 - Foodplain Analysis and Evaluation

OBJECTIVE: To protect floodplain values and avoid, where possible, the long and short-term adverse impacts to soil and water resources associated with the occupancy and modification of floodplains.

EXPLANATION: A flood hazard analysis and evaluation will be made prior to acquisition or exchange of land within floodplains. A floodplain analysis and evaluation will be made when sites within

floodplains are being considered for structures, developments, or management activities. Environmental quality, ecological effects, and individual safety and health are considered. Flood frequencies, watershed conditions, climatic and environmental factors associated with past flood events, flood flow quantities and specific flood boundaries are all evaluated.

IMPLEMENTATION: The Regional Forester is responsible for ensuring consideration of floodplain hazards and values in all NEPA planning processes. The Forest Supervisor, through use of his technical staffs, is responsible for:

a. Determining if proposed facilities are within 100 and 500 year floodplain boundaries

b. Determining if data currently exist about floodplain boundaries;

c. Documenting analysis of floodplain hazards and management options;

d. Requiring flood hazard evaluations prior to issuance of special-use permits;

e. Ensuring that floodplain hazards, management considerations, and appropriate restrictions are included in authorizing documents;

f. Designing, constructing, or rehabilitating National Forest real property in accordance with criteria outlined in the National Flood Insurance Program.

g. Providing for conspicuous marking of highest past and probable future flood heights on permanent structures including those in developed recreation sites.

REFERENCES: EO 11988, Floodplain Management; FSM 2527; Maxwell, J. and LaFayette, R., 1986. Guidelines for Making Floodplain and Wetland Evaluations for Land Exchanges. USDA, Forest Service, Southwestern Region Hydrology Note No. 19a.

PRACTICE: 11.05 - Wetlands Analysis and Evaluation

OBJECTIVE: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands.

EXPLANATION: The Forest Service does not permit the implementation of activities and new construction in wetlands whenever there is a practical alternative. Through the NEPA process, a wetland analysis and evaluation will be made prior to acquisition or exchange of wetlands. Evaluation of proposed actions in wetlands will consider factors relevant to the proposal's effect on the survival and quality of the wetlands. Factors to be considered include water supply, water quality, recharge areas, flood and storm hazards, flora and fauna species, soil types, habitat diversity and stability, and hydrologic utility.

IMPLEMENTATION: The Regional Forester is responsible for insuring wetland values are considered and documented as an integral part of all planning process. The Forest Supervisor, through use of his technical staffs, will determine whether proposed actions should be located in wetlands and, if so, whether there is a practicable alternative. If there are no viable alternatives, the Forest Supervisor must insure that all mitigating measures are incorporated into the plans and designs and that the actions maintain the function of the wetlands. Identification and mapping of wetlands are part of the Forest Planning process.

REFERENCES: EO 11990, Protection of Wetlands; FSM 2527; Maxwell, J. and LaFayette, R., 1986. Guidelines for Making Floodplain and Wetland Evaluations for Land Exchanges. USDA, Forest Service, Southwestern Region Hydrology Note No. 19a.

PRACTICE 11.06 - Public Supply Watershed Management

OBJECTIVE: To manage community and noncommunity public supply watersheds to comply with State water quality standards.

EXPLANATION: The Northern and Intermountain Regions will manage public supply watersheds for multiple use with special emphasis on providing water suitable for human consumption within the realm of State Water Quality Standards, water supply regulations, and Forest Plan standards.

IMPLEMENTATION: Watersheds identified by the States as public supply watersheds will be recognized in Forest Plans. Forest Plans will include management goals and standards which will guide the management of the watershed and result in compliance with State Water Quality Standards. All project plans will be reviewed through the NEPA process which includes review by the appropriate State agency and by the water users and tiered to direction in the Forest Plans and EIS.

REFERENCES: FSM 2542; State Drinking Water Standards; State Public Water Supply Regulations; 36 CFR 251.

PRACTICE 11.07 - Oil and Hazardous Substance Planning

OBJECTIVE: To minimize contamination of waters from accidental spills by prior planning and development of Spill Prevention Control and Countermeasure Plans.

EXPLANATION: A contingency plan is an immediate reporting and action plan that contains a predetermined organization to be implemented in the event of a hazardous substance spill. Factors considered for each spill are: the specific substance spilled, the quantity, its toxicity, proximity of spill to waters, and the hazard to life, property, and the environment.

The Spill Prevention Control & Countermeasure (SPCC) plan is a document which requires appropriate measures to prevent oil, petroleum products, or known hazardous materials that could be spilled from entering the navigable waters of the United States. An SPCC plan is needed if the total, above ground storage of oil, petroleum products, or known hazardous materials exceeds the appropriate "reportable quantity" and if these facilities could reasonably be expected to discharge these hazardous substances into surface waters in the event of a spill.

IMPLEMENTATION: Each Forest is responsible for designating emergency spill coordinators and documenting names and telephone numbers of agencies to call regarding notification and clean-up of spills. Individual Forests may maintain an inventory of materials to use during the clean-up of a spill. Disposal sites will be coordinated with EPA, State, and local officials responsible for safe disposal.

If a spill is from a Forest Service facility or operation, the Forest Service is the "person in charge" and is responsible for all reporting and immediate response actions, as appropriate. If the spill is from a third party operation, the Forest Service will only respond and report the spill if the third party fails to take appropriate action. The Forest Service will generally turn its incident command role over to authorized, Federal On-Scene Coordinators or other authorized, State or local authorities after their arriving at the spill site, and provide support services.

SPCC plans are required for Forest Service owned and special use permitted facilities, and include timber sale operators and other construction contractors. All SPCC plans must be reviewed and certified by a registered professional engineer.

REFERENCES: FSM 6740, 7442, 7443, and 7460; 40 CFR 112; Health and Safety Code Handbook (FSH 6709.011); Safety and Health Program Handbook (FSH 6709.12); R-1 and R-4 Emergency and Disaster Plan; Oil and Hazardous Substances Pollution Contingency Plan for EPA Regions 8 and 10, 7/26/85; State Hazardous Waste Management Plans; SWCP 11.11, 13.07, and 13.10.

PRACTICE 11.08 - Control of Activities Under Special Use Permit

OBJECTIVE: To protect surface and subsurface soil and water resources from physical, chemical, and biological pollutants resulting from activities that are under special use permit.

EXPLANATION: Many activities and uses take place on National Forest lands which are not directly related to Forest Service management activities. Some examples are: hydropower plants, water diversions and water transmission systems, electronic sites, highway and railroad rights-of-way, waste water treatment and disposal, solid waste disposal, and power transmission lines. There are other uses which are recognized Forest Service land management activities which are achieved through permits to a public or private agency, group, or individual. Examples of these types of uses are: organization camps, recreation residence tracts, and ski areas.

Management objectives and Forest Service authority may be limited on lands withdrawn under Federal Energy Regulatory Commission (FERC) authority. When the FERC license is renewed, the Forest Service makes a complete reevaluation of water quality and quantity needs, values, and effects, and updates the management controls within which the permittee must comply.

IMPLEMENTATION: The special use permit under which these agencies, groups, or individuals operate, details the conditions that they must meet to continue operating. The permittees are required to conform to all applicable State and local regulations governing water quality and sanitation. Failure on the part of the permittee to meet the conditions of the special use permit may result in the permit being revoked. Relevant SWCPs from this and other sections may be required: 11.01, 11.04, 11.05, 11.07, 11.10, 11.11, 12.04, 12.06, 12.07, 12.08, 13.04, 13.07-13.13, 14.12-14.14, 14.20, 15.01-15.18, 15.21.

REFERENCES: FSM 2700.

PRACTICE: 11.09 - Management by Closure to Use

OBJECTIVE: To exclude activities that could result in damages to facilities or degradation of soil and water resources.

IMPLEMENTATION: Closures (seasonal, temporary, or permanent) are made when the responsible Line Officer determines that a particular resource or facility needs protection from use. The decision to close an area is made after an evaluation of alternative methods of protection.

REFERENCES: EO 11644, Use of Off-Road Vehicles on the Public Lands, and 11989, Off-Road Vehicles on Public Lands; SWCP 12.10.

PRACTICE: 11.10 - Water Well Construction and Management

OBJECTIVE: To protect ground water resources from contamination transmitted from water well developments.

EXPLANATION: Ground water wells and facilities will be completed in a manner that reduces the potential of contamination of the ground water aquifer. Properly designed well casing programs and above ground well collars will minimize the risk of incidental contamination from grazing livestock and human activities.

IMPLEMENTATION: Water well design standards will contain measures to exclude livestock from the immediate vicinity of the well bore and to prevent the accidental or purposeful introduction of toxic substances into the well bore by humans. Protective measures may include grading to direct surface waters away from the well bore, cementing or grouting around the casing pipe, well covers and seals, fencing, and imposing minimum distances between wells and sewage systems. Abandoned wells will be permanently sealed in compliance with local and state requirements.

REFERENCES: Structural Range Improvement Handbook (FSH 2209.22); Water Developments and Sanitation Handbook (FSH 7409.11); Engineering Field Manual for Conservation Practices, 1969, U.S. Soil Conservation Service, Chapter 12, Springs and Wells; Recommended Standards for Water Works (Ten States Standards), New York Health Education Service; State Drinking Water Standards; State Well Construction Standards.

PRACTICE: 11.11 - Petroleum Storage and Delivery Facilities and Management

OBJECTIVE: To protect surface and subsurface soil and water resources from petroleum fluid contamination resulting from leaking petroleum delivery systems and storage facilities.

EXPLANATION: Petroleum delivery and storage facilities will be located, designed, constructed, and maintained in a manner that minimizes the potential for contamination of surface and subsurface soil and water resources from leaking flowlines, pipelines and storage tanks. Roads, vegetative manipulation, and other considerations should be evaluated in the construction and maintenance of these facilities.

IMPLEMENTATION: The siting and operation of petroleum delivery systems and storage facilities will follow applicable Federal (EPA) and state guidelines and requirements with regard to:

a. Design/Location

b. Construction

c. Installation

d. Operation procedures

e. Testing

f. Release detection systems

g. Recordkeeping requirements

h. Leak/spill reporting requirements

i. Abandonment

Storage facilities and delivery systems on National Forest lands will require a license and/or special use permit. Licenses and permits require the project to comply with all State and local standards. Relevant

SWCPs from this and other sections may be required: 11.04, 11.05, 11.07, 11.08, 11.10, 13.04, 13.07-13.13, 14.12-14.14, 14.20, 15.01-15.18, 15.21.

REFERENCES: Resource Conservation and Recovery Act of 1976, (90 Stat. 2795), as amended; Underground Storage Tank Regulations (40 CFR Part 280); State Hazardous Waste Management Plans; FSM 7460.

PRACTICE: 11.12 - Administrative Site Planning and Management

OBJECTIVE: To locate, design and manage administrative sites to prevent water pollution and other adverse environmental and health impacts.

EXPLANATION: Several types of facilities may be located on Forest Service land to facilitate the administration of various programs. These may include Ranger and Research stations, work centers, fire depots and nursery offices. Some facilities include living quarters with wastewater systems. Most include potable water systems. Water quality and potential health impacts should be a major factor in determining the size, type, and location of new or expanded facilities.

IMPLEMENTATION: New or expanded facilities should not be located within floodplains, wetlands, or riparian areas. Individual facilities should be located to minimize sediment production and the movement of potential pollutants (oil, gas, etc.) into surface and ground waters. All potable water and sewage treatment systems will meet State and local standards. Regional Forest Service programs that guide operation and maintenance of wastewater facilities will be implemented by qualified sanitary personnel. Relevant SWCPs from this and other sectons may be required: 11.04, 11.05, 11.10, 11.11, 12.04, 12.06, 12.07, 15.26.

REFERENCES: FSM 7420, 7430, 7440, and 7460.

PRACTICE: 11.13 - Sanitary Guidelines for Construction of Temporary Labor, Spike, Logging, and Fire Camps and Similar Installations

OBJECTIVE: To eliminate water pollution and other potential environmental and health impacts from the disposal of human waste and wastewater from temporary camps of all types.

EXPLANATION: Environmental and health impacts associated with these camps can be adverse if care is not taken to properly plan, locate, and design wastewater facilities. In establishing site locations, sewage disposal consideration should not be overlooked. Despite the sometimes urgent development of a site, wastewater design should be a primary consideration. This should result in adequate sewage disposal facilities, and little or no health and water pollution threats.

The same applies to the urgent establishment of fire camps. Sufficient care should always be given to the potential Impacts associated with human waste and wastewater disposal. Disposal facilities at existing stations or work centers can be overloaded by fire crews. If this occurs, septic tanks may be overloaded, solids may overflow and plug drainfields, and drainfields may be damaged. Surfacing effluent becomes a potential pollution and health hazard.

IMPLEMENTATION: Appropriate planning will be required and completed for each site by competent technical resource staffs. Systems will be designed to meet requirements of applicable Federal, State and local regulations. Forest Supervisor approval will be obtained prior to construction.

Wastewater treatment and disposal systems at administrative sites will be evaluated as to their capacity to handle fire, emergency, or other crews. Emergency measures such as chemical toilets and portable showers will be considered as an alternative to use of on-site systems.

Latrines or pits for camps will be located at least 150 feet downstream from the camp, 100 feet from surface water, and 4 feet above high groundwater. Latrines will be replaced with chemical toilets or similar units as soon as practicable.

REFERENCES: Health and Safety Code Handbook (FSH 6709.11, Chapter 7-9); FSM 7420, 7430, and 7440; SWCP 12.04, 12.06, 12.07, and 12.09.

PRACTICE: 11.14 - Management of Snow Survey Sites

OBJECTIVE: To protect snow courses and related data sites from effects by land management activities.

EXPLANATION: Snow survey sites are invaluable for forecasting water yields from mountain watersheds and predicting the availability and timing of streamflow. These sites can consist of snow courses, snow pillows, precipitation gauges, snow depth markers, and soil moisture stations with or without radio telemetry and radio repeaters. Formal Memorandum of Understanding, special use permits, or other mechanisms have been developed between the Soil Conservation Service (SCS) and Forest Service to protect these sites against activities or disturbing influences that would damage their value.

IMPLEMENTATION: During the NEPA process for land disturbing activities, the interdisciplinary team will consult land status records, special use permits, and other sources to insure identification of any snow survey sites within the assessment area. If sites are identified, they will be protected according to the terms of the memorandum of understanding, special use permit, or other mechanism. Line Officers should request assistance from the SCS in designing measures to protect and buffer these sites. The Forest Service and SCS will also cooperate on the elimination of ineffective sites and installation of additional snow courses or sites to improve the reliability of runoff forecasts. If it becomes necessary to conduct activities which may affect a snow course or related data site, Line Officers must consult the SCS and follow the Instructions of the agreement.

REFERENCES: FSM 2530 and 2720; FSM 1541.1--1to 7 (FSM 1/87 R-1 Supp. 50) or FSM 2504.2--9 to 16 (FSM 2/79 R-4 Supp. 56).

12 - RECREATION. Recreation on National Forest System lands falls into two general categories: developed and dispersed. Developed recreation is the term used to describe recreation areas that have been designed and built to provide some facilities to the user. These are campgrounds where tables, fire places, toilets, etc., have been provided. Recreational residences, resorts, ski areas, and other similar facilities are considered developed recreation.

Dispersed recreation is outdoor recreation use which occurs outside of sites developed or managed for concentrated recreation use. Facilities are, however, sometimes required to safeguard visitors, protect resources, enhance the quality of visitor experiences, and disperse users. Dispersed recreation also includes the table-under-the-tree type of facility, portable toilets in otherwise undeveloped sites, trailheads, and trails.

PRACTICE: 12.01 - Recreation Facilities Planning

OBJECTIVE: To introduce soil and water resource considerations into Recreation Facilities Planning.

EXPLANATION: Recreation facilities include developed sites such as campgrounds, picnic areas, boat ramps, etc., and special use facilities such as ski areas, summer homes, and organizational camps. Individual site plans are prepared for each facility.

IMPLEMENTATION: An interdisciplinary team identifies potential impacts to water quality and soil productivity during the NEPA process. The NEPA process identifies mitigating measures needed to protect soil and water resources. Consideration should be given to appropriate location and design of facilities and to the secondary impacts due to continuing use.

REFERENCES: NFMA; NEPA; FSM 2332 and 2333.

PRACTICE: 12.02 - Monitoring and Evaluation of Water Quality at Designated Swimming Sites

OBJECTIVE: To insure the health and safety of water contact recreationists at designated National Forest Swimming Sites.

EXPLANATION: The monitoring and evaluation for bacterial contamination of water quality is recommended at all designated swimming sites. Analysis values are tested against State Water Quality Standards for primary contact recreation.

IMPLEMENTATION: As a part of SWCP 11.02, the water quality for swimming sites is monitored and evaluated. If State Standards are exceeded, the area will be closed to all contact recreation use until the cause or causes have been identified and remedied.

Closure is the responsibility of the Forest Supervisor or the District Ranger.

REFERENCES: FSM 2532 and 2335; State Water Quality Standards.

PRACTICE: 12.03 - Sanitary Surveys to Augment the Evaluation of Designated Swimming Waters

OBJECTIVE: To provide information regarding potential hazards or the cause of an existing problem which is a health hazard.

EXPLANATION: This practice is designed to augment the monitoring and evaluation of swimming waters (SWCP 12.03). Adjacent areas and the aquatic environment are examined to detect potential or existing health hazards. The survey provides information needed in defining the cause(s) of contamination, if evaluation of swimming waters shows standards have been exceeded.

IMPLEMENTATION: A sanitary survey will be made prior to the development of plans for each new swimming facility. All areas where swimming is specifically encouraged or permitted should have a sanitary survey as soon as practical. Subsequent surveys will be repeated periodically. Results of the survey are documented and provided to the Forest Supervisor and District Ranger for evaluation and appropriate action.

REFERENCES: FSM 2532 and 2335; SWCP 11.02.

PRACTICE: 12.04 - Providing Safe Drinking Water Supplies

OBJECTIVE: To provide safe drinking water to Forest Service facilities such as campgrounds, picnic grounds, trailheads, Visitor Information Centers, winter sport areas, and developed roadside facilities.

EXPLANATION: Administrative guidelines for water source location and development; testing frequency and limitation for bacteriological, chemical, and physical contaminants; performance of sanitary surveys; closing, correction, and reopening of defective water systems; and documentation of data are provided in the State Drinking Water Standards.

IMPLEMENTATION: Location, design, sampling, and sanitary surveys will be performed by qualified individuals who are familiar with drinking water supply systems and requirements. Coordination and cooperation will be pursued with State and local health department representatives in all phases of drinking water system management. Preventive measures will be taken in the location, construction, operation, and maintenance of water supply systems to minimize possibilities of contamination.

Sampling and testing of drinking water quality will be required. If State and local health departments do not perform the water analysis, State approved laboratories must be used. When test results indicate that State Standards are exceeded, the water supply will be closed or treatment required until the problem is corrected and satisfactory results are obtained. Seasonal systems will be tested and proven to be satisfactory prior to opening.

REFERENCES: Safe Drinking Water Act (P.L. 95-190); State Water Quality Standards; State Drinking Water Standards; 40 CFR Parts 141, 142, and 143; Health and Safety Code Handbook (FSH 6709.11); FSM 2332, 2333, and 7420; SWCP 11.10 and 12.05.

PRACTICE: 12.05 - Documentation of Potable Water Quality Data

OBJECTIVE: To assure the availability of water quality data and related information when making analysis and interpretations with respect to potable water systems.

EXPLANATION: An inventory of the location of all designated potable water supplies will be prepared and maintained documenting pertinent site information such as dates and results of all water quality tests and surveys. This is an administrative practice of record keeping to establish a record of cause and effect to aid in identifying any sources of contamination.

IMPLEMENTATION: Forests will use the computer-based "Potable Water System Management Program" for site documentation. All laboratory results will be filed on the Forest for a minimum of five years. Data will be stored, edited, and summarized annually.

REFERENCES: FSM 2532, 7421.24, and 7421.25.

PRACTICE: 12.06 - Management of Sanitation Facilities

OBJECTIVE: To protect surface and subsurface soil and water resources from bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of sewage at Forest Service facilities.

EXPLANATION: Toilet facilities are provided at some recreation sites. The type and number depends on site utilization and the capacity of a given site. Sanitation facilities which may vary from a pit

toilet to a treatment plant will be planned, located, designed, constructed, operated, inspected and maintained to minimize the possibility of soil and water contamination.

IMPLEMENTATION: The location, design, inspection, operation and maintenance will be performed or controlled by qualified operators who are familiar with sanitation systems and guidelines. State and local authorities should be consulted prior to the installation of new sanitation facilities or modifications of existing facilities to assure compliance with all applicable State and local regulations. Coordination and cooperation should be pursued with State and local Health Departments.

Disposal of sewage at designated sewage treatment plants will be required, when feasible. Where disposal at sewage treatment plants is not feasible, specially designated sites will be identified. These areas will be identified in the disposal contract or agreement. Sanitary engineers will designate all areas on Forest property where untreated effluent may be disposed of. Sewage should be buried at least 300 feet away from all surface water sources.

State and local health departments will be consulted as to concerns, requirements, and regulations.

REFERENCES: Water Developments and Sanitation Handbook (FSH 7409.11); FSM 2331, 2332, 2333, 7430, 7440, and 7460; State and local codes; State Water Quality Standards.

PRACTICE: 12.07 - Control of Refuse Disposal

OBJECTIVE: To protect surface and subsurface soil and water resources from nutrients, bacteria, and chemicals associated with soil waste disposal.

EXPLANATION: The users of National Forest recreation facilities are encouraged to cooperate in the proper disposal of garbage and trash. Users are encouraged to burn their combustible trash in fireplaces or stoves. Receptacles are provided for unburnable garbage and trash at some developed sites. Garbage and trash must be packed out by those who use dispersed and wilderness areas.

IMPLEMENTATION: The public education effort is a continuing process accomplished through the use of signs, printed information, mass media, and personal contact. Public cooperation is vital.

Each National Forest will follow their solid waste disposal plan which describes their collection, removal, and final disposal methods. Garbage containers are placed in areas which are convenient for recreationists and are easily maintained. On-site enforcement may be necessary.

The final disposal of collected garbage will be at a properly designed and operated sanitary landfill. Each landfill site will be located where groundwater and surface waters are at a safe distance as prescribed by State and local codes.

REFERENCES: FSM 2332, 2333, and 7460; State and local codes.

PRACTICE: 12.08 - Assuring Proper Sanitation and Water Supplies For Special Use facilities

OBJECTIVE: To protect the quality of water both consumed by and discharged from facilities under Special Use Permit.

EXPLANATION: Special Use facilities must comply with State and local sanitation ordinances. Buildings and grounds will be supplied with at least the minimum sanitary facilities required by local codes. Water systems must provide an adequate volume of acceptably pure water for drinking, cooking, and general sanitation. Structures designed with toilets, showers, and wash basins will be planned to serve the facility's needs and capacity.

IMPLEMENTATION: Management controls and requirements protecting water quality through installation and maintenance of proper sanitation and water supply facilities will be incorporated into the Special Use Permit for the facility. Permittees are required to conform with all applicable State and local regulations governing water quality and sanitation. Permittees are required to inspect their facilities and test potable water supplies to ensure a safe water supply and proper sanitation. Copies of the test results will be provided to the appropriate Forest Officer, as specified in the Special Use Permit.

REFERENCES: FSM 2342 and 2343; SWCP 11.08, 12.04, 12.06 and 12.07; State Water Quality and Drinking Water Standards.

PRACTICE: 12.09 - Sanitation at Hydrants and Water Faucets Within Developed Recreation Sites

OBJECTIVE: To maintain water quality standards around hydrants and faucets which provide water for consumptive use in developed recreation sites.

EXPLANATION: This practice prohibits the cleaning or washing of any personal property, fish, animal, or food at a hydrant or at a water faucet not provided for that purpose. The public must be informed of their responsibilities concerning sanitary regulations.

Acceptable designated areas are those that are located away form consumptive water sources and where effluent from the washing operation can be disposed of properly.

IMPLEMENTATION: The authorized Forest Officer will inform the public of their sanitary responsibilities by posting signs on bulletin boards or at hydrants or faucets, by notices in newspapers, and by personal contact. On-site enforcement by the Forest Officer may be necessary for violators.

REFERENCES: FSM 2334, 7410, 7420, and 7430.

PRACTICE: 12.10 - Management of Off-Road Vehicle Use

OBJECTIVE: To control Off-Road Vehicle (ORV) use which is causing soil erosion and adverse effects on water quality and to identify corrective measures.

EXPLANATION: Areas or trails where ORV use is causing degradation of water quality or soil erosion should be identified. It should be determined through monitoring and evaluated if degradation is beyond acceptable limits, as defined by Forest Plans.

IMPLEMENTATION: Monitoring results will be evaluated against Forest Plan standards for soil and water resources and the management objectives for the area. If considerable adverse effects are occurring or are likely to occur, corrective action should be taken (SWCP 11-03). Corrective actions may include, but are not limited to, redistribution in the amount of ORV use, development of a Forestwide Travel Plan, signing or barriers to redistribute use, partial closing of areas, rotation of use on areas, closure to causative vehicle types or total closure, and structural solutions such as culverts and bridges.

Closure is done by authority of the Forest Supervisor (SWCP 11.09).

REFERENCES: SWCP 11.02; EO 11644, Use of Off-Road Vehicles on the Public Lands, and EO 11989, Off-Road Vehicles on Public Lands; 36 CFR 295.5; FSM 2352 and 2355.

PRACTICE: 12.11 - Protection of Water Quality Within Developed and Dispersed Recreation Areas

OBJECTIVE: To protect water quality by regulating the discharge and disposal of potential pollutants.

EXPLANATION: This practice prohibits placing in or near a stream, lake, or other waterbody, materials or substances which may degrade water quality. The actual safety distance from each water body is at least 100 feet, or greater if warranted by local conditions.
This includes, but is not limited to, human and animal waste, oil, and other hazardous substances. Areas may be closed in order to restrict use in problem areas.

IMPLEMENTATION: Within developed sites, authorized Forest Officers will inform the public of their responsibility through signs, bulletin boards, newspapers or personal contact. Pamphlets, brochures and other material will be used to encourage public cooperation in protecting water quality in dispersed areas. Forest Officers can issue citations to violators.

REFERENCES: FSM 2323, 2332, 2333, 2334, 2335, and 2502; SWCP 11.02 and 11.07; Wilderness Management Handbook (FSH 2309.19).

PRACTICE: 12.12 - Location of Pack and Riding Stock Facilities in Wilderness, Primitive, and Backcountry Areas

OBJECTIVE: To avoid degradation of water quality from pack and riding stock facilities.

EXPLANATION: This practice directs the location of pack and riding stock facilities at safe locations away from springs, streams, lakes, wet meadows, and any other surface waters.

IMPLEMENTATION: The Forest Supervisor may authorize the construction and installation of simple temporary facilities in backcountry or designated areas, such as corrals or hitchrails, but excluding cabins, if they are necessary to direct pack stock use away from surface waters.

Public education is essential to establish acceptable use patterns. Signs, brochures, organized public education programs, and personal contacts will be used to gain compliance. Wilderness patrolmen will check compliance with use.

REFERENCE: FSM 2323.63; Wilderness Management Handbook (FSH 2309.19).

13 - VEGETATION MANAGEMENT. Vegetation management on National Forest System lands is conducted in the course of forest regeneration, brushland conversion to grass for fuels reduction, brushland conversion to forests, utility transmission corridor maintenance, rangeland improvement, water yield improvement, and wildlife habitat improvement. Means of conversion are: chemical, mechanical, burning, and biological. Each project is evaluated through the NEPA process by an interdisciplinary team.

PRACTICE: 13.01 - Operating Seeding and Land Preparation Equipment on the Contour

OBJECTIVE: To reduce soil erosion and losses in soil productivity and to minimize sediment production and turbidity.

EXPLANATION: This measure is implemented to provide a means of rapid infiltration and surface water detention, so that infiltration can take place. The factors evaluated are slope, infiltration rate, permeability, soil depth, climatic variables, and soil water holding capacity. These field evaluations are made by technical staffs during project planning.

IMPLEMENTATION: Appropriate contract provisions and/or management controls are identified in the NEPA process. The project supervisor is responsible for enforcing these management requirements that deal with contour operations on In-Service projects. The Contracting Officer is responsible for enforcing provisions of contracts. Contour operations, where limited by steepness of slope (usually greater than 30 percent), may require other methods of stabilization such as hydroseeding or hand operations.

REFERENCES: FSM 2245 (National Grasslands); see references in "Best Management Practices" Definition (05--2 and 3).

PRACTICE: 13.02 - Slope Limitations for Tractor Operation

OBJECTIVE: To reduce gully and sheet erosion and associated sediment production.

EXPLANATION: This measure limits surface disturbance and keeps surface runoff water from concentrating. This practice restricts tractor operation to slopes where corrective measures for proper drainage such as water bars are easily installed and effective. Criteria that may be used to determine slope restrictions are soil stability, mass stability, infiltration rate, and soil water holding capacity. This data may be interpreted from soil and landtype inventories, geologic maps, and climatic and hydrologic information. Subsequent field verification may be necessary.

IMPLEMENTATION: Recommended provisions and management controls for operating machinery on steep slopes is identified during the NEPA process. These provisions should be included in the contract. The Contracting Officer is responsible for ensuring implementation of these contract provisions. For In-Service projects, the project supervisor is responsible for enforcement of management requirements and for identification of additional areas where operations should be limited.

REFERENCES: SWCP 14.07; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.04 - Revegetation of Surface Disturbed Areas

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EXPLANATION: This practice is designed to prevent soil puddling, compaction and displacement, and the concentration of surface water and soil erosion, which may lead to rill or gully erosion and subsequent water quality degradation. This measure is intended to prevent or reduce the need for corrective measures to solve water concentration problems due to tractor use.

IMPLEMENTATION: Application is mandatory on all vegetation manipulation projects unless specifically excluded in the NEPA process. Contract specifications and controls and requirements are identified in the environmental analysis. The project supervisor and/or Contracting Officer are responsible for identifying wetlands and meadows not previously recognized in the NEPA process, and for following management controls and contract provisions pertaining to wetlands and meadows.

REFERENCES: EO 11990, Protection of Wetlands; FSM 2527; SWCP 11.05 and 14.16; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.04 - Revegetation of Surface Disturbed Areas

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EXPLANATION: This practice is used to stabilize the surface of the disturbed area through the influence of vegetation. The vegetation will be selected to meet many or most of the management objectives for the area --range, wildlife, timber, fuels, minerals, aesthetics, etc. Grass or browse species may be seeded between recently planted trees for erosion prevention, wildlife habitat enhancement, or other management needs.

The factors evaluated are soil fertility, slope, aspect, landtype characteristics, soil water holding capacity, climatic factors, vegetation species characteristics, and project objectives. These are field determinations and office interpretations made by an interdisciplinary team.

IMPLEMENTATION: The identification of disturbed areas and species mix will be determined during the NEPA process. The responsible Line Officer assigns specific Individuals to execute the project. Projects are subsequently monitored to assess the revegetation effectiveness, and need for follow-up action.

REFERENCES: FSM 2522, 2405, 2472, and 7721; SWCP 11.02, 11.03, and 14.13; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.05 - Soil Protection During and Following Slash Windrowing

OBJECTIVE: To prevent removal or severe disruption of the productive surface soil and to minimize losses from erosion.

EXPLANATION: Windrowing is a common method of slash treatment removal and surface scarification. On slopes the material should be windrowed on the contour to act as a filter barrier which catches sediment and detains runoff water. On many forest soils, great care must be taken to preserve the surface soil layer during the windrowing operation.

IMPLEMENTATION: Recommendations on slash windrowing are identified during the NEPA process. The project supervisor is responsible for enforcing applicable management requirements. The Contracting Officer is responsible for enforcing contract clauses.

REFERENCES: SWCP 13.01; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullying with resultant sediment production and loss of soil productivity.

EXPLANATION: This measure minimizes surface disturbance during high soil moisture conditions which would result in compaction, puddling, rutting, and gullying problems. This practice reduces the need to correct these soil and water resource problems later. Soil erodibility, compactibility, climatic factors, soil/water, relationships, and mass stability, evaluate tractor limitations during the NEPA process.

IMPLEMENTATION: Contract provisions and management requirements for soil moisture limitations are identified during the environmental analysis. The project supervisor and/or Contracting Officer are responsible for determining when the soil surface is unstable and susceptible to damage and is then responsible for suspending or terminating operations.

REFERENCES: FSM 2522; see references in "Best Management Practices" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 13.07 - Pesticide Use Planning

OBJECTIVE: To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.

EXPLANATION: The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporates the hydrologic considerations contained in SWCP 13.08 through 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction.

Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest location, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.

IMPLEMENTATION: The interdisciplinary team evaluates the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer then prepares the necessary NEPA documentation, Project Plan, and Safety Plan. Depending on the pesticide use, (FSM 2151.04) the Forest pesticide-use coordinator or Integrated Pest Management Working Group or Regional IPMWG reviews the documents along with the Pesticide-Use Proposal, form FS-2100-2, and makes recommendations for or against approval of the project.

REFERENCES: NFMA; NEPA; FSM 2150 and 2323; State Hazardous Waste Management Plans; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.08 - Apply Pesticides According to Label and EPA Registration Directions

OBJECTIVE: To avoid water contamination by complying with all label instructions and restrictions.

EXPLANATION: Label directions for each pesticide are detailed and specific, and include legal requirements for use.

IMPLEMENTATION: Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirements are followed rests with the Forest Supervisor or a designate such as the Forest Pesticide-Use Coordinator. For contracted projects, it is the responsibility of the Contacting Officer to ensure that label directions and all other requirements are followed.

REFERENCES: FSM 2150; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.09 - Pesticide Application Monitoring and Evaluation

OBJECTIVE: To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of water or non-target areas or resources.

EXPLANATION: This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use, so as to minimize or eliminate hazards to non-target areas or resources. Monitoring and evaluation methods include spray cards, dye tracing, and direct measurement of pesticide in or near water. Type of pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable Federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.

IMPLEMENTATION: The monitoring and evaluation of pesticide application is a component of SWCP 11.02. The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. If determined necessary, this monitoring and evaluation plan will consider the same items as in SWCP 11.02. A technical staff familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards and adequacy of project specifications.

REFERENCES: FSM 2150; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.10 - Pesticide Spill Contingency Planning

OBJECTIVE: To reduce contamination of water from accidental pesticide spills.

EXPLANATION: A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for the notification, how spills will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property, and the environment.

IMPLEMENTATION: The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

REFERENCES: SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution Contingency Plan for EPA Regions 8 and 10, 7/26/85; R-1 and R-4 Emergency and Disaster Plan; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.11 - Cleaning and Disposal of Pesticide Containers and Equipment

OBJECTIVE: To prevent water contamination and risk to humans from cleaning and disposal of pesticide containers.

EXPLANATION: The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms, and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.

IMPLEMENTATION: When the pesticide is applied by In-Service personnel, the Forest or District Pesticide Use Coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved disposal site. When the pesticide is applied by a contractor, the contractor is responsible for proper clean-up and container disposal in accordance with label directions and Federal, State, and local laws.

The Project Contracting Officer will document that the proper disposal methods were followed.

REFERENCES: FSM 2150; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); Health and Safety Code Handbook (FSH 6709.11); Safety and Health Program Handbook (FSH 6709.12); SWCP 11.07 and 11.08; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.12 - Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying

OBJECTIVE: To minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, and other non-target areas.

EXPLANATION: When applying pesticides, an untreated buffer strip will be left alongside surface waters, wetlands, and riparian areas. Factors considered in establishing buffer strip widths beyond minimums established by FSM and NEPA documents are: beneficial water uses, adjacent land use, rainfall, temperature, wind speed, wind direction, terrain, slope, soils and geology, vegetative type, and aquatic life. Other considerations include: persistence, mobility, toxicity, and formulation of the pesticide, method of application, equipment used, spray pattern, droplet size, application height, and application pattern.

IMPLEMENTATION: Protected areas will be identified and mapped by an interdisciplinary team and the Forest Pesticide Use Coordinator during the NEPA process. Protection of untreated areas is the responsibility of the project supervisor for In-Service projects and the Contracting Officer for contracted projects. The certified commercial applicators are briefed about location of protection areas. These areas are flagged or otherwise marked when necessary to aid in boundary identification.

REFERENCES: FSM 2526, 2527, 2245, and 2150; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 13.13 - Controlling Pesticide Drift During Spray Application

OBJECTIVE: To minimize the risk of pesticide contaminating non-target areas.

EXPLANATION: Pesticide spray applications will be accomplished according to a prescription that specifies the following: areas to be left untreated, buffer areas, type of spray and associated materials, equipment and method to be used, droplet size, spray height, application pattern, flow rate, terrain and

meteorological considerations. Hand spraying, with less associated risk, will have fewer application restrictions for drift control than aerial application.

IMPLEMENTATION: The prescription is prepared by an interdisciplinary team and the Forest or District Pesticide Use Coordinator during the NEPA process. The Line Officer is responsible for designating a project supervisor who is responsible for ensuring that the prescription is followed during application and for terminating application if the standards are exceeded.

REFERENCES: FSM 2150 and 2245; SWCP 13.12; see references in "Best Management Practice" Definition (05--2 and 3).

14 - TIMBER. Timber harvesting and reforestation are the culmination of several years of timber resource assessment and detailed project planning. The actual Physical activities consist of felling, bucking, skidding, yarding, loading and hauling, site preparation, tree planting, and other activities associated with stand establishment.

Planning generally starts 5 to 10 years before the timber is sold for harvesting. First, the land must be suitable for and allocated to timber resource activities in the Forest Plan. The proposed sale must follow the standards, guidelines, and direction within the Forest Plan. Next, a cumulative effects feasibility analysis is conducted prior to including the project on the implementation schedule to ensure that the project will not impact soil, water, and other resources beyond acceptable limits. A position statement is then prepared which documents the intent and schedule to harvest and offers tentative harvesting alternatives. The harvest proposal is next considered by an interdisciplinary team which conducts an environmental analysis. Based on the analysis results, the appropriate NEPA document which is tiered to the Forest Plan is prepared documenting the estimated effects of the proposed timber project. This is used by the appropriate Line Officer in decision making. When the sale plan is approved, the timber project is implemented under terms of this decision. The Timber Sale Contract and appraisal are then prepared by using contract provisions that were selected to satisfy management constraints and mitigation measures in the environmental analysis. The timber is now advertised and sold to the successful bidder. Finally, the terms of the Timber Sale Contract, including harvesting, are administered on the ground by the certified Sale Administrator and Forest Service Representative.

Success of a good harvest is measured by comparing the on-the-ground results to the management objectives and constraints identified and addressed in the environmental analysis and Forest Plan.

PRACTICE: 14.01 - Timber Sale Planning

OBJECTIVE: To incorporate soil and water resource considerations into Timber Sale Planning.

EXPLANATION: Timber Sale Planning is accomplished through the NEPA process. The environmental analysis will evaluate the potential for impacts to and the cumulative effects on the soil and water resources. If a significant potential exists, the environmental analysis will: (1) consider how to minimize potential effects during and following the sale layout and subsequent logging operations; (2) include mitigation of effects for those treated areas where impacts are unavoidable; (3) and identify environmentally sensitive areas where impacts from proposed treatments can not be mitigated to conform with standards.

IMPLEMENTATION: During the NEPA process, an interdisciplinary team will evaluate watershed characteristics and estimate response of soil and water resources to proposed timber harvest and related activities. The NEPA process identifies mitigating measures needed to protect soil and water resources. The subsequent contract will include provisions to meet water quality, soils, and other resource protection requirements as directed by the environmental analysis.

REFERENCES: NFMA; NEPA; FSM 1950, 2431.1, 2431.2, 2511, and 2531; the Timber Sale Contract; individual Forest Plans; SWCP 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.07; and 11.14; Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.02 - Timber Harvest Unit Design

OBJECTIVE: To insure that timber harvest unit design will secure favorable conditions of water flow, maintain water quality and soil productivity, and reduce soil erosion and sedimentation.

EXPLANATION: This is an administrative and preventive practice. The proposed timber harvest units are evaluated to estimate the response on the affected watersheds. This involves field examination, utilization of existing data, analysis of potential watershed response (i.e., water yield and sediment yield analysis), and professional judgment. Characteristics to be evaluated can include: (1) the recovery from past harvests; (2) the allowable area that can be harvested; (3) the protection of stream channels; (4) the erosion potential of the area; (5) landform characteristics; (6) the number, size, shape, and location of harvest units; (7) estimated location and size of roads and skid trails; (8) logging system design; and (9) the potential natural recovery rate of the watershed. Where adverse water quality and soil productivity impacts or undesirable streamflows may result, the harvest unit design should be modified, individual units deleted, and/or the natural recovery rate accelerated by using watershed improvement measures.

IMPLEMENTATION: The watershed evaluation of proposed timber harvest is accomplished by the interdisciplinary team during the NEPA process of Timber Sale Planning. Prescriptions to assure acceptable protection of soil and water resources are incorporated into the environmental analysis. On-the-ground accomplishment of the direction in the environmental analysis is carried out by the Presale Forester, the certified Sale Administrator, the Project Engineer, and the administrator of post sale slash disposal and cultural activities, with review by technical resource staffs. The need for monitoring and evaluation will be identified in the environmental analysis when necessary.

REFERENCES: NFMA (Section 3091-6 F, III-V, and Section 219.10); Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18); FSM 2471 and 2405.13; SWCP 11.01, 11.02, 11.03, and 11.14.

PRACTICE: 14.03 - Use of Sale Area Maps for Designating Soil and Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and available water sources and to insure their recognition, proper consideration, and protection on the ground.

EXPLANATION: The following features are designated on the Sale Area Map (and described in associated contract provisions), which is an integral part of the Timber Sale Contract.

a. Location of stream courses to be protected (perennial, intermittent, and ephemeral)

b. Wetlands and Riparian Areas (meadows, lakes, pot holes, etc.) to be protected

c. Boundaries of harvest units

d. Specified roads

e. Roads where log hauling is prohibited or restricted

f. Structural improvements

g. Areas for different skidding and yarding methods

h. Sources of rock for road work, riprapping, etc.

i. Water sources available for Purchaser's use

j. Other features required by Division "C" Contract Provisions

k. Domestic or public water supply source.

IMPLEMENTATION: The interdisciplinary team identifies and delineates these and other features on maps which are included in the project design along with a discussion of each feature. The Presale Forester includes them on the Sale Area Map at the time of contract preparation. The features are reviewed on the ground by the Purchaser and the certified Sale Administrator prior to harvesting.

REFERENCES: Timber Sale Contract Provisions B1.1, B6.5, B6.6, C6.5l (R-1); FSM 2431.1-.3 and 2471; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.04 - Limiting the Operating Period of Timber Sale Activities

OBJECTIVE: To minimize soil erosion and sedimentation and loss in soil productivity by insuring that the Purchaser conducts his operations, including erosion control road maintenance, etc., in a timely manner, within the time of the Timber Sale Contract.

EXPLANATION: Timber is purchased by individuals or companies who either harvest the timber themselves or contract harvest to other parties. Therefore, it is necessary to insure that Purchasers understand and adhere to soil and water resource recommendations determined in the NEPA process. This is accomplished by setting forth the Purchaser's responsibilities in the Timber Sale Contract.

The C6.3 "Plan of Operation" provision is required in all Timber Sale Contracts. This provision states that the Purchaser must submit a general plan of operation which will set forth planned periods for and methods of road construction, timber harvesting, completion of slash disposal, erosion control work, and other contractual requirements. Forest Service written approval of the Plan of Operation is a prerequisite to commencement of the Purchaser's operation.

The contract provision B6.31 "Operation Schedule" requires that the Purchaser shall provide an annual schedule of anticipated activities such as road maintenance and erosion control work.

Contract provision C6.31 "Limited Operating Period" may be used in a contract to limit the Purchaser's operations to specified periods of the year. Provision B6.6 can be used to control operations because of wet weather, high water, etc., in order to protect resources.

IMPLEMENTATION: Limited operating periods are identified and recommended during the environmental analysis by the interdisciplinary team. The Presale Forester prepares the contract to include provision C6.31. Provisions B6.3, B6.31, and C6.3 are all mandatory provisions of the Timber Sale Contract. Provision C6.3 is only mandatory for sales over a two year contract period. The Purchaser must submit his general plan and annual plans to the Forest Service. The Purchaser may commence operations only after written Forest Service approval of the general plan under C6.3.

REFERENCES: Timber Sale Contract Provisions B6.3, B6.31, B6.65, B6.6, C6.3; FSM 2451 and 2453.2; Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.05 - Protection of Unstable Areas

OBJECTIVE: To protect unstable areas and to avoid triggering mass movements of the soil mantle and resultant erosion and sedimentation.

EXPLANATION: This management practice is an administrative and preventive control. Where unstable areas cannot be managed without irreversible effects, they are taken out of suitable forest land base in the Forest Plan and are reclassified as unsuitable forest land. Using existing harvesting technologies, these lands are not managed for timber production because irreversible damage to soil productivity or watershed conditions would result. Timber harvesting is deferred until improved harvesting technologies are developed and proven.

IMPLEMENTATION: The interdisciplinary team during the environmental analysis identifies unstable areas by utilizing input provided by various technical resource staffs. Where unstable areas are presently classified as suitable forest lands and harvest cannot be designed without causing irreversible effects, they are changed to the classification of unsuitable forest lands. If the interdisciplinary team determines that current or prospective logging methods would result in unacceptable watershed impact, the harvest is deferred.

REFERENCES: FSM 2405.13.

PRACTICE: 14.06 - Riparian Area Designation

OBJECTIVE: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

EXPLANATION: The Riparian Area is not a zone of exclusion, but an area of closely managed activity. It acts as (1) an effective filter and absorptive zone for sediment; (2) maintains shade; (3) protects aquatic and terrestrial riparian habitats; (4) protects channel and streambanks; and (5) promotes floodplain stability. As a preventive measure, roads, skid trails, landings, and other timber harvesting facilities will be kept out of these areas when feasible or at a prescribed distance from streams and wetlands. Factors such as stream class, channel stability, sideslope steepness, slope stability, resources dependent on these areas, and standards, guidelines, and direction from Forest Plans are considered in determining the management of activities and width of Riparian Areas. Fisheries habitat condition and its estimated response to the proposed timber sale are also evaluated.

IMPLEMENTATION: The Riparian Area requirements are identified during the environmental analysis by the interdisciplinary team. The timber sale project is designed to include site specific recommendations for the prevention of sedimentation and other stream damage from logging activities. The environmental analysis will provide for planning of harvests to insure long-term health and revegetation of the Riparian

Areas, while meeting shading, debris recruitment, and other management objectives. As appropriate, monitoring and evaluation will be identified in the environmental analysis documentation. The Presale Forester is responsible for the inclusion of the Riparian Areas in the Timber Sale Contract and on the Sale Area Map. The certified Sale Administrator is responsible for contract compliance during harvest operations.

REFERENCES: FSM 2405.13, 2453.2, 2526, and 2471; NEPA; NFMA; Timber Sale Contract Provision C6.5 (R-1), C5.421; SWCP 11.02, 11.05, 13.03, and 14.03; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 14.07 - Determining Tractor Loggable Ground

OBJECTIVE: To protect water quality from degradation caused by tractor logging ground disturbance.

EXPLANATION: This practice is intended to minimize soil erosion and subsequent sedimentation and water quality degradation. Tractor loggable ground is a product of local slope limitations, the volume of timber to be harvested from the site, and the soil, land type, geologic, climatic, and hydrologic characteristics of the site. On-the-ground reconnaissance may be necessary.

IMPLEMENTATION: The determination of tractor loggable ground is performed by the interdisciplinary team during the transportation planning portion of the Timber Sale Planning Process. The results of this determination are presented in a NEPA document. These results are considered during the selection of logging and silvicultural methods and are used in determining the intensity of and restrictions for land disturbance activities. Provisions in the Timber Sale Contract specify the areas and conditions upon which tractors can operate (e.g., requiring tractor logging on snow in riparian areas).

REFERENCES: Timber Sale Contract; FSM 2522; SWCP 13.02 and 13.03; Sale Preparation Handbook (FSH 2409.18); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 14.08 - Tractor Skidding Design

OBJECTIVE: To minimize erosion and sedimentation and protect soil productivity by designing skidding patterns to best fit the terrain.

EXPLANATION: This is a preventive practice. The watershed factors that are considered include slope, aspect, soil stability, vegetative cover, Riparian Areas, meadows, and other factors that may affect the flood and sediment yield potential of the land. The careful control of skidding patterns serves to avoid onsite and downstream channel impacts, the build up of destructive runoff flows, erosion in sensitive watershed areas such as meadows and Riparian Areas, and a reduction in soil productivity.

Two complementary methods of protecting soil and water resources by tractor skid trail design are:

a. End-Lining. This method involves winching the log directly out of the sensitive areas (such as meadows and Riparian Areas) with a cable operated from outside the sensitive area. In this manner, logs can be removed from the sensitive areas while avoiding encroachment by heavy equipment and associated site damage.

b. Felling to the Lead. This method involves felling trees toward a predetermined skid pattern. This procedure facilitates an uncomplicated approach of the tractor operating between the log and the skid trail.

Soil disturbance and compaction are consequently lessened and residual stand and site impacts are minimized.

IMPLEMENTATION: For skid trail design, sensitive areas are identified and evaluated in the environmental analysis during the Timber Sale Planning Process. If necessary, prescriptions can be included in the Timber Sale Contract through the use of a special provision. The certified Sale Administrator then executes the prescription on the ground by locating the skid trails with the timber purchaser or by agreeing to the Purchaser's proposed locations prior to construction.

REFERENCES: Timber Sale Contract Provision B6.422, B6.424, and C6.6; FSM 2524 and 2451; Sale Preparation Handbook (FSH 2409.18) and Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.09 - Suspended Log Yarding in Timber Harvesting

OBJECTIVE: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.

EXPLANATION: Suspended log yarding includes all yarding systems which suspend logs either partially or wholly off of the ground. These systems include hilead, skyline, helicopter, and balloon yarders. The systems are used on steep or unstable slopes and in Riparian Areas where tractors cannot operate. All of the systems result in less soil disturbance since heavy machinery is not used over the sale area. In most cases, these systems require fewer roads because of longer skidding distances. Fewer roads and less soil disturbance will result in less impact on the soil and water resource.

IMPLEMENTATION: Areas where suspended log yarding is to be used are determined and identified in the environmental analysis. The specific systems are included in the contract and designated on the Sale Area Map by the Presale Forester. The certified Sale Administrator oversees the project operation using the guidelines and standards established in the Timber Sale Contract with reference to the environmental analysis documentation.

REFERENCES: Timber Sale Contract Provisions B6.42 and C6.4; Sale Preparation Handbook (FSH 2409.18) and Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.10 - Log Landing Location and Design

OBJECTIVE: To locate landings in such a way as to avoid soil erosion and water quality degradation.

EXPLANATION: This practice is both administrative and preventive. Location of all landing clearing limits shall be agreed to by the Forest Service and Purchaser prior to construction. The following criteria are used in evaluating landings:

a. The cleared or excavated size of landing shall not exceed that needed for safe and efficient skidding, decking, and loading operations. Every landing must meet the safety requirements of the Occupational Safety and Health Administration.

b. Where a choice exists, landing locations are selected which involve the least amount or excavation and the least erosion potential.

c. Where possible, landings are located near the points of ridges so that felled timber lying between drainages can be skidded to the landing without crossing channels or impacting Riparian Areas.

d. Landings are located where the least number of skid roads are required and sidecast will enter drainages nor damage other sensitive areas.

e. If possible, landings are positioned such that the skid road approach will be nearly level.

f. Locate landings to minimize the number of tractor roads entering a given landing.

g. Some landings are designed and constructed as part of specified roads.

h. Landings are shaped to drain in a planned direction and manner to minimize erosion and sediment delivery to stream courses.

i. Major landings, such as those for helicopter logging, are treated to restore soil infiltration rates when use is completed.

IMPLEMENTATION: Landing locations chosen by the Purchaser must be agreed to by the certified Sale Administrator. The Sale Administrator can negotiate with the Purchaser's representative to select mutually acceptable landing locations. Acceptable landings must meet the above criteria. Should agreement not be reached, the decision of the Forest Service shall prevail within the limitations of law.

REFERENCES: Timber Sale Contract Provisions B6.422; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.11 - Log Landing Erosion Prevention and Control

OBJECTIVE: To reduce the impacts of erosion and subsequent sedimentation from log landings through the use or mitigating measures.

EXPLANATION: This practice employs administrative, preventive, and corrective controls to meet the objective. Timber Sale Contract requirements provide for erosion prevention and control measures on all landings. Provisions are made in the Timber Sale Contract for landings to have proper drainage. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope the landings to permit the drainage and dispersion of water. Provisions are also made for revegetation. Other provisions may include scarifying, smoothing and sloping construction of drainage ditches, prevention of water draining off roads from reaching a landing, spreading slash, covering with wood chips, or applying straw mulch. Unless agreed otherwise, cut and fill banks around landings shall be sloped to remove overhangs and otherwise minimize erosion. The specific work needed on each landing will depend on the actual ground conditions.

IMPLEMENTATION: The Presale Forester and certified Sale Administrator assess the need for stabilization with technical resource staff input as needed. It is the responsibility of the certified Sale Administrator to insure that this practice is properly implemented on the ground.

REFERENCES: Timber Sale Contract Provisions B6.6, B6.63 B6.422, C6.4, C6.6, C6.601; FSM 2405.13; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.12 - Erosion Prevention and Control Measures During Timber Sale Operations

OBJECTIVE: To ensure that the Purchaser's operations shall be conducted reasonably to minimize soil erosion.

EXPLANATION: Timber is purchased by individuals or companies who either harvest the timber themselves or contract harvest to other parties. Therefore, it is necessary to insure that purchasers understand and adhere to soil and water resource prescriptions arrived at in the Timber Sale Planning Process. This is accomplished by setting forth the Purchaser's responsibilities in the Timber Sale Contract.

IMPLEMENTATION: Equipment shall not be operated when ground conditions are such that excessive impacts will result. The kinds and intensity of control work done by Purchaser shall be adjusted to ground and weather conditions and the need for controlling runoff. The certified Sale Administrator is responsible for insuring that the Purchaser conducts his operations according to the Timber Sale Contract. Erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff. If the Purchaser fails to do erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility for the work and any unencumbered deposits (performance bonds) may be used by the Forest Service to do the work.

REFERENCES: Timber Sale Contract Provisions B4.225, C6.3, C6.3l2, C6.6, C6.601; FSM 2451, 2453.2, and 2522; SWCP 14.04; Timber Sale Administration Handbook (FSH 2409.15); In R-4: R-4 Technical Guide Erosion Prevention and Control on Timber Sale Areas, May 1981; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 14.13 - Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities

OBJECTIVE: To prevent erosion and sedimentation on disturbed areas.

EXPLANATION: Where soil is disturbed by Purchaser's operations on tractor roads, skid trails, landings, temporary road fills, and other logging sites, the Purchaser shall provide adequate treatment to protect exposed soils. This may be accomplished by spreading slash or wood chips, mulching, establishing an adequate cover of grass or other vegetation acceptable to the Forest Service, or performing other agreed stabilization measures. This provision is to be used only for sales which contain special soil stabilization problems and are not expected to be revegetated by the normal methods prescribed under the standard Timber Sale Contract.

IMPLEMENTATION: The interdisciplinary team will identify areas needing special stabilization measures during the Timber Sale Planning Process. Treatment areas will be verified during sale layout and the estimate of work needed will be carried to the timber sale appraisal. Specific locations to be treated will be designated on the ground by the Forest Service.

The Forest Service, upon request, shall provide advice as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the certified Sale Administrator to make sure that stabilization work is done correctly and in a timely manner.

REFERENCES: Timber Sale Contract Provisions B6.6, C6.6, and C6.601; SWCP 14.04; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.14 - Revegetation of Areas Disturbed by Harvest Activities

OBJECTIVES: To establish a vegetative cover on disturbed sites to prevent erosion and sedimentation.

EXPLANATION: Where soil has been severely disturbed by Purchaser's operations and the establishment of vegetation is needed to minimize erosion, the Purchaser shall take appropriate measures normally used to establish an adequate cover of grass or other vegetation acceptable to Forest Service or

take other agreed stabilization measures. This measure is applied in contracts where it is expected that disturbed soils in parts of the sale area will require vegetative cover for stabilization and the problems will not be mitigated by other contract provisions.

IMPLEMENTATION: An estimate of the need is included in the environmental analysis and timber sale appraisal. The Forest Service shall annually designate on the ground the disturbed soils, such as logging areas and temporary roads, that must be treated.

The Forest Service, upon request, shall provide advice as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the certified Sale Administrator to make sure that revegetation work is done correctly and in a timely manner.

REFERENCES: Timber Sale Contract Provisions B6.6, C6.6, and C6.601; SWCP 14.13; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.15 - Erosion Control on Skid Trails

OBJECTIVE: To protect water quality by minimizing erosion and sedimentation derived from skid trails.

EXPLANATION: This practice employs preventive controls to reach the objective. The Timber Sale Contract requires the installation of erosion control measures on skid trails, tractor roads, and temporary roads. Normally, the work involves constructing cross ditches and water spreading ditches. Other methods such as backblading may be agreed to in lieu of cross drains. Grass seeding may also be required by a licit provision which may be added to the Timber Sale Contract. Areas in need of erosion control measures are shown on the Sale Area Map and designated on the ground annually as logging and temporary access construction progresses.

IMPLEMENTATION: Location of all erosion control measures are designated and agreed to on the ground by the certified Sale Administrator. The Timber Sale Administration Handbook contains guidelines for spacing of cross drains, construction techniques, and cross drain heights. The Sale Administrator can use these guidelines on the ground to identify site specific preventive work to be required of the Purchaser. The Purchaser is obligated to complete and maintain erosion control work as specified in contract provisions.

REFERENCES: Timber Sale Contract Provisions B6.422, B6.6, B6.66, and C6.601; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.16 - Meadow Protection During Timber Harvesting

OBJECTIVE: To avoid damage to the ground cover, soil, and water In meadows.

EXPLANATION: This is an administrative and preventive action. Unauthorized operation of vehicular or skidding equipment on meadows designated on Sale Area Maps and marked on the ground is prohibited. Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. Unless otherwise agreed, trees felled into meadows shall be removed by end-lining, and resulting logging slash shall also be removed.

IMPLEMENTATION: The concerns and constraints mentioned above are set forth in Timber Sale Contract requirements. Damage to meadows, stream courses, and Riparian Areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely and agreed manner to restore and prevent further damage.

This provision shall not apply when the damage is caused by fire suppression activities.

REFERENCES: Timber Sale Contract Provisions B6.61; E.O. 11990, Protection of Wetlands; SWCP 13.03, 14.03, 14.06, 14.08, and 14.17; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 14.17 - Stream Channel Protection (Implementation and Enforcement)

OBJECTIVES: (1) To protect the natural flow of streams; (2) to provide unobstructed passage of stormflows; (3) to reduce sediment and other pollutants from entering streams; and (4) to restore the natural course of any stream as soon as practicable if the stream is diverted as a result of timber management activities.

EXPLANATION: This management practice employs administrative, preventive, and corrective measures to meet the objectives. The following points are fundamental to protecting stream channels:

a. Location and method of stream crossings must be agreed upon prior to construction. This is done when locations of skid trails, tractor roads, and temporary roads are agreed on by the Forest Service and the Purchaser.

b. Purchaser shall repair all damage to a streamcourse caused by Purchaser's operations, including damage to banks and channel to an acceptable condition as agreed to by the certified Sale Administration and Purchaser's representative.

c. All project debris shall be removed from streamcourse and in an agreed manner that will cause the least disturbance,

d. Wheeled or track laying equipment shall not operate within 50 feet slope distance of the apparent high water mark of streamcourses designated for protection in the Timber Sale Contract, except as agreed to by the certified Sale Administrator and the Purchaser.

e. When ground skidding systems are employed, logs will be end-lined out of streamside and Riparian Areas. Equipment is permitted to enter streamside areas only at locations and times agreed to by the certified Sale Administrator and the Purchaser.

f. Water bars and other erosion control structures will be located to prevent water and sediment from being channeled Into streamcourses, and to dissipate concentrated flows.

g. Material from temporary road and skid trail stream crossings is removed and streambanks restored to an acceptable condition, as agreed to by the certified Sale Administrator and Purchaser's representative.

h. Logs or products shall be fully suspended above the ground when crossing streamcourses designated for protection in the Timber Sale Contract.

IMPLEMENTATION: The certified Sale Administrator works with the Purchaser's representative to insure that the Timber Sale Contract clauses covering the above items are carried out on the ground. Technical resource staffs can be consulted to help the Sale Administrator with decisions. In the event Purchaser causes debris to enter streamcourses in amounts which adversely affect the natural flow of the stream, water quality, or fishery resources, Purchaser shall remove such debris within 48 hours and in an agreed manner that will cause the least disturbance to streamcourses.

REFERENCES: FSM 2405.13 and 2452; Timber Sale Administration Handbook (FSH 2409.15); Timber Sale Contract Provisions B6.5, B6.6, C6.5 (R-1), C6.6, C6.51(R-1), and C6.53(R-1); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 14.18 - Erosion Control Structure Maintenance

OBJECTIVE: To insure that constructed erosion control structures are stabilized and working effectively.

EXPLANATION: Erosion control structures are only effective when they are in good repair and stable condition. Once the erosion control structures are constructed and seeded, there is a possibility that they may not become adequately vegetated or they may become damaged from subsequent harvest activities. It is necessary to provide follow-up inspection and structural maintenance order to avoid these problems and insure adequate erosion control.

IMPLEMENTATION: During the period of the Timber Sale Contract, the Purchaser shall provide maintenance Of Soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, erosion control work needed is accomplished through Watershed Improvement Practices (SWCP 11-03).

The Forest Service may agree to perform such structure maintenance under B4.225 (Cooperative Deposits), if requested by the Purchaser, subject to agreement on rates. If the Purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the Purchaser accordingly.

REFERENCES: Timber Sale Contract Provisions B6.6, B6.66, and B4.225; Timber Sale Administration Handbook (FSH 2409.15).

PRACTICE: 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.

EXPLANATION: The effectiveness of soil erosion prevention and control measures is determined by the results found after sale areas have been exposed one or more years to the elements. Although a careful check is required before a timber sale is closed to assure that planned erosion work has been completed to the standard prescribed, the erosion prevention work done in previous years should be periodically inspected during the life of the timber sale. These inspections will help determine whether the planned work was adequate, if maintenance work is needed, the practicability of the various treatments used, and the necessity for modifying present standards or procedures.

IMPLEMENTATION: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Sale Administrators will not accept as complete erosion control, measures which fail to meet this criteria.

REFERENCES: FSM 2451, 2452, 2453, and 2456; Timber Sale Contract Provisions B6.6, B6.63, B6.64, B6.65, B6.66, and C6.6 ; SWCP 11.02; Timber Sale Administration Handbook (FSH 2409.15).

PRACTICE: 14.20 - Slash Treatment in Sensitive Areas

OBJECTIVE: To protect water quality by protecting sensitive tributary areas from degradation which would result from using mechanized equipment for slash disposal.

EXPLANATION: Special slash treatment may be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment. Meadows, wetlands, Riparian Areas, and landslide areas are typically sensitive areas where equipment use is normally prohibited. Slash treatment methods are indicated for each harvest unit on the Slash Treatment Map and referenced in associated contract provisions.

IMPLEMENTATION: Sensitive areas needing protection are identified by the interdisciplinary team in the Timber Sale Planning Process. Results are documented during the environmental analysis and identified in the Timber Sale Contract and on the Slash Treatment Map. The certified Sale Administrator inspects the treatment for correct and satisfactory slash disposal accomplishment.

REFERENCES: Timber Sale Contract; SWCP 14.08, 14.16, and 14.17; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.21 - Non-recurring "C" Provisions For Soil and Water Protection

OBJECTIVE: To exercise the option of inserting non-recurring (Special) "C" provisions into the Timber Sale Contract to protect soil and water resources, where standard "B" or "C" provisions do not apply or are inadequate to protect watershed values.

EXPLANATION: Non-recurring "C" provisions are sometimes needed to meet management objectives on a particular sale area. They require Regional Forester approval and may only be included in the sale for which approval was given. This practice can be used for a variety of special situations which may occur on any timber sale. There are no standard or set provisions that can be referenced, since each Special "C" provision is unique and specific to one sale.

IMPLEMENTATION: The need for non-recurring "C" provisions is identified during the Timber Sale Planning Process and environmental analysis by the interdisciplinary team. The Presale Forester prepares the non-recurring "C" provision and submits it through Line Officers to the Regional Forester for approval. The Regional Forester insures that the wording complements the Timber Sale Contract and returns it to the District with approval. The non-recurring "C" provision is applied by the certified Sale Administrator in the same manner as the standard contract provisions.

REFERENCE: FSM 2431.2, 2431.3, and 2431.4; Sale Preparation Handbook (FSH 2409.18).

PRACTICE: 14.22 - Modification of the Timber Sale Contract

OBJECTIVE: To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

EXPLANATION: Once timber sales are sold, they are harvested as described in the Timber Sale Contract. However, it may be necessary to modify a timber sale contract because of new concerns about the effects of the sale on soil and water resources.

IMPLEMENTATION: If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract. Once the decision to take action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations for implementation.

REFERENCES: NFMA, Section 6; Timber Sale Contract Provision B8.3; SWCP Handbook 10.40, Feedback Mechanism.

PRACTICE: 14.23 - Reforestation Requirement

OBJECTIVE: To promote prompt reforestation and to limit disturbance on areas with limited regeneration potential.

EXPLANATION: Forested lands will not be planned for timber harvest production objectives unless there is reasonable assurance that these sites can be adequately restocked within 5 years after final harvest, based on existing technology and knowledge. The 5-year time frame begins at different times for different silvicultural systems. Restocking is adequate when the cut area contains the minimum number, size, distribution, and species composition of regeneration as specified in the silvicultural prescription. Site preparation, species selection, and seedling protection are critical factors that need consideration for successful regeneration. The implementation of this practice affects soil and water resources by stabilizing soils, increasing ground cover, improving infiltration and reducing surplus water yields.

In meeting overall resource objectives, some timber stands may be harvested to achieve multiple resource objectives other than timber production. Delaying immediate regeneration may be desirable for meeting the overall objectives.

IMPLEMENTATION: During the Timber Sale Planning Process, the interdisciplinary team assesses the resource objectives of the proposed areas and the capability to achieve reforestation within the prescribed period. The environmental analysis contains the interdisciplinary team determinations and recommendations. Past and present reforestation activities will be evaluated.

REFERENCES: Reforestation Handbook (FSH 2409.26b); NFMA (36 CFR 219.27 c(3)); FSM 2472; SWCP 11.02.

15 - ROADS AND TRAILS. Transportation systems are developed to serve the transportation needs of National Forest System lands and resource management programs. Transportation planning is a complex process that assures that roads and trails are planned, located, designed, constructed, and maintained to meet these long-term Forest management needs and objectives. General objectives are developed by legislation, policy, and directives and addressed in Forest Plans. Specific objectives are developed by an interdisciplinary team during the NEPA process in project planning.

Transportation planning is normally conducted on a Forest or area-wide basis with the objective of locating roads for individual timber sale areas and long range transportation needs. Alternative road corridors are mapped or flagged on the ground after consideration of management objectives and resource information. The interdisciplinary team reviews these corridors and makes recommendations for road design criteria, modifications of the corridor location, use of existing roads, and upgrading inadequate roads.

The environmental effects, economic analysis, and recommendations from the interdisciplinary team are considered prior to selecting a preferred alternative by the Line Officer. The appropriate NEPA document resulting from the environmental analysis establishes design criteria which is used to develop design standards, erosion control measures, and the road operation and maintenance standards. Additional interdisciplinary team input may be required in the design phase to ensure meeting the management objectives.

During road construction, the Contract Officer and/or Engineering Representative shall be assigned to the project. These personnel assure that the project is constructed according to contract specifications and drawings. Interdisciplinary team members may be requested to review proposed design modifications during construction.

Subsequent to and upon road completion, periodic reviews of selected projects are made by interdisciplinary team members to evaluate the construction performance, the effectiveness of specific design features or treatments to control erosion, and the appropriateness of the level of maintenance. These reviews provide a feedback mechanism to improve future road construction and maintenance by modifying design or erosion control practices.

PRACTICE: 15.01 - General Guidelines for Transportation Planning.

OBJECTIVE: To introduce soil and water resource considerations into Transportation Planning.

EXPLANATION: Transportation Planning shall be included as an integral part of the Forest Planning process. In some cases, a transportation facility may itself require an appropriate NEPA document. Transportation systems will be planned to achieve an optimum balance of minimum environmental effects at minimum, overall long-term cost, while meeting the land and resource management objectives.

Transportation Planning shall develop and evaluate alternative methods of providing needed transport services. Alternative methods may include alternative modes, routes, geometric features, materials standards, or some combination thereof. Evaluation shall include determining the social, environmental, and economic characteristics of each alternative. Selection of a recommended alternative shall be by the responsible Line Officer and the decision shall be documented. No implementing activities shall be undertaken prior to the approval by the responsible official.

IMPLEMENTATION: An interdisciplinary team during the NEPA process will evaluate watershed characteristics and estimate the response of soil and water resources to proposed transportation alternatives and activities. The NEPA process will identify mitigating measures needed to protect soil and water resources. The subsequent contract will include provisions to meet water quality, soil, and other resource protection requirements as directed by the environmental analysis.

REFERENCES: FSM 1950, 7700, and 7710; NFMA; NEPA; individual Forest Plans; SWCP 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.09, and 11.14. see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.02 - General Guidelines for the Location and Design of Roads and Trails.

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EXPLANATION: There are several considerations which must be incorporated into the location and design of roads and trails. These factors directly affect protection of water quality, soil, and other resource values. The following coordination instructions apply to all transportation activities:

a. Area Transportation Analysis and project planning will be completed using an interdisciplinary process, and the appropriate NEPA document will be prepared and tiered to the Forest Plan. Area Transportation Analysis is an extremely effective tool to reduce overall road mileages and, thus, minimize potential resource impacts.

b. Location, design, and construction activities shall utilize appropriate technical resource staffs, when needed, to evaluate effects of transportation development and operations, and recommend mitigating measures to minimize adverse impacts.

c. Roads and trails will be located and designed to facilitate completion of the transportation system, serve specific resource management needs, fit the terrain, and minimize damage to improvements and resources. Fragile, unstable, sensitive, or special areas should be avoided.

d. Roads and trails should be designed based on traffic and safety requirements of anticipated use and to meet the overall transportation plan. The design shall incorporate features to prevent or minimize soil movement and sedimentation as well as undue disruption of water flow.

e. Stream crossing structures shall be designed to provide the most efficient drainage facility consistent with resource protection, importance of the road, legal obligations, and total costs. The design may involve a hydrologic analysis to determine runoff rates and volumes, flood conditions, velocities, scour, open channel shapes, approach topography, materials-foundation condition, and fish passage, as required. An economic comparison of various flood frequencies versus structure sizes and types is also considered.

f. Locate and design roads and trails to drain naturally by appropriate use of outsloping or insloping with cross drainage and grade changes, where possible. Relief culverts and roadside ditches will be designed whenever reliance upon natural drainage would not protect the running surface, excavation, or embankment. Road and trail drainage should be channeled to effective buffer areas to maximize sediment deposition prior to entry into live water.

IMPLEMENTATION: During the environmental analysis, an interdisciplinary team will be used to insure that management needs, objectives, requirements, and controls are incorporated in the location and design of roads and trails. Mitigation measures needed to protect soil and water resources will be identified in the NEPA process. Contract provisions will be prepared that meet the soil and water resource protection requirements.

REFERENCES: FSM 7710 and 7720; Road Preconstruction Handbook (FSH 7709.56); SWCP 15.01. see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.03 - Road and Trail Erosion Control Plan

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.

EXPLANATION: Land disturbing activities usually result in at least short-term erosion. Poorly designed, located, constructed, and maintained roads and trails are usually responsible for the majority of stream sedimentation problems associated with forest management practices. By effectively planning for erosion control, sedimentation can be minimized.

Roads and trails require a variety of erosion control measures. Many erosion control practices will not only protect water quality but also maintain road prism integrity, reduce maintenance costs, and improve trafficability. The location of the road or trail with respect to streams, beneficial uses of that water, soil, and geologic information and other site factors govern the degree of stabilization required. Stabilization usually includes a combination of practices that promotes the reestablishment of vegetation on exposed slopes, provides physical protection to exposed surfaces, prevents the downslope movement of soil, or controls road drainage.

Since a newly constructed road is most susceptible to erosion from seasonal precipitation, the timing of erosion control practices is of primary concern. Those practices that can be accomplished concurrent with road construction shall be favored as a means of immediate protection of the water resource.

IMPLEMENTATION: Erosion control objectives and detailed mitigation measures are developed using an interdisciplinary approach during the environmental analysis. These measures and objectives shall be reflected in the contract specifications and provisions for the road or trail. When standard specifications do not provide the degree of mitigation required, special project specifications will be developed by the interdisciplinary team.

Prior to the start of construction, the Purchaser shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. The schedule shall consider erosion control work necessary for all phases of the project. The Purchaser's construction schedule and plan of operation will be reviewed in conjunction with the

erosion control plan to insure their compatibility before any schedules are approved. No work will be permitted on the project until all schedules have been approved by the Contracting Officer.

The Contracting Officer or Engineering Representative shall ensure that erosion control measures are implemented according to the approved schedule and are completed in a acceptable fashion. Field reviews and on-site inspection by the Line Officer and/or Forest Engineer will identify any additional erosion control measures required to protect the streams that were not recognized during planning or design. Necessary correction measures shall be implemented immediately through normal administrative channels.

An interdisciplinary team should review selected road construction projects or existing roads to evaluate the effectiveness of erosion control measures and proper maintenance in protecting the water resource. Knowledge gained through these evaluations will improve future contract specifications and provisions.

The following items may be considered as erosion control measures when constructed in a timely manner. To maximize effectiveness, erosion control measures must be in place and functional prior to seasonal precipitation or runoff.

a. Measures to reestablish vegetation on exposed soils. This is usually accomplished by seeding suitable grass and legume species in conjunction with mulching and fertilization. In some situations, treatments may include tree seedling planting or sprigging of other woody species.

b. Measures which physically protect the soil surface from detachment or modify the topography to minimize erosion. These treatments may include the use of dust oil or gravel on the road travelway and ditches and the use of mulches, riprap, erosion mats, and terracing on cuts, fills, and ditches. Temporary waterbars in areas of uncompleted roads and trails can be effectively utilized to reduce sedimentation.

c. Measures which physically inhibit the downslope movement of sediments to streams. These may include the use of slash filter windrows on or below the fill slopes, baled straw in ditches or below fillslopes, catch basins at culvert inlets, and sediment basin slash filter windrows may be utilized in live water drainages where fish passage is not required and where peak flows are low.

d. Measures that reduce the amount of soil disturbance in or near streams. These measures may include dewatering culvert installation or other construction sites, and immediate placement of permanent culverts during road pioneering. Temporary pipes should not be allowed unless positive control of sedimentation can be accomplished during installation, use, and removal.

e. Measures that control the concentration and flow of surface and subsurface water. These may include insloping, outsloping, ditches, cross drains, under drains, trenches, etc.

REFERENCES: FSM 7721, 7722, and 7723; Timber Sale Contract Provisions B6.31, B6.5, B6.6, and C6.3; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981; Cook, M.J. and J.G. King. 1983 Construction Cost and Erosion Control Effectiveness of Filter Windrows on Fill Slopes. USDA Forest Service Research Note, INT-335; SWCP Handbook 10.40 Feedback Mechanism; Drainage Structures Handbook (FSH 7709.56b).

PRACTICE: 15.04 - Timing of Construction Activities

OBJECTIVE: To minimize erosion by conducting operations during minimal runoff periods.

EXPLANATION: Erosion and sedimentation are directly related to runoff. Scheduling operations during periods when the probabilities for rain and runoff are low is an essential element of effective erosion

control. Purchasers shall schedule and conduct operations to prevent erosion and sedimentation. Equipment shall not be operated when ground conditions are such that excessive impacts will result. Such conditions are identified by the Contracting Officer or Engineering Representative with assistance from technical resource staffs as needed. Temporary erosion control measures may be required to prevent, control, and mitigate erosion and sedimentation.

In addition, it is important to keep permanent erosion control work as current as practicable with ongoing operations. Construction of drainage facilities and performance of other contract work which will contribute to the control of erosion and sedimentation shall be carried out concurrent with earthwork operations or as soon thereafter as practicable. Limitation of the amount of area being graded at a site at any one time, and minimization of the time that an area is laid bare should be a consideration in contract preparation. Erosion control work must be kept current when road construction occurs outside of the normal operating season.

IMPLEMENTATION: Detailed erosion control measures are developed by an interdisciplinary team during the environmental analysis and are incorporated into the contract specifications. Compliance with plans, specifications, and the operating plan is assured by the Contracting Officer and/or Engineering Representative.

REFERENCES: FAR 52.236-.15; Timber Sale Contract Provisions C6.3, C6.36, and B6.31; SWCP 15.03; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.05 - Slope Stabilization and Prevention of Mass Failures

OBJECTIVE: To reduce sedimentation by minimizing the chances for road-related mass failures, including landslides and embankment slumps.

EXPLANATION: Road construction in mountainous terrain requires cutting and loading natural Slopes which may lead to landslides and/or embankment failures depending on the soil strength, geology, vegetation, aspect, and groundwater regime. Landslides and embankment failures are undesirable because they interrupt traffic, are costly to repair, visually unacceptable, and generate large quantities of erosion and sedimentation.

Roadways may drastically change the subsurface drainage characteristics of a slope. Since the angle and height of cut and fill slopes increase the risk of instability, it is often necessary to provide subsurface drainage to avoid moisture saturation and subsequent slope failure. Where it is necessary, horizontal drains, drainage trenches, or drainage blankets may be used to lower the subsurface water levels and to prevent groundwater from entering embankments.

In areas with high landslide potential, the composition and characteristics of embankments may be controlled since they are essentially engineered structures. Care must be taken to prevent the incorporation of construction slash or other organic material and the embankment material should be placed by one of the following methods.

a. Layer placement.

b. Controlled compaction.

c. Controlled compaction using density controlled strips.

d. Compaction controlled with a special project specification.

IMPLEMENTATION: In areas with intrinsic slope stability problems, appropriate technical resource staffs must be involved in an interdisciplinary approach to route location. Sufficient subsurface investigation and laboratory testing must be performed to generate design parameters and mitigating features which will meet the constraints and requirements developed through the NEPA process.

In contracted projects, compliance with environmental analysis requirements and controls which have been provided for in the specifications is assured by enforcement of the Timber Sale Contract Provisions by the Contracting Officer and/or Engineering Representative.

REFERENCES: FSM 7706.11, 7706.12, 7710, and 7720; Standard Specifications 203, 212, 605, 613, 619, 630, and 631; Timber Sale Contract Provisions B6.31, B6.62, C5.2, C5.4, and C6.36; Transportation Engineering Handbook (FSH 7709.11) and Drainage Structures Handbook (FSH 7709.56b); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes.

OBJECTIVE: To minimize soil erosion from road cutslopes, fillslopes, and travelway.

EXPLANATION: Road construction exposes fresh, loose soil to the erosive force of wind, water, and traffic. Surface erosion from roads is greatest during the first year following construction. It is desirable to minimize erosion due to the adverse impacts on water quality, vehicle maintenance, road maintenance, and safety. Erosion can occur on cutslopes, fillslopes, and/or travelway. Each of the three surfaces has unique erosion considerations which are outlined below:

Surface	General Characteristics	Stabilization-Mitigation Measures
Cutslope	Steeper, undisturbed, and more sterile soil	Vegetative and mechanical stabilization
Fillslope	Flatter, loose, and more fertile soil	Vegetative and mechanical stabilization
Travelway	Flattest, compact (due to traffic)	Surface Stabilization

Vegetative measures include seeding herbaceous species (grass, legumes, or browse species) or the planting of brush or trees.

Fertilization, mulching, watering, and/or erosion netting and fabrics may be required to insure success.

Mechanical measures include construction of slash windrows, straw bale dams, erosion netting and fabrics, terraces, or benching, riprapping, tackifiers, and gunnite.

Surface stabilization includes watering, dust oiling, dust pallatives, aggregate layer, bituminous surface treatment, or asphalt paving depending on traffic, soils, and climatic factors.

An integrated system of collection control, and dispersion of concentrated surface water is very important in order to prevent erosion on fillslopes, travelways, and natural slopes below cross drains and culverts.

IMPLEMENTATION: During the NEPA process, detailed mitigation measures and slope stabilization techniques are incorporated into the design package by the interdisciplinary team. Compliance with environmental analysis controls and requirements is obtained by the Contracting Officer and/or Engineering Representative through the Standard Specifications and/or Timber Sale Contract Provisions.

REFERENCES: FSM 7706.11, 7706.12, 7706.13, and 7720; 'Standard Specifications 50.4, 203, 204, 206A, 210, 212, 412, 619, 625, 626, 629 and 630; Timber Sale Contract Provisions B6.31, B6.6, B6.62, B6.65, B6.66, C5.2, C5.23, C5.4, C5.441, C5.46, R-1 C6.36, C6.52, C6.6, C6.601, and C6.622; SWCP 15.03 and 15.04; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EXPLANATION: Degradation of water quality by sediment and the erosive effects of surface runoff can be minimized by stabilizing the road prism and adjacent disturbed areas from erosion. Velocities in the road drainage system can be dissipated before entry into the natural system by design and construction of control structures.

A number of measures can be used alone or in combination to control the detrimental effects of road drainage. Methods used to control water and reduce erosion may include: properly spaced culverts, cross drains, water bars, rolling dips, energy dissipaters, aprons, gabions, and armoring of ditches and drain inlets and outlets. Dispersal of runoff can also be accomplished by rolling the grade, insloping, outsloping, crowning, contour trenching, installation of water spreading ditches, etc.

IMPLEMENTATION: Project location, design criteria, drainage control features, and detailed mitigation measures are determined during the NEPA process by an interdisciplinary approach. Compliance with plans, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: SWCP 15.02, 15.03, 15.06; Timber Sale Contract Provisions B6.6, B6.66, C6.3, C6.6, and C6.601; FSM 7721, 7723, 7706.11, and 7706.12; Drainage Structures Handbook (FSH 7709.56b); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.08 - Pioneer Road Construction

OBJECTIVE: To minimize sediment production and mass wasting associated with pioneer road construction.

EXPLANATION: Pioneer roads are built to allow equipment access for construction of planned roadways. Pioneering is usually done within the corridor of the planned road. To meet the objective of minimizing sediment, the following constraints should be followed:

a. Construction of pioneer roads shall be confined to the roadway construction limits unless otherwise approved by the Contracting Officer.

b. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, prevent avoidable deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts or log crossings unless approved otherwise.

c. Erosion control work will be completed concurrent with construction activity or prior to the wet season.

d. Live streams crossed by pioneer roads will be dewatered by diversion devices.

IMPLEMENTATION: The Contracting Officer or Engineering Representative are responsible for enforcing contract specifications, drawings, and plans. The Purchaser is responsible for submitting for approval an operating plan that includes erosion control measures.

REFERENCES: SWCP 15.02, 15.03, 15.04, 15.05, and 15.06; Standard Specification 201, 203; FSM 7721; Timber Sale Contract Provision B6.6, B6.65, C6.3; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.09 - Timely Erosion Control Measures on Incomplete Roads and Streamcrossing Projects

OBJECTIVE: To minimize erosion of and sedimentation from disturbed ground on incomplete projects.

EXPLANATION: The best drainage design and erosion control measure can be useless if projects are incomplete at the end of the normal operating season. Affected areas can include roads, fills, tractor trails, skid trails, landings, streamcrossings, bridge excavations, and firelines. Preventive measures include:

a. The removal of temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways;

b. The installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion.

c. The removal of debris, obstructions, and spoil material from channels and floodplains.

d. Grass seeding, planting deep rooted vegetation, and/or mulching.

IMPLEMENTATION: Protective measures must be applied to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside the Normal Operating Season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

Project location and mitigative measures are developed in the NEPA process using an interdisciplinary approach. Compliance with environmental analysis controls and requirements, contract specifications, and operating plans are assured by the Contracting Officer or Engineering Representative.

REFERENCES: FSM 7721; Standard Specification 206; Timber Sale Contract Provisions B6.31, B6.6, C6.6; FAR 52.213-3, 52.236-15, and 4G-52.236-107; SWCP 15.03 and 15.04; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.10 - Control of Road Construction Excavation and Sidecast Material

OBJECTIVE: To reduce sedimentation from unconsolidated excavated and sidecast material caused by road construction, reconstruction, or maintenance.

EXPLANATION: Unconsolidated material from road construction is frequently exposed on cut and fillslopes, can be difficult to stabilize, and represents a major sediment source. The area of exposed material is often reduced when the cut and fillslopes and roadbed are constructed to the lines, grades, and dimensions shown on the drawings or designated on the ground. The Contracting Officer and/or Engineering Representative insures that construction Is within tolerances, particularly on sections of high erosion or stability hazards. In some cases layer placement and/or benching may be necessary for stabilization and to obtain the proper dimensions and fill slope ratios. End hauling and retaining structure may be necessary to prevent thin layers of unconsolidated material from being sidecast on steep slopes where compaction is impractical. Prior to commencing construction, reconstruction, or maintenance activities, waste areas should be located where excess material can be deposited and stabilized. If waste areas are located on steep slopes, sidecast materials should be consolidated and stabilized. Disposal of slide debris should be in areas where it can be stabilized. The purchaser may be required to remove excess material not placed according to the contract and/or restore damaged areas.

Normal erosion control such as seeding should be supplemented with special mitigation measures such as jute netting, erosion cloth, mulching, slash windrows, sediment ponds, hay bale dams, and rock gabions, when such measures are determined necessary for local conditions.

IMPLEMENTATION: Project location, selected disposal areas, and mitigative measures are developed through the NEPA process, using an interdisciplinary approach. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and project requirements. For contracted projects, compliance with specifications and operating plans is assured by the Contracting Officer and/or Engineering Representative.

REFERENCES: FSM 7720.3, 7706.11, and 7721; FAR 52.236-09; Standard Specification 203; SWCP 15.03, 15.05, 15.06, and 15.09; Timber Sale Contract Provisions C6.221 and C5.4; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.11 - Servicing and Refueling of Equipment

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials.

EXPLANATION: During servicing or refueling, pollutants from logging or road construction equipment may enter a watercourse. This threat is minimized by selecting service and refueling areas well away from wet areas and surface watercourses and by using berms around such sites to contain spills.

IMPLEMENTATION: The Contracting Officer, Engineering Representative, or certified Sale Administrator will designate the location, size and allowable uses of service and refueling areas. They will also be aware of actions to be taken in case of a hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan (SWCP 11-07).

REFERENCES: SWCP 11.07; Timber Sale Contract Provisions B6.34, C6.341, and C6.34; Standard Specifications 204.42; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.12 - Control of Construction in Riparian Areas

OBJECTIVE: To minimize the adverse effects on Riparian Areas from roads and trails.

EXPLANATION: Except at designated stream crossings, road and trail construction will avoid placing fill materials or structures in Riparian Areas that will directly affect the ecological values of the

stream. Occasionally exceptions may occur. These instances should be identified by the interdisciplinary team in the NEPA process and the final location designed to create the minimum impact possible. Factors such as stream class, channel stability, sideslope steepness, slope stability, resources dependent on these areas and standards, guidelines, and direction from Forest Plans are considered in determining the management of activities and width of Riparian Areas. Mitigation measures should be used to the optimum to insure minimum impact.

IMPLEMENTATION: Riparian Area requirements are identified during the environmental analysis by the interdisciplinary team. The road or trail project is designed to include site specific recommendations for the prevention of sedimentation and other stream damage from road/trail activities. As appropriate, monitoring and evaluation will be identified in the NEPA documentation. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and project requirements. On contracted projects, compliance with project requirements, contract specifications and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: SWCP 11.02, 14.03, and 14.06; FSM 7706.11, 7706.12, 7706.14 and 7710; Timber Sale Contract Provisions B6.5, B6.61, C6.51, and C6.52; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.13 - Controlling In-Channel Excavation

OBJECTIVE: To minimize stream channel disturbances and related sediment production.

EXPLANATION: During the construction of roads and the installation of stream crossing structures, it may be necessary for construction equipment to cross, operate in, or operate near streamcourses. However, this will be allowed only at crossings designated by the Forest Service or as necessary in the construction or removal of culverts and bridges. Close coordination is needed with the Purchaser to minimize damage to the stream and aquatic resources.

Also, excavation during the installation of streamside structures should be accomplished in the following manner in order to protect water quality. Unless otherwise approved, no excavation shall be made outside of caissons, cribs, cofferdams, or sheet piling, and the natural stream bed adjacent to the structure shall not be disturbed without approval of the Engineering Representative or Contracting Officer. If any excavation or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, all such excavations will be restored to the original ground surface or the stream bed will be protected with suitable stable material. Material deposited within the stream area from foundation or other excavation shall not be discharged directly into live streams but shall be pumped to settling areas shown on the drawings or approved by the Engineering Representative or Contracting Officer. If the channel is damaged during construction, it should be restored as nearly as possible to its original configuration without causing additional damage to the channel. Excavations for stream crossings should be started early enough in the summer so that the installation is complete before winter.

IMPLEMENTATION: Project location and mitigation measures are developed by the interdisciplinary team during the NEPA process and are inserted into the contract. Compliance with the management requirements, contract specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: FAR 52.213-3, 52.236-15, and 4G-52.236-107; FSM 7721 and 2505.1; Standard Specifications 206; Timber Sale Contract Provisions C6.36, C6.52, and B6.5; EO 11988, Flood Plain Management; SWCP 11.04, 11.05, 14.03, 14.06, and 15.12; see references in "Best Mangement Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.14 - Diversion of Flows Around Construction Sites

OBJECTIVE: To minimize downstream sedimentation by insuring that all stream diversions are carefully planned.

EXPLANATION: Flow must sometimes be guided or piped around project sites. Typical examples are bridge and dam construction. Flow in streamcourses will be diverted if the Forest Service deems it necessary for the Purchaser to do the job. Such a diverted flow shall be restored to the natural streamcourse as soon as practicable and, in any event, prior to the major storm season or fish migration season. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment as soon as possible.

IMPLEMENTATION: The interdisciplinary team during the environmental analysis will identify where diversions are required and the project design will include mitigative measures to protect fishery values and other downstream uses. The NEPA process may require project review by other Federal, State, and/or local agencies and private parties, to insure that all factors are considered. For In-Service projects, Forest Service supervisors are responsible for implementing design standards and management requirements. On contracted projects, compliance with contract specifications and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: Timber Sale Contract Provisions B6.5, C6.3, C6.51, C6.52, and C6.6; FSM 2505.1 and 7721; FAR 52.213-3, 52.236-15, and 4G-52.236-107; Drainage Structures Handbook (FSH 7709.56b); EO 11988, Flood Plain Management; SWCP 11.04, 11.05, 14.03, 14.06, 15.12, and 15.13; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.15 - Streamcrossings on Temporary Roads

OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.

EXPLANATION: Culverts, temporary bridges, low water crossings, or fords will be required on temporary roads at all locations where it is necessary to cross streamcourses. Such facilities shall be designed and installed to provide unobstructed stream flow and fish passage, and to minimize damage to streamcourses.

The number of crossings shall be kept to the minimum needed for access. Channel crossings should generally be as perpendicular to streamcourses as possible. Streambank excavation shall be kept to the minimum needed for use of the crossings.

Crossing facilities shall be removed when the facility has served its purpose and is no longer needed. Fills associated with these facilities shall also be removed.

IMPLEMENTATION: Project location and protective measures are developed by the interdisciplinary team during the NEPA process. Those developed by the Purchaser will be reviewed and approved by the certified Sale Administrator or Contracting Officer. Forest Service supervisors are responsible for insuring that In-Service projects meet management objectives and requirements. For contracted projects, compliance with specifications and operating plans is assured by the Contracting Officer, certified Sale Administrator, or Engineering Representative.

REFERENCES: Timber Sale Contract Provisions B6.5, B6.62, B6.65, C6.3, C6.51, C6.52, C6.6, and C6.753; Timber Sale Administration Handbook (FSH 2409.15); FSM 2505.1 and 7721 FAR 4G-52.236-107; SWCP 11.04, 11.05, 14.03, 14.06, 14.17, 15.12, 15.13, and 15.14; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide-Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.16 - Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)

OBJECTIVE: To Minimize Sedimentation and Turbidity Resulting from Excavation for In-Channel Structures.

EXPLANATION: Excavation in or near streamcourse is a common requirement for the installation of bridges, culverts, and other streamside structures such as weirs, check dams, riprapping, or fish passage structures. Surplus material should not obstruct the streamcourse including the floodplain nor the efficiency of the associated structure. Preventive measures include:

a. Diverting stream flow around project sites during construction in order to minimize erosion and downstream sedimentation.

b. Easily erodible material shall not be deposited into live streams.

c. Any material stockpiled on floodplains shall be removed before rising waters reach the stockpiled material.

d. During excavation in or near the streamcourse, it may be necessary to use suitable coffer dams, caissions, cribs or sheet piling. This will usually be the case where groundwater is contributing a significant amount of water to the immediate excavation area. If any of the aforementioned devices are used, they will be practically watertight and no excavation will be made immediately outside of them. If water from subsurface strata is not significant, pumping may be used, provided the sediment from the pumped water can be disposed of where it will not re-enter the stream during high flows.

e. Water pumped from foundation excavation shall not be discharged directly into live streams, but shall be pumped into settling ponds.

f. When needed, bypass roads should be located to have the minimal disturbance on the streamcourse.

g. The construction activity in or adjacent to the stream will be limited to specific times to protect beneficial water uses (i.e., fisheries).

h. Operation of mechanical equipment in live streams shall be kept to the amount necessary to avoid impacts to aquatic resources.

IMPLEMENTATION: Project location and detailed mitigative measures are developed in the environmental analysis and are detailed in the appropriate NEPA document using an interdisciplinary team approach. Forest Service supervisors are responsible for insuring that In-Service projects meet the design standards. For contracted projects, compliance with contract specifications and operating plans Is assured by the Contracting Officer or Engineering Representative.

REFERENCES: FAR 52.213-3, 52.236-15, and 4G-52.236-107; Standard Specifications 206 and 206A; Timber Sale Contract Provision C6.5; FSM 2505.1; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.17 - Regulation of Borrow Pits, Gravel Sources and Quarries

OBJECTIVE: To minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbance in those gravel sources suitable for development in floodplains.

EXPLANATION: Borrow pits, gravel sources, and quarries are often susceptible to erosion due to steep side slopes, lack of vegetation, and/or their proximity to water courses. Whenever possible, the top soil should be removed and stockpiled for use as surface dressing during the reclamation phases, prior to excavation of the site.

Drainage design for the excavation should consider temporary erosion control measures during the life of the material source and permanent drainage control measures after the site has been rehabilitated. When excavation of the site has been completed on all or part of the area, and the site will not be used again, the sides will be sloped, graded, or scaled and the general pit area smoothed and stabilized. Oversize material, if planned for future use as riprap or derrick rock, should be stockpiled. If not, it should be scattered or buried. Finer material, if available, should be spread over the bottom of the pit prior to spreading stockpiled or imported topsoil. Seeding, mulching, and/or planting should be carried out. If the site will be used again, the above requirements will be limited to those essential to resource protection between uses. Access roads to the site should also have temporary or permanent drainage design for erosion control depending on the life of the pit or the roads should be ripped, drained, blocked to traffic, and seeded, mulched, and/or planted unless other uses are planned.

Borrow pits and gravel sources located in floodplains require special attention. Material deposited in floodplains or along channel sections during storm runoff often provide excellent and inexpensive sand and gravel. Because of easy access, these deposits are often in demand. With careful planning and design, these deposits can be removed with minimal impact on water resources. Under some circumstances, sand and/or gravel removal may alter stream flow characteristics and consequently affect stream channel stability and create a new sediment source. Excavation of these deposits within stream channels should be limited to those above the waterline which is normal for the period of the excavation. If the borrow area is subject to periodic flooding, leveling, shaping, or other special drainage features shall be provided.

Excavation in floodplains should not take place below the water table unless sediment basins are built to contain or catch the resulting sediment. Sediment basins should not be subject to washouts. If excess sediment accumulates in basins, it should be excavated to clean the basin and the sediment removed to an approved site.

Wash water or waste from concrete batching or aggregate operations shall not be allowed to enter streams prior to treatment by filtration, flocculation, settling and/or other means. The potential pollution of adjacent water resources by blasting agents in quarry operations shall be addressed in the pit operation plan.

IMPLEMENTATION: Project feasibility, location, suitability, and the limits for disturbance and sediment production will be identified through the NEPA process using an interdisciplinary approach. Detailed mitigative measures are developed by the design engineer using criteria from the environmental analysis and through consultation with technical resource staffs when needed. Development of borrow pits or gravel sources in the floodplain will be coordinated with State and local agencies.

Special-use permits issued for borrow pits, gravel sources, and quarries will include the above requirements and District Rangers or their representatives are responsible for insuring compliance. Forest Service supervisors are responsible for implementing In-Service projects to design standards. For contracted projects, compliance with management requirements, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: FSM 2511, 2505.1, 7706.11, 7706.12, 7721; Transportation Engineering Handbook (FSH 7709.11) and Road Preconstruction Handbook (FSH 7709.56); FAR 52.236-09; Standard Specifications 203, 210, 611, 624, 625, 626, and 629; Timber Sale Contract Provisions B6.31, B6.6, B6.62, B6.65 and B6.66, C5.2, C5.23, C5.4, C6.36, C6.52, C6.6, C6.60l, C6.622; Water Pollution Control Act, 33 USC 466; NEPA; Montana Water Quality Act and Hardrock Act; Idaho Dredge and Placer Mining Act, Title 47, Ch. 13; SWCP 11.04, 11.05, 15.03; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.18 - Disposal of Right-of-Way and Roadside Debris

OBJECTIVE: To insure that debris generated during road construction is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

EXPLANATION: As a preventive measure, construction debris and other newly generated slash developed along roads near streams shall be disposed of by the following means as applicable:

a. On-Site

1. Windrowing (SWCP 15.03)

2. Scattering

3. Burying

4. Chipping

5. Disposal in Cutting Units

6. Piling and Burning

b. Removal to agreed upon locations.

c. A combination of the above.

d. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

IMPLEMENTATION: Criteria for the disposal of Right-of-Way and roadside debris are established in the environmental analysis by an interdisciplinary team. Project location and detailed mitigative measures are also developed. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards. For contracted projects, compliance with plans, specifications, and operating plans is assured by the Contracting Officer, Engineering Representative, or certified Sale Administrator.

REFERENCES: Timber Sale Contract; SWCP 13.05, 14.20, and 15.03, see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.19 - Streambank Protection

OBJECTIVE: To minimize sediment production from streambanks and structural abutments in natural waterways.

EXPLANATION: The stabilization of stream embankments disturbed by the construction of a water crossing or a roadway fill parallel to a streamcourse, is necessary to prevent erosion of the material during natural stream flow. To reduce sediment and channel bank degradation, it is necessary to incorporate "armoring" in the design of a structure to allow the water course to stabilize after construction. Riprap, gabion structures, and other

measures are commonly used to armor stream banks and drainage ways from the erosive forces of flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to stream flow and would only serve as sediment sources. Outlets for drainage facilities in erodible soils commonly require riprapping for energy dissipation.

IMPLEMENTATION: Project location and detailed mitigative measures are developed through the NEPA process to meet the objectives and requirements of the management. Forest Service supervisors are responsible for implementing In-Service projects to design standards and management requirements. For contracted projects, compliance with contract specifications and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: SWCP 15.03; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide-Erosion Prevention and Control on Timber Sale Areas, May 1981.

PRACTICE: 15.20 - Water Source Development Consistent With Water Quality Protection

OBJECTIVE: To supply water for road construction and maintenance and fire protection while maintaining water quality.

EXPLANATION: Water source development is normally needed to supply water for road construction, dust control, mixing surface, compaction, planting and for fire control requirements of the timber Purchaser. Water source development should aim toward the construction of durable, long term water sources rather then the construction of hasty, expedient developments. Permanently designed sources, such as tanks, will result in the lowest, long term impact to the affected streams.Other considerations in the development of water sources should be:

a. Downstream flow should not be reduced so as to detrimentally affect aquatic resources, fish passage, or other uses.

b. Temporary cofferdams should be constructed of sandbags containing sand or clean gravel, or of other materials and means which will not induce sediment in the stream.

c. Overflow should go directly back into the stream.

d. All temporary facilities for gathering water will be removed prior to causing any resource damage.

IMPLEMENTATION: Certified Sale Administrators and Engineering Representatives in conjunction with technical resource staffs should evaluate streams in which water developments may be constructed. Project location and detailed mitigative measures are developed by the interdisciplinary approach during the environmental analysis. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and management requirements. For contracted projects, compliance with contract specifications and the operating plan is assured by the Contracting Officer and/or Engineering Representative.

Any damage to resources caused by Purchaser's operations or fire suppression activities shall be repaired by Purchaser or fire suppression crews in a timely and agreed manner to the extent practical to restore and prevent further resource damage.

REFERENCES: Standard Specification 207; Timber Sale Contract Provisions; SWCP 14.03; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.21 - Maintenance of Roads

OBJECTIVE: To maintain all roads in a manner which provides for soil and water resource protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities.

EXPLANATION: Roads normally deteriorate because of use and weather impacts. This deterioration can be minimized through proper and timely maintenance and/or restriction of use (SWCP 11.09). All system roads will be maintained to at least the following level: Provide the basic custodial care required to protect the road investment and to insure that damage to adjacent land and resources is held to minimum. This level of maintenance often requires an annual inspection to determine what work, if any, is needed to keep drainage functional and the road stable. This level is the normal prescription for roads that are closed to traffic. As a minimum measure, maintenance must protect drainage facilities and runoff patterns. Higher levels of maintenance may be chosen to reflect greater use or resource administrative needs. Additional maintenance measures could include resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches, spot rocking, and drainage improvement.

Maintenance needs will be reflected in an annual road maintenance plan developed to include all roads under Forest Service control. Individual maintenance plans will be developed annually for each timber sale and for each cost share area outlining performance standards, responsibilities, and timing.

For maintenance of roads on active timber sales, the Forest Service and the Purchaser shall annually agree at the beginning of the operating season on an Annual Road Maintenance Plan outlining responsibilities and timing. If the road is subjected to commercial use, the Forest Service may collect deposits to facilitate road maintenance and to equitably assess maintenance cost of each user.

In addition to timely performance of regular maintenance, each Forest should have an emergency action plan which identifies procedures to be used during periods of high runoff to protect facilities and reduce resource damage.

IMPLEMENTATION: The work is controlled through the Forest Engineer who is responsible for the development of the annual road maintenance plan based on condition surveys. Maintenance levels are established for each road and maintenance performed in accordance with standards. On timber sales, maintenance is a Purchaser responsibility and compliance with standards is assured by the Contracting Officer, Engineering Representative, or certified Sale Administrator. On system roads outside of active timber sales, road maintenance is insured by the Engineering Representative or Contracting Officer.

REFERENCES: FSM 7730.2, 7732 and 7735; Timber Sale Administration Handbook (FSH 2409.15) and Transportation System Maintenance Handbook (FSH 7709.15); Timber Sale Contract Provision C5.4; SWCP 11.09; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.22 - Road Surface Treatment to Prevent Loss of Materials

OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.

EXPLANATION: Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies. On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: water, dust oiling, penetration oiling, sealing, aggregate surfacing, chip-sealing, or paving.

IMPLEMENTATION: Project location and detailed mitigative measures are developed by an interdisciplinary approach to meet environmental analysis criteria. Forest Service supervisors are responsible for insuring that In-Service projects meet design standards and management requirements. On contracted projects, compliance with contract specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: Timber Sale Contract; Timber Sale Administration Handbook (FSH 2409.15).

PRACTICE: 15.23 - Traffic Control During Wet Periods

OBJECTIVE: To reduce the potential for road Surface disturbance during wet weather and to reduce sedimentation probability.

EXPLANATION: The unrestricted use of many National Forest roads during wet weather often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The damage/maintenance cycle for roads that are frequently used during wet periods can create a disturbed road surface and sediment source.

Roads that must be used during wet periods should have a stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, oiling, paving, and armoring are measures that may be necessary to protect the road surface and reduce erosion potential. Roads not constructed for all weather use should be closed during the wet season. Where winter field operations are planned, roads may need to be upgraded and maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

IMPLEMENTATION: Road closures (SWCP 11-09) and traffic control measures should be implemented on all roads when damage would occur as a result of use during wet weather. Project-associated implementation procedures can be enforced by District personnel. Hauling activity can be controlled by the certified Sale Administrator within active timber sales. The decision for closure is made when the responsible Line Officer determines that a particular resource or facility needs protection from use.

Detailed mitigative measures are developed by an interdisciplinary approach as necessary. Forest Service supervisors are responsible for implementing In-Service projects according to design standards. For contracted projects, compliance with plans, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: FSM 7731.4, SWCP 11.09, 13.06, and 14.04; Timber Sale Contract Provisions B5.12, B6.22, and C5.12; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.24 - Snow Removal Controls

OBJECTIVE: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

EXPLANATION: This is a preventive measure used to protect resources and indirectly to protect water quality. Forest roads are sometimes used throughout the winter for a variety of reasons. For such roads, the following measures are employed to meet the objectives of this practice:

a. The Purchaser is responsible for snow removal in a manner which will protect roads and adjacent resources.

b. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.

c. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the roadsurface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.

d. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

IMPLEMENTATION: Project location and detailed mitigative measures are developed by the interdisciplinary team during the NEPA process. Contracted projects are implemented by the Purchaser. Compliance with criteria in the contract specifications and operating plan is assured by the Contracting Officer or Engineering Representative.

REFERENCES: Timber Sale Contract Provision C5.46; Standard Specification 203.09; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.25 - Obliteration of Temporary Roads

OBJECTIVE: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.

EXPLANATION: Temporary roads are constructed for a specific short-term purpose, e.g., ski area development roads, logging spurs on a timber sale, etc. In order to prevent continued low level casual use, such roads are obliterated at the completion of their intended use. Due to short-term nature of temporary roads, continued maintenance funds can not be used for work on temporary roads. Temporary roads that are allowed to remain in use beyond their prescribed time are subject to continued, uncorrected damage, and they can become chronic sediment sources.

Effective obliteration is generally achieved through a combination of the following measures:

a. Road effectively drained and blocked.

b. Temporary culverts and bridges removed and natural drainage configuration re-established.

c. Road returned to resource production through revegetation (grass, browse, or trees).

d. Sideslopes reshaped and stabilized.

IMPLEMENTATION: For timber sales, temporary road closure, stabilization and removal of temporary structures are accomplished by the Timber Purchaser. Compliance with plans and the Timber Sale Contract is assured by the certified Sale Administrator. Forest Service supervisors are responsible for insuring that other temporary roads developed by the Forest Service meet design standards and management requirements. Temporary road development on Forest Service lands that are allowed through special use permits and/or easements are subject to the same obliteration requirements as temporary roads

on timber sales. District Rangers or their representatives are responsible for assuring the obliteration of such roads is accomplished.

REFERENCES: Timber Sale Contract Provisions B6.62, B6.5, C6.6, C6.601; FSM 2522; SWCP 11.03, 11.08, 11.09, 13.04, 14.12-.14, 14.19 and 15.03; NFMA; Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.26 - Surface Erosion Control at Facility Sites

OBJECTIVE: To minimize the amount of erosion and sedimentation at developed sites.

EXPLANATION: On lands developed for administrative sites, ski areas, campgrounds, parking areas, or waste disposal sites much ground is cleared of vegetation. Erosion control methods need to be implemented to stabilize the soil and to reduce the amount of stream sedimentation. Some examples of erosion control methods that could be applied: grass seed, jute mesh, tackifiers, hydromulch, paving, or rocking of roads, water bars, cross drains, or retaining walls.

To control erosion and sedimentation, the natural drainage pattern of the area should not be changed. Sediment basins and sediment filters should be established to filter surface runoff. Diversion ditches and berms should be built to divert surface runoff around bare areas. Construction activities should be scheduled to avoid periods of heavy precipitation or runoff.

IMPLEMENTATION: Mitigative measures are developed by the interdisciplinary team during the NEPA process and incorporated in the project by the design engineer. Forest Service supervisors are responsible for implementing In-Service projects to design standards and management requirements. For contracted projects, compliance with plans, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.
REFERENCES: SWCP 11.08, and 11.12; FSM 2522; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 15.27 - Trail Maintenance and Rehabilitation

OBJECTIVE: To minimize soil erosion and water quality problems resulting from trail erosion.

EXPLANATION: Trails often have erosion problems due to poor location, improper maintenance, and the amount or type of use. This deterioration can often be minimized by proper maintenance, restriction of certain types of use, and/or relocation.

Mainline and heavy use trails should have a functional drainage systems (waterbars, culverts at small stream crossings, corduroy, puncheon or boardwalks in boggy areas). Additional measures (lateral ditching, trail relocation, reconstruction, etc.) may be required in heavy use or problem areas.

IMPLEMENTATION: Each District will develop a trail maintenance plan which determines level, timing and frequency of maintenance. The need for closures will be identified through Forest Transportation Planning. Closure is done by authority of the Forest Supervisor (SWCP 11.09).

REFERENCES: SWCP 11.03, 11.09, 15.01, 15.02, and 15.03; Drainage Structures Handbook (FSH 7709.56b).

16 - MINERALS. Minerals (including oil, gas and geothermal resources) exploration and development activities on National Forest System lands fall into generally one of the following categories:

a. Locatable. The General Mining Law of 1872, as amended, governs the prospecting for and the appropriation of metallic and most non-metallic minerals with a distinct and special value on National Forest System lands that were reserved from the public domain. This applies to most hard rock and placer mineral deposits.

b. Leasable. The Mineral Leasing Act of February 25, 1920, as amended and supplemented, subject certain mineral and energy resources to disposal through leasing actions. These energy and mineral resources include, but are not limited to, coal, oil, gas, geothermal, oil shale, potassium, sodium, and phosphate. The Mineral Leasing Act for Acquired Lands of August 7, 1947, makes all minerals on acquired (purchased) National Forest System lands, unless otherwise reserved or held as outstanding rights, subject to the provisions of the 1920 Minerals Leasing Act.

c. Common Variety Minerals. The Materials Act of July 31, 1947, provides disposal and use of common variety mineral materials such as sand, stone, gravel, pumice, cinders and clay located on National Forest System lands. Disposal can be by sale or free use permit to private entities or Federal, State, and local units of government, when consistent with good public land management and in the public interest

PRACTICE: 16.01 - Administration of the General Mining Law (Act of May 10, 1872) for Mineral Exploration and extraction on National Forest System Lands

OBJECTIVE: To protect water quality from degradation by physical and chemical constituents which may result from mining and associated activities.

EXPLANATION: Six instruments are involved in analyzing and approving locatable mining activities which could affect water quality on National Forest System lands. Instruments d., e., and f. may not be necessary in every case. The instruments are listed in sequential order if all are needed:

a. Notice of Intent to Operate

b. Plan of Operations

c. Environmental Analysis

d. Special Use Permit(s)

e. Road Use Permits

f. State and/or other Federal Agency Permit(s) / Certification

The Notice of Intent to Operate is required from those who propose to conduct mining related activities which might cause disturbance of surface resources on National Forest System lands. The notice is submitted to the appropriate responsible official, normally the District Ranger. The proposed operations described in the notice must be evaluated by the District Ranger, who will inform the operator within 15 days after the notice is received that either his operation is exempt from the requirement for an operating plan or one is required. If the District Ranger determines that significant disturbance of surface resources will likely result from the proposed operations, the District Ranger will inform the operator to prepare a Plan of Operations.

A written Plan of Operations is required from all operators who will likely cause a significant disturbance of surface resources. Prior to approval of the Plan of Operations, the operator may be required to furnish a guarantee in the form of an approved surety bond or other security to perform reclamation work. If hazardous materials are to be used or generated, documentation that compliance with applicable State or other Federal agency permits/certification have been met is required. The operating plan shall be submitted to the District Ranger who

will review the plan and prepare an environmental analysis within 30 days after the receipt of the plan. The environmental analysis either results in the plan of operations not being required, being approved, needing changes or additions, needing more review time (Environmental Assessment) but not exceeding an additional 60 days, or being deferred until an Environmental Impact Statement (EIS) has been prepared and filed by the Forest Service.

Plans of Operation and/or Special Use Permits may be required and issued for construction or reconstruction of roads for access to mining claims or across National Forest System lands on which the operator has no mining claim. However, when an operating plan is required, and does not include access,

the plan must be approved prior to issuance of a special use permit regulating access. Special use permits may also be required and issued for water diversions, water transmission facilities, and electric transmission lines needed for mining activities.

Road Use Permits may be required and issued for commercial use of National Forest System roads. State and/or other Federal Agency Permits/Certification may be required and issued for air quality, water quality, reclamation, disposal and treatment of solid wastes, etc. When required, the Forest Service will advise the operator to obtain the appropriate permits or certification. If the proposed operation will involve the use or generation of hazardous substances, the operator will be required to incorporate the permitting requirements of the appropriate regulatory agencies before approval of the Plan of Operations.

IMPLEMENTATION: A Notice of Intent or Plan of Operations is required to be submitted by the operator prior to operations. Preventive measures should be set forth within the notice or plan which will control sediment from land disturbing activities, control chemical seepages from mines and tailings, and prevent and correct hazardous substance spills. Locations for spoil and tailing disposal are also specified. The plan is reviewed by an interdisciplinary team. Any needed changes are conveyed to the operator and negotiated prior to final plan approval.

Through the use of the Notice of Intent, Plan of Operations and provisions in any Special Use Permit issued, the responsible e Forest Officer, usually the District Ranger, checks for compliance with prescribed measures. Legal remedies are available if mutual cooperation fails. A court may grant Injunctive or mandatory relief, and award damages to the extent of property damaged. There may be other remedies for violation of Federal, State and local standards for air and water quality and for the disposal of solid wastes.

REFERENCES: 36 CFR 228, 36 CFR 251, and 30 USC 612; NEPA; FSM 1950, 2725, 2726, 2730.3, 2734.3, 7720, 2810, 2817 and 2850; Land Managers Handbook on Minerals Management (FSH 2809.11) and Minerals Planning Handbook (FSH 2809.12); SWCP 11.01, 11.02, 11.04, 11.05, 11.06, 11.07, 11.08, 11.11, 11.13, 12.06, 12.07, 12.08, 13.04, 15.01, 15.02, and 15.03.

PRACTICE: 16.02 - Administration of Bureau of Land Management Issued Permits, Licenses, or Leases for Mineral Exploration and Extraction on National Forest System Lands

OBJECTIVE: To protect soil and water resource values during mineral exploration, extraction, processing and reclamation activities that are conducted on National Forest System lands under the terms of Bureau of Land Management prospecting permits, coal exploration licenses, and mineral leases.

EXPLANATION: Through the NEPA process, the Forest Service (FS) and Bureau of Land Management (BLM) make a determination as to whether or not a permit, license, or lease should be issued by the BLM. The FS and BLM develop the permit, license, or lease stipulations needed to protect water quality and other resource values.

IMPLEMENTATION: Detailed mitigative measures are developed by an interdisciplinary team during the environmental analysis and are written into the special stipulations section of the permit, license, or lease. Conditions of approval are also developed by the interdisciplinary team to be included in the operating plan.

By interdepartmental agreement, all applications to lease lands under FS jurisdiction are referred to the FS for review, recommendation, and development of special stipulations to protect the surface resources. Technical administration of BLM permits, licenses, and leases is the responsibility of the BLM. Therefore, compliance inspections are the responsibility of the BLM unless the FS is authorized to conduct compliance inspections through an interagency agreement or MOU. The Forest Service may inspect and refer situations of non-compliance with operating plans to the BLM for action.

REFERENCES: Land Managers Handbook on Minerals Management (FSH 2809.11) and Minerals Planning Handbook (FSH 2809.12); FSM 2725, 2726, 2734, and 2820; Mineral Leasing Act (41 Stat. 437, as amended; 30 USC 181); Federal Coal Leasing Amendments Act (90 Stat. 1083; 30 USC 201 (b) and 207; 16 USC 1276); Act of March 4, 1917 (39 Stat. 1150, as supplemented; 16 USC 520); Section 402 of Reorganization Plan No. 3, of July 16, 1946 (60 Stat. 1097, 1099; 5 USC Appendix); Act of August 7, 1947 (61 Stat. 913; 30 USC 351, 352, 354, 359) as amended by PL 167 and the Geothermal Steam Act (PL 91-581); SWCP 11.01, 11.02, 11.04, 11.05, 11.06, 11.07, 11.08, 11.11, 11.13, 12.06, 12.07, 12.08, 13.04, 15.01, 15.02, and 15.03.

PRACTICE: 16.03 - Administration of Common Variety Mineral Operations

OBJECTIVE: To assure protection of water quality and other resource values when common variety mineral materials are used for both In-Service and Out-Service.

EXPLANATION: Common variety mineral materials such as sand, stone, gravel, pumice, cinders and clay may be disposed of and developed when their use is consistent with good public land management and in the public interest. Use authorizations will require reasonable erosion control, and rehabilitation and revegetation of the surface ' Removal may be approved if adequate measures can be accomplished to prevent erosion or stream pollution and satisfactory arrangements can be made for rehabilitation and restoration as outlined here and in SWCP 15.13, 15.14 and 15.17.

IMPLEMENTATION: A project plan or Mineral Material Permit identifies the location and conditions of mineral material removal and disposal. Both will be preceded by an environmental analysis. Project location, the scope of the proposal, and detailed mitigative measures are developed using an interdisciplinary approach. The project or permit is approved by the District Ranger or Forest Supervisor. Compliance with the project design standards, the terms and conditions of the permit, and applicable Federal and State regulations is assured by the District Ranger or Forest Service representative.

REFERENCES: 36 CFR 228, Subpart C; FSM 2725, 2726, 2734, 2814, 2817, and 2850; Minerals Program Handbook (FSH 2809.13) and Transportation Engineering Handbook (FSH 7709.11); Act of July 31, 1947 (61 Stat. 681), as amended by the Act of August 31, 1950 (64 Stat. 571), and the Act of July 23, 1955 (69 Stat. 367; 30 USC 601-603), and pursuant to the Act of June 11, 1960 (74 Stat. 205), and the Act of September 25, 1962 (76 Stat. 587); SWCP 11.04, 11.05, 11.07, 11.08, 15.01, 15.02, 15.03, 15.13, 15.14, and 15.17.

PRACTICE: 16.04 - Permits and Administration of Geophysical Operations

OBJECTIVE: To protect the quality of surface and ground water from degradation resulting from geophysical activities on National Forest System lands.

EXPLANATION: Geophysical activities will be managed in a manner that is both timely and offers protection to other multiple use values and management objectives. Many activities have no effects. However, if effects are identified, standard seismic hole plugging procedures will be followed to prevent contamination of ground water resources, and shot hole placement will be examined for potential impacts to other resource values (SWCP 11.10). New road construction, if allowed, will be located, constructed, and maintained to protect the soil and water resources (SWCP 15.01, 15.02, and 15.03).

IMPLEMENTATION: During the environmental analysis, an interdisciplinary team will be assembled to prepare the appropriate NEPA document that evaluates potential impacts, including cumulative, and any needed mitigation measures for the geophysical prospecting permit. The use of water resources for the prospecting activities may require Non-Forest Service authorizations or permits.

REFERENCES: Organic Act of 1897 (30 Stat. 34, as amended, 16 USC 472, 475-478, 480-482, 551); Multiple Use--Sustained-Yield Act of 1960 (74 Stat. 215, 16 USC 528-531); RPA, as amended (88 Stat.

476; 16 USC 1600-1614); FSM 2860; Minerals Program Handbook (FSH 2809.13); In R-1: A Procedural Guide for Oil and Gas Administration, USDA-Forest Service, R-1, Custer NF; SWCP 11.01, 11.07, 11.08, 11.10, 13.04, 15.01, 15.02, and 15.03.

PRACTICE: 16.05 - Mineral Activity Coordination Analysis

OBJECTIVE: To protect the soil and water resource from degradation during development of minerals resources.

EXPLANATION: One essential function of a minerals management program is to forecast what, where and when mineral activity will occur. While the Forest Service has limited ability to control the pace and location of mineral development, the Forest Service has the authority to influence the process considerably. The Activity Coordination Analysis approach for mineral exploration, development and production is a prudent approach that assists in minimizing adverse impacts to the soil, water, and other resources.

IMPLEMENTATION: The specific land area requiring an Activity Coordination Analysis will be identified. This will necessitate the delineation of the study area based on typical oil and gas spacing intervals, pipeline, primary and alternative recovery installation locations, directional drilling opportunities, sensitive areas for water and other resources, and other environmental concerns. An interdisciplinary team will collect and analyze data, prepare an environmental analysis, and develop a management design that will best mitigate impacts to soil and water resources as well as other resource values. Technical staffs familiar with the components of construction, development, and production of an oil and gas field will be utilized.

REFERENCES: In R-1: A Procedural Guide for Oil and Gas Administration, USDA-Forest Service, R-1, Custer NF; Minerals Program Handbook (FSH 2809.13); NEPA; SWCP 11.01, 11.02, 11.04, 11.05, 11.07, 11.10, 11.11, 13.04, 15.01, 15.02, and 15.03.

PRACTICE: 16.06 Reclamation of Oil and Gas Well Sites

OBJECTIVE: To protect soil and water resources through the development of reclamation plans prior to the approval of an Application for Permit to Drill.

EXPLANATION: Reclamation of oil and gas well sites is necessary to protect the soil and water resources, both on and off-site. Revegetation with plants or grasses, forbs, shrubs and trees that provide the best protective ground cover should be utilized to prevent erosion and stream sedimentation. Revegetation species should, however, be selected that provide for an immediate ground cover and allow for the reestablishment of the desirable species over the long-term. For both producing and non-producing well sites, reclamation will normally commence within the first growing season following completion of the drilling activities. In the case of a producing well site, only those portions of the site not required for production need be reclaimed. Any necessary drainage or erosion control structures to prevent erosion and degradation of water quality should be installed during rehabilitation of the site. Temporary roads used to access oil and gas well sites are also reclaimed and obliterated upon completion of their intended use.

IMPLEMENTATION: Detailed erosion control and mitigative measures are developed by an interdisciplinary team during the environmental analysis and are incorporated into the Plan of Operations. Compliance with permits and the operating plan is assured by the District Ranger or Forest Service representative. Non-compliance with approved operating plans are referred to the Bureau of Land Management for action.

REFERENCES: 43 CFR 3164; FSM 2840; In R-1: A Procedural Guide for Oil and Gas Administration, USDA Forest Service, R-1, Custer NF; SWCP 13.01, 13.04, 15.05, 15.06, and 15.25; Surface Operating

Standards for Oil and Gas Exploration and Development, 1978, Bureau of Land Management, U.S. Geologic Survey, and USDA, Forest Service; Surface Environment and Mining (SEAM) Reclamation User Guides.

PRACTICE: 16.07 - Reserve Pit Location, Design, Operation and Reclamation

OBJECTIVE: To protect the quality of surface and ground water from degradation by physical and chemical contaminants originating from the construction and operation of reserve pits at drilling sites.

EXPLANATION: Under current technology, a reserve pit is normally utilized to collect, store, and recycle drilling fluids in oil and gas well drilling operations. Reserve pits must be located, operated, and reclaimed so as to prevent adverse effects on the surface and ground water resources. Reserve pits should be designed and constructed utilizing the following standards:

a. Reserve pits should be located in the cut portion of the drill pad and not at the edge of steep slopes.

b. Special measures may be required to insure the containment of drilling fluids where the reserve pit must be placed in a sensitive location or in porous material. These measures may consist of lining the reserve pit with an impermeable material substance such as plastic or bentonite or the use of a closed mud system.

c. The pit should be constructed so as to prevent sloughing and to maintain the integrity of the liner. Fill material may be used and laid down to provide better consolidation than from natural, in-place materials.

d. The use of non-toxic drilling fluids should be encouraged whenever possible.

e. Dumping trash in the reserve pit will be prohibited.

f. Reserve pit reclamation methods will be utilized that provide positive protection to both ground and surface water.

IMPLEMENTATION: An interdisciplinary approach during the NEPA process will develop and specify the project location, design features, operating requirements, mitigative measures, and reclamation needed. Compliance with permits and the operating plan is assured by the District Ranger or Forest Service representative.

REFERENCES: In R-1: A Procedural Guide for Oil and Gas Administration, USDA-Forest Service, R-1, Custer NF; Surface Operating Standards for Oil and Gas Exploration and Development, 1978, Bureau of Land Management, U.S. Geologic Survey, and USDA, Forest Service.

PRACTICE: 16.08 - Oil and Gas Well Blowout Contingency Plan

OBJECTIVE: To protect the soil, water and other resources from oil and gas well blowout impacts.

EXPLANATION: Although infrequent, uncontrolled emissions from oil and gas wells can occur. Fluids emitted can be oil, fresh water, salt water, or a combination thereof. A Well Blowout Contingency Plan is necessary in order to minimize impacts to soil and water resources.

IMPLEMENTATION: Individual operators are required to provide Blowout Contingency Plans for emergency situations. The plans must meet the following items:

a. List of agencies, institutions and persons to notify (SWCP 11-O7).

b. A "plan of attack" to handle the various levels of emergencies.

c. Soil and water protection measures to be instituted while the blowout is occurring and immediately following the control of the well blowout.

d. Established blowout or toxic spill damage assessment time gates and goals (SWCP 11.07).

e. The frame work necessary to establish an interdisciplinary team to develop and implement a reclamation plan.

REFERENCES: 43 CFR 3160; In R-1: A Procedural Guide for Oil and Gas Administration, USDA-Forest Service, R-1, Custer NF; FSM 7442 and 7443; 40 CFR 112; Oil and Hazardous Substances Pollution Contingency Plan for EPA Regions 8 and 10, 7/26/85; SWCP 11.07 and 11.11; Surface Environment and Mining (SEAM) Reclamation User Guides.

PRACTICE: 16.09 - Abandoned Mine Land Reclamation

OBJECTIVE: To reduce erosion and water quality degradation by sediment and toxic substances from abandoned mined lands through reclamation of these lands.

EXPLANATION: Abandoned mined lands are frequently erosive, bare of vegetation, or are exuding toxic substances and/or sediment into nearby streams. Some sites may pose a threat to public health or safety. Reclamation plans for reducing impacts to soil and water resources are needed for each abandoned mine. Specific practices may vary from site to site, ranging from simple revegetation or reshaping with earth-moving equipment, to restoration to predisturbance conditions. All ground disturbing activities should comply with SWCP 11.03, 13.01, 13.04, 15.05 and 15.06.

It is important that the site be revegetated with plant species that accomplish the purposes of reclamation. Species may be native or introduced and may be both live plants or seed. Fertility of soil/spoil materials and climate will affect species selection and survival, and soil amendment recommendations.

IMPLEMENTATION: This practice is typically implemented through the development of an inventory of all abandoned mined lands, and for inclusion of those lands needing reclamation within SWCP 11.03. If a soil and water resource problem area is observed and documented, an interdisciplinary team will assess that abandoned mine site, develop the necessary actions to correct the problem, and integrate them into the Forest Planning process for funding and execution. The NEPA process will be followed in the planning and implementation of reclamation measures. The Forest Service should work toward inclusion of the more important abandoned mined lands in State inventories and reclamation plans, since both the State and the Office of Surface Mining (OSM) can provide funding for State projects.

REFERENCES: FSM 2522, 6740, 7442, 7443, and 7460; Watershed Improvement Handbook (FSH 2509.15); NFMA; SWCP 11.03, 13.01, 13.04, 15.05 and 15.06; Abandoned Mine Lands Reclamation Control Handbook, Office of Surface Mining; Surface Environment and Mining (SEAM) Reclamation User Guides.

17 - RANGE. Range management involves range and resource analysis, allotment management planning, and a grazing permit system. It includes controlling overall livestock numbers and season of use, controlling livestock distribution, structural and non-structural improvements, providing for wildlife needs, and restoration of deteriorated range lands.

The historical use Of National Forest System lands in the Northern and Intermountain Regions for grazing generally predates the actual establishment of individual Forests. During this early period, grazing use was typically uncontrolled with generally an excessive number of animals using these lands and producing numerous soil and water resource problems. The current situation is much improved over that which existed historically. Most allotments maintain the productive status of the land and protect underlying soils. There are, however, some allotments where the range remains in a deteriorated condition. These SWCP's are designed to restore deteriorated range and maintain all range in a productive state.

PRACTICE: 17.01 - Range Analysis, Allotment Management Plan, Grazing Permit System and Permittee Operating Plan

OBJECTIVE: To maintain and protect soil and water resources through sustained forage production and managed multiple use of range forage.

EXPLANATION: An analysis of potential and/or existing range is conducted by an interdisciplinary team to evaluate productive capabilities, inherent hazards, resource values, and uses. Based on this analysis, the Forest Service, in cooperation with the permittee and other users, prepares a written allotment management plan and issues a permit to authorize livestock grazing as per stipulations in the plan. These documents include measures to protect other resource values, such as water quality and

riparian areas, and to coordinate livestock grazing with other resource uses. Specific methods for controlling when, where, amount of utilization, and numbers of livestock to be grazed are covered in the plan. Rangeland improvements and an implementation schedule are also included. Permittees are required to contribute a portion of the cost of new improvements and to maintain the existing improvements on an allotment.

A permittee operating plan is prepared, reviewed and revised annually to reflect direction in the allotment management plan, to account for current allotment conditions and trends, and to adjust for unexpected resource problems (e.g., drought). The amount of livestock use is determined primarily through measurement of vegetative utilization. Allowable use is determined by research, vegetative trends, and experience.

IMPLEMENTATION: The District Ranger is responsible for analysis of range allotments, completion of the environmental analysis, preparation of allotment management plans, and processing grazing applications. The Forest Supervisor approves allotment management plans and issues grazing permits with required stipulations and conditions. Most permits are issued for ten year terms. Allotment management plans are revised as needed. Permittee operating plans are prepared or revised annually, to adjust for current allotment conditions and trends, and to incorporate seasonal instructions. The permittee carries out the plans under the direction and supervision of the District Ranger or Forest Service representative. Corrective action is taken if a permittee does not comply with grazing permit conditions designed to protect the soil and water resources.

REFERENCES: FSM 2203, 2204, and 2323.2 - .24; Range Management Information System Handbook (FSH 2209.12), Crazing Permit Administration Handbook (FSH 2209.13), and Service-wide Range Analysis and Management Handbook (2209.14); NEPA; SWCP 11.01, 11.02, 11.03, and 11.05.

PRACTICE: 17.02 - Controlling Livestock Numbers and Season of Use

OBJECTIVE: To maintain and protect soil and water resources through management of livestock numbers and season of use.

EXPLANATION: In addition to the proper stocking rate and season of use specified in the grazing permit, annual field checks are made to identify needed adjustments in distribution, season of use, and livestock numbers. Analysis includes:

a. Range readiness evaluations to assure that the soil is not too wet and that sufficient forage growth has occurred.

b. Livestock counts to assure that only the permitted livestock enter the allotment.

c. Forage and browse utilization measurements to provide data for improved livestock distribution and stocking.

d. Periodic assessment of rangelands to verify soil and vegetative condition and trend.

Standard measurement techniques for allowable utilization have been established for key vegetative types. Specific standards and guidelines have been established prescribing proper utilization levels by vegetative type. Livestock numbers and season of use are adjusted to reflect the results of these field checks.

IMPLEMENTATION: Allotments are administered by the District Ranger or Forest Service representative. Permit provisions are carried out by the grazing permittee, as directed in the permit and

annual operating plan. Appeals are made to the Forest Supervisor. Field checks and measurements are made periodically by the Forest Service. Numbers, seasons, and use patterns may be changed annually to reflect current allotment conditions and trends and, if necessary, the permit may be modified, cancelled, or suspended in whole or in part.

REFERENCES: FSM 2210, 2230, 2240, 2250, and 2323.25; Service-wide Range Analysis and Management Handbook (FSH 2209.14) and Range Analysis and Management Handbook (FSH 2209.21); SWCP 11.02.

PRACTICE: I7.03 - Controlling Livestock Distribution

OBJECTIVE: To maintain and protect soil and water resources including riparian areas through controlling livestock distribution.

EXPLANATION: Livestock use within allotments is typically not uniform due to variations in topography, water availability, vegetation type, and forage condition. Several techniques are used to achieve proper livestock distribution and reduce the impact on areas which are sensitive or naturally overused. These techniques include:

a. Construction of fences and implementation of seasonal or pasture systems of management.

b. Placing of water developments in areas that receive little use and closure of water developments when proper use has been achieved.

c. Riding and herding to shift livestock locations.

d. Placing salt or supplements away from water in forage areas with light grazing use to attract livestock.

e. Installation of range improvements such as construction of shade structures, fertilization, prescribed burning, or seeding.

f. Moving livestock when prescribed utilization levels are reached.

Open herding, limiting trailing, and use of new bed grounds nightly are additional techniques used for goats and sheep. Developing sufficient watering places is one way to limit the amount of trailing. Livestock distribution needs are determined through evaluations of range conditions and trends, including utilization studies.

IMPLEMENTATION: Livestock distribution practices are carried out by the permittee under supervision of the District Ranger or Forest Service representative. Direction is incorporated into the allotment management plan and the annual operating plan. The annual operating plan becomes an integral part of the grazing permit and provides current Forest Service instructions. These instructions reflect current allotment conditions and vegetative trends.

REFERENCES: FSM 2210, 2230, 2240, 2250, and 2323.25; Service-wide Range Analysis and Management Handbook (FSH 2209.14) and Range Analysis and Management Handbook (FSH 2209.21); SWCP 11.02.

PRACTICE: 17.04 - Rangeland Improvements

OBJECTIVE: To maintain and protect soil and water resources through the use of rangeland improvements.

EXPLANATION: Rangeland improvements are used to improve management and restore or improve forage quality, quantity, or availability. These may consist of providing rangeland rest and/or deferment through rotation grazing, fencing, or lighter grazing use by changing the grazing season, kind, class, or permitted number of livestock. Other measures may include stream channel stabilization efforts such as riprapping, gully plugging, planting, or mechanical treatments such as pitting, chiseling, or furrowing. Reseeding and/or fertilization may be done individually or in conjunction with any of these measures. Water developments are often included in rangeland improvement projects. Improvement efforts are directed at increasing the ability of the range to produce forage and protect and provide for other resources at a specified ecological serial stage. Practices used for improvement of watershed conditions, which may include the exclusion of livestock, are described in SWCP's 11-03 (Watershed Improvement Planning and Implementation) and 11.09 (Management by Closure to Use). All range water improvements constructed should protect the water quality of both surface and ground water sources.

IMPLEMENTATION: The permittee is a cooperator in rangeland improvements and may complete the work under Forest Service direction. Implementation may also be done by Forest Service crews. Range improvement needs are recognized In the Range Allotment Planning Process and are scheduled for implementation in the allotment management plan. An interdisciplinary team provides consultation and help in the development of improvement programs.

REFERENCES: FSM 2210, 2240, 2250, and 2323.26; Structural Range Improvement Handbook (FSH 2209.22) and Nonstructural Range Improvement Handbook (FSH 2209.23); SWCP 11.02, 11.03, and 11.09.

18 - FIRE SUPPRESSION AND FUELS MANAGEMENT. Emergency fire ssuppression activities on National Forest System lands are conducted to reduce erosion and the loss of soil Productivity, degradation of water quality, and threats to life and property both on-site and off-site. Suppression activities include fireline and access road construction, firing operations, and fire retardant drops. Water quality and soil erosion and productivity objectives are weighed with the need for rapid suppression during the development of suppression strategies. Since some watershed damage will likely result from suppression activities, an objective of the fire suppression program is to rehabilitate suppression-related damage.

Fuels management activities are intended to reduce the size, cost, and damage of wildfire. Fuels management is a form of Vegetation Manipulation (Chapter 13). Vegetation is manipulated by changing fuel type, creating fuel breaks, or by reducing or altering fuels over extensive areas. Fuels management is also concerned with the manipulation of dead fuels such as cull logs and slash. These materials may be utilized, removed, or burned to reduce fuel loading.

PRACTICE: 18.01 - Fire and Fuel Management Activities

OBJECTIVE: To reduce public and private losses, and/or subsequent flooding and erosion by reducing the frequency, intensity and destructiveness of wildfire.

EXPLANATION: These administrative, corrective and preventive measures include: (1) fuelbreak construction; (2) type conversions; (3) greenbelt establishment to separate urban areas from wildlands; (4) fuel reduction blocks; (5) access roads for rapid ingress and egress; (6) fire suppression activities; (7) fuel utilization and modification programs; and (8) public information and education programs.

IMPLEMENTATION: Fuel Management is implemented through normal program planning and budgeting, Forest Planning, and NEPA processes. Other resource areas such as Timber, Range, and Wildlife may initiate projects that also benefit Fire Management through fuel modification. Fuel management projects are evaluated by an interdisciplinary team. The management objectives and requirements, and multiple resource protection prescriptions are documented through the NEPA process. Application of controls and prescriptions are the responsibility of the project officer. Suppression activities are conducted in response to fires as they occur.

REFERENCES: FSM 1950, 5102, 5103, 5121, 5150.2, 5150.3, and 5151; NEPA; NFMA; SWCP 11.02 and 11.06.

PRACTICE: 18.02 - Formulation of Fire Prescriptions

OBJECTIVE: To provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.

EXPLANATION: Prescription elements will include such factors as fire weather, slope, aspect, soil moisture, and fuel moisture which influence the fire Intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The

amount of remaining litter and induced water repellency can significantly affect erosion rates, water quality, and runoff volumes.

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during the environmental analysis. Field investigations are conducted to identify site specific conditions which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established.

REFERENCES: FSM 5140, 5150.3, 5151, and 5153.

PRACTICE: 18.03 - Protection of Soil and Water from Prescribed Burning Effects

OBJECTIVES: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering surface water.

EXPLANATION: Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites; and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellent tendencies as part of the environmental analysis.

REFERENCES: FSM 5140, 5142, 5150.3, 5151, and 5153; SWCP 11.02, 11.05, 11.06, and 13.04.

PRACTICE: 18.04 - Minimizing Watershed Impacts from Fire Suppression Efforts

OBJECTIVES: To avoid watershed impacts in excess of that which would be caused by the fire itself.

EXPLANATION: Heavy equipment operation on fragile soils, sensitive areas, and steep slopes should be avoided when possible. Major project fires utilize a Resource Advisor to advise the Incident Commander on resource values during the suppression effort. National fire management policies were changed in 1978, to provide in part that an Escaped Fire Situation Analysis shall be prepared for all fires which escape initial suppression action. The analysis will be prepared by a Line Officer with Incident Management Team input. Watershed considerations must be part of the analysis.

IMPLEMENTATION: A Resource Advisor is assigned by the Forest Supervisor and works for the Incident Management Team. Technical resource staffs are normally available to identify fragile soils, sensitive areas, and unstable areas and would be assigned to the fire as technical experts.

REFERENCES: Fire Management Analysis and Planning Handbook (FSH 5109.19); FSM 5130.3 and 5132; see references in "Best Management Practice" Definition (05-- 2 and 3).

PRACTICE: 18.05 - Stabilization of Fire Suppression Related Watershed Damage

OBJECTIVE: To stabilize all areas that have had their erosion potential significantly increased, or their drainage pattern altered by suppression related activates.

EXPLANATION: Treatments for fire-suppression damages include, but are not limited to: (1) installing water bars and other drainage diversions in fire roads, firelines, and other cleared areas; (2) seeding, planting and fertilizing to provide vegetative cover; (3) spreading slash or mulch to protect bare soil; (4) repairing damaged road drainage facilities; and (5) clearing stream channels of debris that is deposited by suppression activities.

IMPLEMENTATION: This work is done by the fire fighting forces either as a part of the suppression effort or before men and equipment are taken off the fire lines. The Incident Commander is responsible under the direction of the local Line Officer for repair of suppression related resource damage.

REFERENCES: Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13); FSM 2523 and 5130.2; SWCP 11.13, 13.04, 15.03, 15.06, and 15.11; see references in "Best Management Practice" Definition (05--2 and 3).

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EXPLANATION: Heavy equipment operation on fragile soils, sensitive areas, and steep slopes should be avoided when possible. Major project fires utilize a Resource Advisor to advise the Incident Commander on resource values during the suppression effort. National fire management policies were changed in 1978, to provide in part that an Escaped Fire Situation Analysis shall be prepared for all fires which escape initial suppression action. The analysis will be prepared by a Line Officer with Incident Management Team input. Watershed considerations must be part of the analysis.

IMPLEMENTATION: A Resource Advisor is assigned by the Forest Supervisor and works for the Incident Management Team. Technical resource staffs are normally available to identify fragile soils, sensitive areas, and unstable areas and would be assigned to the fire as technical experts.

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REFERENCES: Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13); FSM 2523 and 5130.2; SWCP 11.13, 13.04, 15-03, 15.06, and 15.11; see references in "Best Management Practice" Definition (05--2 and 3).

PRACTICE: 18.06 - Emergency Rehabilitation of Watersheds Following

OBJECTIVES: To minimize the loss of soil and on-site productivity, the deterioration of water quality, and threats to life and property, both on-site and off-site.

EXPLANATION: Emergency rehabilitation is a corrective measure that involves a variety of treatments. Treatments may include: (1) seeding grasses or other vegetation to provide a protective cover as soon as possible; (2) fertilizing; (3) fencing to protect new vegetation from livestock; (4) clearing debris from stream channels; and (5) constructing trash racks, channel stabilization structures and debris retention structures. Treatments are selected on the basis of on-site values, downstream values, probability of successful implementation, social and environmental considerations, and cost as compared to benefits.

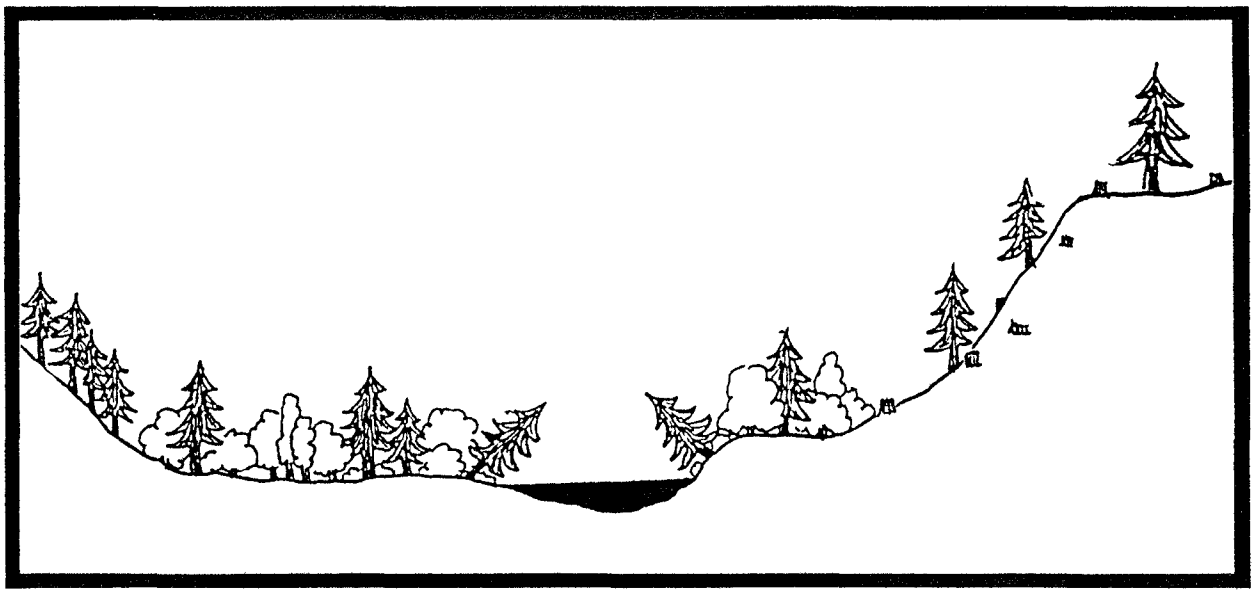
IMPLEMENTATION: Burned-area surveys shall be performed promptly to determine If watershed emergency rehabilitation treatment is needed. Surveys of all fires that exceed 300 acres shall be conducted by an interdisciplinary team. The responsible official, typically the District Ranger, may request a burned-area survey by an interdisciplinary team for smaller fires if significant resource damage has occurred. Team members normally include a hydrologist, a soil scientist, and other technical resource staffs, as needed. They are typically designated prior to the fire season to become reacquainted with Forest Service policy and direction. The survey and proposed rehabilitation treatment measures will be delivered to the Regional Office and/or the Washington Office for approval within three days of control of the fire. If the rehabilitation project is funded, a project supervisor and restoration team will begin work with the objective of project completion before damaging storms occur. Rehabilitation projects are evaluated following major storms and runoff events and at least annually until the watershed is stabilized. The evaluation determines the effectiveness of the rehabilitation measures and indicates if follow-up actions are needed.

In situations where National Forest System and other intermingled lands are involved in similar emergency rehabilitation efforts from large wildfires, interagency rehabilitation teams, if applicable, may be requested to conduct burned area surveys. Prior coordination and agreements are necessary to insure each land owner's needs and objectives are met.

REFERENCES: FSM 2523 and 2323.43b; Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13); SWCP 11.02, 11.03, and 11.06; In Montana: Interagency Emergency Watershed Rehabilitation Procedures, Draft, July 1987.

Riparian Area Guidelines

Timber Harvest Guidelines Within Streamside Management Zones (SMZ's)



KOOTENAI NATIONAL FOREST PLAN

APPENDIX 26

U.S. Department of Agriculture
Forest Service
Kootenai National Forest

1/25/91

United States Department
Of Agriculture
Forest Service
Kootenai National Forest

RIPARIAN AREA GUIDELINES

PROTECTING RIPARIAN ZONES DURING TIMBER HARVEST

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INTRODUCTION

The purpose of the Kootenai National Forest (KNF) Riparian Area Guidelines is to provide information so that streamside timber harvest-related activities are conducted in such a manner that important stream and riparian values, functions and conditions are maintained. The intent is to provide information to be applied in all instances where an Interdisciplinary Team (IDT) recommendation is made to harvest timber along or beside a waterbody. Ground implementation is accomplished through use of special contract provisions (Appendix 3).

OBJECTIVES of the RIPARIAN AREA GUIDELINES

1. Provide further implementation guidance for the KNF Riparian Area Standards and Guidelines.

2. Clarify terminology, objectives and definitions as discussed in the KNF Plan for riparian area management.

3. Strengthen and emphasize the issue of woody debris recruitment for stream channel and streambank stabilization into the existing Forest Plan guidelines.

SCOPE OF GUIDELINES

1. Management guidelines and treatments recommended in this document apply to all instances where timber harvest or related activities are specified on or near a stream or riparian zone.

2. As discussed in the Forest Plan, in suitable timber Management Areas (MA's 11, 12, and 14-17), timber harvest may occur both in and adjacent to riparian areas with appropriate resource protection constraints.

3. Implementation of these Guidelines will meet or exceed the intent of the KNF Plan (Chapter II, pgs. II-28 to II-33); the Forest Service Riparian Area Management Policy as stated in the Manual (FSM 2526.03); and the Best Management Practices (BMPs) for Forestry in Montana (July, 1989).

   Where conflicts occur between these Guidelines and the Idaho Forest Practices Act requirements on the Idaho portions of the KNF, the Forest Practices Act requirements will take precedence.

4. The Guidelines are intended to be implemented **only where an IDT recommendation has been made to harvest along or near a waterbody.** It is still the job of the IDT to consider all the other resource values when evaluating such harvest. For example, when harvesting in a drainage with known Bull Trout spawning, the IDT may decide to require buffer strip non-harvest zones along all tributaries rather than using these Guidelines.

5. For circumstances where these Guideline requirements cannot be met, mitigation will be required to negate such effects. For example, in some instances units cannot be burned and still protect the leave trees as desired. In this instance, the IDT may require deciduous and coniferous plantings along the stream, and the dropping of another proposed riparian harvest unit as mitigation for the expected final condition of the first unit. Required mitigation and the reason for deviating from the Guidelines will be identified in the appropriate NEPA document.

6. The requirement for leaving woody debris recruitment trees will apply only to those channels where woody debris can be effectively utilized. Bedrock channels and large-boulder channels will not require the recruitment of woody debris.

7. KNF Stream Classes I-IIIB and riparian zones will be identified and mapped at 2.64"/mile scale prior to activities, the same scale as other Management Areas (MA's). KNF Classes I-IIIA can be identified and mapped during the inventory phase of NEPA document preparation. Ground truthing of the preliminary identification, and initial identification of other riparian and wetland areas will take place during the alternative analysis phase (i.e, harvest unit location during EA finalization).

DESIRED FUTURE CONDITIONS FOR RIPARIAN AREAS

SHORT-TERM (Immediately following completion of a management activity)

Riparian zones in desirable condition contain the leave-trees required for that particular KNF stream class. They also still contain the majority of the existing deciduous trees, brush, and unmerchantable-sized conifers. This was accomplished by directional tree-felling and line yarding from equiptment located outside the stream management zone (SMZ), modified slashing requirements, and from careful attention to fire during the slash disposal stage. The leave trees remain alive because of careful underburning using low to moderate burn intensities, and because slash burning in areas adjacent to the SMZ has been planned to ensure protection of the leave trees from heat kill and scorching. The soil surface in the SMZ provides sediment filtering capability because of the above-mentioned practices. Perennial streams still have adequate shading while intermittent and ephemeral streams have reduced shading. There are no concentrations of ash materials within the SMZ (or topographic depression in the case of Class IV channels).

LONG-TERM: (Taken from Forest Plan, Chapter II, page. II-29)

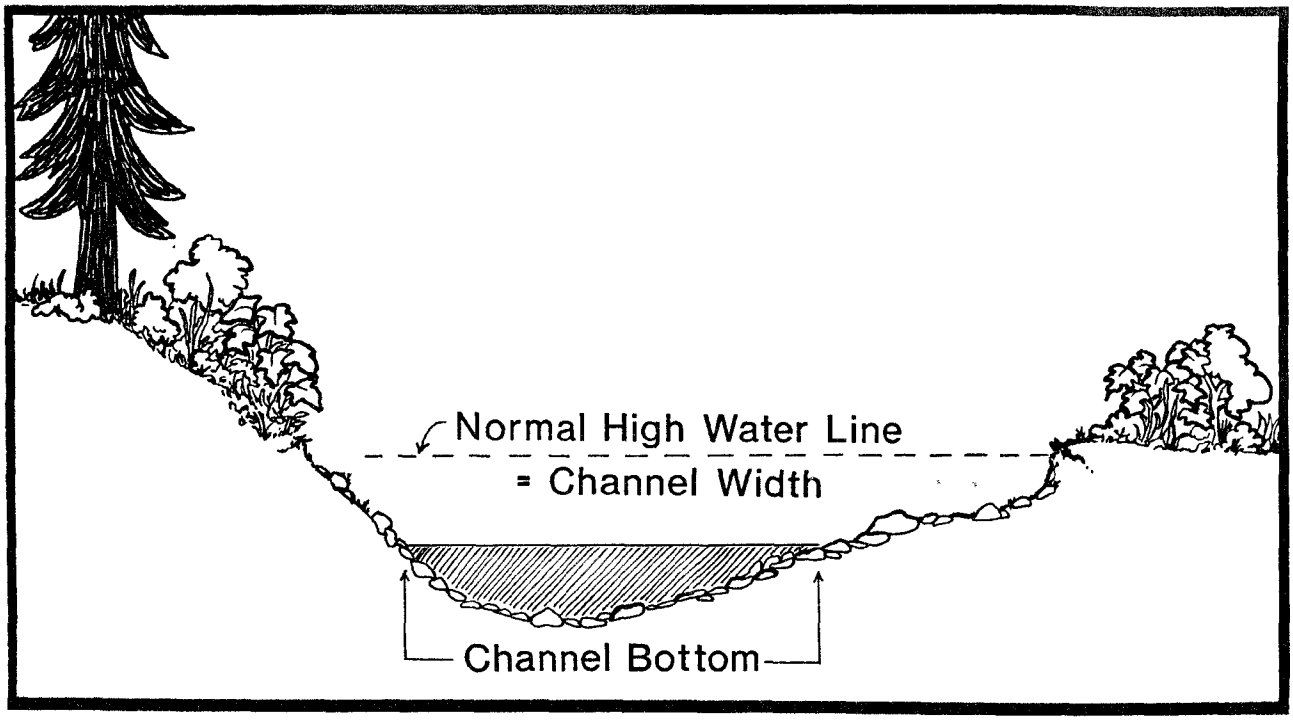
Riparian zones in a desirable condition have both coniferous and deciduous vegetation of varying age. Vigorous, diversified streamside vegetation contributes to stable soil conditions, and stable channel and streambank conditions. Streamside thermal cover, as a protection against summer heating and winter icing of streams, is present in suitable quantities and locations. Streamside stands of various ages provide for stream debris and log recruitment, cover and habitat for wildlife species, and options for long-term maintenance of old-growth over selected areas of the watershed (See Appendix 2). Water quality is high and sedimentation associated with human-related activities is within acceptable limits and reflective of healthy streamside plant communities and stable channel conditions. Cutting units within the riparian zone are designed to meet the needs of other resources as well as timber.

Riparian zone management is "light on the land." All resources, including water, wildlife, fish, and recreation are integrated to not incur any significant losses. Activities enhance the riparian zone to the fullest extent possible.
Riparian zones support timber stands on longer rotation lengths, as well as segments of old-growth which may not be harvested. Scheduling of streamside openings provide adequate debris recruitment for pool formation and organic energy input over time. These openings allow for enough streamside canopy to remain so that summer water temperatures do not violate Montana State Water Quality Standards, and anchor icing in winter does not significantly increase over natural levels. Adequate cover is left to meet wildlife needs.

DEFINITIONS

The following definitions are appropriate for the Kootenai National Forest:

Channel Width: Distance as measured between the channel bank slope or vegetation *breaks*, usually outside of the channel bottom scour zone. These breaks normally delineate the normal high water line, a height above which flow would be considered "flood" (see diagram below):



Existing (Past) Riparian Harvest: For purposes of analyzing effects of existing and past harvest activities on Classes I-IIA, where streamside harvest lengths are constrained, any activity or combination of activities, including those on private land, that have removed **25% or more of the original canopy** must be included in the past streamside harvest length calculations. Consultation with Hydrology or Fisheries professionals for questions about past non-regeneration harvests may be advisable.

Riparian Area: Geographically identifiable area with distinctive resource values and characteristics, identified by soil characteristics or distinctive vegetation communities that require free or unbound water. (FSM 2526.05, 3/86, Amendment #48.)

Riparian Vegetation: Distinctive vegetation requiring free or unbound water, i.e., saturated soil conditions during some part of the year. Examples of riparian vegetation found on the KNF include: Devils' Club, Baneberry, Sedges, Redstem, Bullrush, willows, Horsetail, Blue-joint Reedgrass, and Oak Fern.

Significant Topographic (Topo) Break: An area on-the-ground where the slope changes very noticeably within a short distance (10-20 feet), particularly where the land changes from a steep, sensitive slope to a gentle, more operable slope. For use in these Guidelines, the top of the significant topo break means that activities outside this point have little or no likelihood of reaching or impacting the streamside.

Stream: Natural water course of perceptible extent with definite bed and banks which confines and conducts continuously or intermittently flowing water. Definite beds are defined as having a sandy or rocky bottom which results from the scouring action of water flow (BMP's for Forestry in Montana).

> **Perennial Stream:** A stream channel or channel reach with surface discharge more than 80% of the time (approximately 9.5 months). (FSH 2509.17, 4/89, Amendment #3.)
>
> **Intermittent and Ephemeral Stream:** A stream or portion of a stream that flows only in direct response to precipitation or seasonal snowmelt, usually dry for 3 or more months per year. (Resource Conservation Glossary, Soil Conservation Soc. of Amer., 1982.)

Streamside Management Zone (SMZ): Includes the stream itself and an adjacent land area of varying width on both sides of the stream where management practices might affect water quality, fish, or other aquatic resources. The SMZ acts as an effective filter and adsorptive zone for sediment; maintains shade; conserves aquatic and terrestrial riparian habitat; protects the stream channel and banks; and promotes floodplain stability (BMPs for Forestry in Montana).

Swales and Dry Draws: Low spots in the topography which conduct flow on a sporadic basis, but not often enough to scour an identifiable channel bed or banks. Often identified by vegetative characteristics, but not necessarily by riparian vegetation.

Woody Debris: Woody material that is deposited in the stream and stream channels from the adjacent land area (see WDRZ, Woody Debris Recruitment Zone), to meet a variety of objectives such as flow energy dissipation, sediment storage, channel stability, and fisheries habitat development (in the perennial streams). The size of desirable woody material varies from small twigs and branches in small channels to 18-inch-DBH trees in the large perennial streams (KNF Stream Class I, Large Perennial Fisheries).

Woody Debris Recruitment Zone (WDRZ): The land area within the SMZ adjacent to both sides of the stream channel that is managed for the continuous recruitment of woody material into the stream channel. For Stream Classes requiring a WDRZ, the width of the WDRZ on each side of the stream varies from 25 to 50 feet, depending on the Class. The goal of WDRZ management is to provide for the continuous availability of adequate amounts of suitably-sized woody material, distributed along the entire length of the stream, to meet channel stability and fisheries needs. "Continuous recruitment" means managing the WDRZ and adjoining lands so that there are no long periods of time (several decades) when there is no, or inadequate amounts of, desirable woody material available to fall into the stream channel. Trees in excess of the number needed for woody debris recruitment are available for harvest if not needed for other resource values such as wildlife habitat, floodplain protection, etc.

KOOTENAI NATIONAL FOREST (KNF) STREAM CLASS STRATIFICATION

Working within the above-stated objectives, definitions and scope, it was necessary to redefine those characteristics which, in a working manner, would differentiate each significant stream-type found on most of the suitable timberland area on the Kootenai Forest. For general guidelines purposes, most of the area appeared to fall into one of the following four general classes:

KNF Stream Class I - Large Perennial Streams
KNF Stream Class II - Smaller Perennial Streams
KNF Stream Class III - Intermittent and Ephemeral Streams
KNF Stream Class IV - Dry Draws and Swales

In order to further put into perspective the objectives and needs of each stream class, the following statements and objectives were developed:

KNF STREAM CLASS I - LARGE PERENNIAL STREAMS

Description: These streams run yearlong, and many of them will display riparian vegetative conditions for at least a 100-foot-wide distance from the stream (each side), especially in the more gentle topography. Many of these streams are not included, or only a portion of them are included, within the suitable timber Management Areas (MA's 11, 12, and 14-17).

Objectives:

1. Conduct all streamside activities so that bank sloughing is not activated or increased and to maintain natural resistance to streamflow undercutting. Most of the trees falling into the streamflow are swept to the bank and settle parallel to the channel and serve to protect streambanks and also provide for fishery cover. Desirable woody debris recruitment tree size is 18 inches diameter at breast height (DBH) and larger.

2. Maintain adequate shading. Retain woody debris recruitment trees, riparian vegetation and plant additional vegetation for shading, if needed, to maintain desired water temperatures for beneficial uses.

3. Provide and/or maintain fisheries habitat over the long term through woody debris recruitment and streambank protection.

4. Provide for floodplain protection. Retained woody debris recruitment trees as well as downed woody material that has not fallen into the stream will help dissipate periodic overland flows.

5. Provide for wildlife cavity habitat.

6. Provide for possible timber harvest opportunities within the appropriate management area allocations.

7. Protect recreation and/or visual values as prescribed for management areas in the Forest Plan.

CLASS II - SMALLER PERENNIAL STREAMS

Description: These streams usually run at least 9.5 months of the year, and many of them will not display riparian vegetative conditions for a 100-foot-wide distance from the stream (each side). Many of these streams are included within the suitable timber Management Areas (MA's 11, 12 and 14-17). In the Timber Harvest Guidelines, this Class was broken into two types (IIA, and IIB) based on a channel-width distance of greater than, or less than, 10 feet.

Objectives:

1. Conduct all streamside activities so that bank sloughing is not activated or increased and to maintain natural resistance to streamflow undercutting. Most of the trees falling into the stream will settle in a manner that will create a log barrier or dam for sediment storage and pools for potential fisheries habitat. Desirable woody debris recruitment tree size is 12 inches DBH and larger.

2. Maintain adequate shading. Retain woody debris recruitment trees, riparian vegetation and plant additional vegetation if needed to maintain the shading desired for water temperature maintenance.

3. For streams within this Class with perennial flow and a fisheries resource, provide and/or maintain fisheries habitat by providing for pools and insect habitat.

4. Provide for sediment storage and waterflow energy dissipation by retaining the existing down and dead material within the streambanks and identifying adjacent trees for woody debris recruitment.

5. Provide for floodplain protection. Adequate residual woody debris recruitment and shade trees will help dissipate periodic overland flows.

6. Provide for cavity habitat and other riparian-dependent wildlife needs.

7. Provide for timber harvest opportunities as determined within the appropriate management area designations.

8. Protect recreation and/or visual values as prescribed for management areas in the Forest Plan.

CLASS III - INTERMITTENT AND EPHEMERAL STREAMS

Description: These streams usually run less than 9.5 months of the year, but still have a definable bed and banks from flow scour. These streams will normally only display riparian vegetative conditions within the immediate streamside or bank. Recent research indicates that conditions in these streams are critical for watershed protection, especially for important sediment storage and streamflow energy dissipation. For these reasons, they warrant increased consideration and management on the KNF. In the Timber Harvest Guidelines, this Class was broken into two types (IIIA, and IIIB) based on a channel-width distance of greater than, or less than, 3 feet.

Objectives:

1. Conduct all streamside activities so that bank sloughing is not activated or increased and to maintain natural resistance to streamflow ndercutting. Most of the trees falling into the streamflow channel will eventually break and settle to create potential sediment storage and energy dissipation barriers. Desirable woody debris recruitment tree size is 8 inches DBH and larger.

2. Tree shading is not required because of the limited duration and timing of the flow periods. Protect and retain the immediate streamside riparian vegetation for stream channel stability.

3. Provide for sediment storage and waterflow energy dissipation by retaining down and dead material within the streambanks and identifying trees for future woody debris recruitment.

4. Provide for floodplain protection. Residual woody debris recruitment trees will help dissipate periodic overland flows.

5. Provide for wildlife cavity and travel corridor habitat where feasible.

6. Provide for timber management opportunities as determined in the appropriate management area designations.

7. Minimize sedimentation potential by applying BMP's within identified SMZ's.

NOTE- Some small perennial streams on the KNF have interspersed surface/subsurface segments, such as where a Class IIB becomes a Class III. For these instances, apply the Guideline Class for the segment that has the adjacent harvest unit planned. For example if the proposed harvest unit is bounded by the perennial stream segment, apply the Class IIB Guidelines; if the proposed harvest unit is beside the intermittent or ephemeral segment, apply the Class III Guidelines.

CLASS IV - DRY DRAWS AND SWALES

Description: This Class includes low topographic areas where flow is not sufficient to develop a definable bed or banks, but which still require resource protection guidance to insure soil stability and downstream water quality.

Objectives:

1. Provide for soil stability and water quality protection by:
   a. Minimizing mechanically-disturbing activities on the site;
   b. Allow and encourage winter logging (frozen ground and/or significant snow depth);
   c. Prohibiting jackpot slash piles in draw bottoms (to protect water quality from slash disposal effects);
   d. Keep skid trail locations out of draw and swale bottoms and relocate to the toes of the slope;
   e. Leaving the older dead and down woody debris already existing within these areas, so that the increased flows commonly occurring after activities do not lead to excessive scour and sedimentation effects.

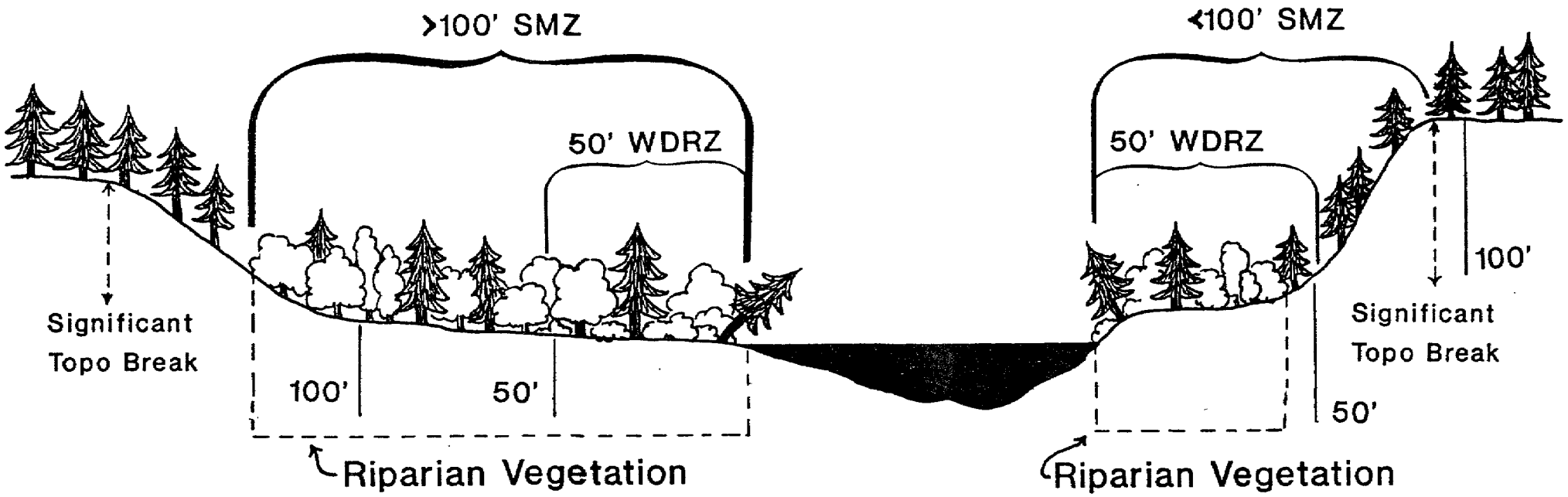
2. Provide for wildlife cavity and travel corridor habitat, where feasible.

TIMBER HARVEST GUIDELINES WITHIN STREAMSIDE MANAGEMENT ZONES (SMZS) KNF STREAM CLASSES

			REQUIREMENTS FOR EACH SIDE OF STREAM			HARVEST RESTRICTIONS			RESOURCE GUIDELINES FOR TREATMENT ZONES
KNF STREAM CLASS	**DESCRIPTION**	**DURATION OF FLOW**	**SMZ WIDTH**	**WDRZ WIDTH**	**LEAVE TREE REQUIREMENTS**	**2 Sided Harvest**	**Length of Each Unit**	**TOTAL HARVEST Exist + Proposed Length Per Mile**	
I	**LARGE PERENNIAL**	YEAR ROUND	**100'** UNLESS EXTENDED BY ERV; LESS IF STB W/IN THE 100' ZONE **(Minimum 25')**	50'	30 TREES PER 1000' AT LEAST 12" DBH (18" OR MORE DBH IS DESIRED)	NO	600'	1200' per Decade	SMZ:1-4,6,7 WDRZ:1-9 OTHER:1,3,5
IIA	**SMALLER PERENNIAL: CHANNEL BANK WIDTH AT LEAST 10 FEET**	AT LEAST 9.5 MO'S PER YEAR	**100'** UNLESS EXTENDED BY ERV; LESS IF STB W/IN THE 100' ZONE **(Minimum 25')**	30'	50 TREES PER 1000' AT LEAST 8" DBH (12" OR MORE DBH IS DESIRED)	NO	600'	1200' per Decade	SMZ:1-4,6,7 WDRZ:1-9 OTHER:1,3,5
IIB	**SMALLER PERENNIAL: CHANNEL BANK WIDTH LESS THAN 10 FEET**	AT LEAST 9.5 MO'S PER YEAR	**100'** UNLESS EXTENDED BY ERV; LESS IF STB W/IN THE 100' ZONE **(Minimum 25')**	25'	50 TREES PER 1000' 6-8" DBH (12" OR MORE DBH IS DESIRED)	NO	1000'	1500' per Decade	SMZ:1-7 WDRZ:1-9 OTHER:1,3,5
IIIA	**LARGE INTERMITTENT/ EPHEMERAL: CHANNEL BANK WIDTH AT LEAST 3 FEET**	LESS THAN 9.5 MO'S PER YR	**50'** UNLESS EXTENDED BY ERV; LESS IF STB W/IN THE 50' ZONE **(Minimum 25')**	25'	50 TREES PER 1000' AT LEAST 6" DBH (12" OR MORE DBH IS DESIRED)	YES	---	---	SMZ:1,3,6,7 WDRZ:1-7,9 OTHER:1,3,5
IIIB	**SMALLER INTERMITTENT/ EPHEMERAL: CHANNEL BANK WIDTH <3 FEET**	LESS THAN 9.5 MO'S PER YR	EDGE OF RIPARIAN VEG BUT NOT LESS THAN 25'	NONE	NONE	YES	---	---	SMZ:1,3,6-8 OTHER:1,3,5
IV	**DRY DRAWS, SWALES (WITHOUT IDENTIFIABLE CHANNEL)**	---	NONE	NONE	NONE	YES	---	---	OTHER:2,4,5
N/A	**SMALL PONDS AND BOGS BETWEEN 1/10 AND 2 ACRES**	WATER THROUGH SUMMER	EDGE OF RIPARIAN VEG BUT NOT LESS THAN 25'	25'	3 TREES PER 100': 10" DBH OR MORE DBH IS DESIRED	---	---	---	SMZ:1,3,6,7 WDRZ:6,7,9
N/A	**PONDS AND BOGS GREATER THAN 2 ACRES**	WATER THROUGH SUMMER	FOLLOW <u>I I B</u> REQUIREMENTS						

ERV: EDGE OF RIPARIAN VEGETATION
SMZ: STREAM SIDE MANAGEMENT ZONE
WDRZ: WOODY DEBRIS RECRUITMENT ZONE
STB: TOP OF SIGNIFICANT TOPOGRAPHIC BREAK

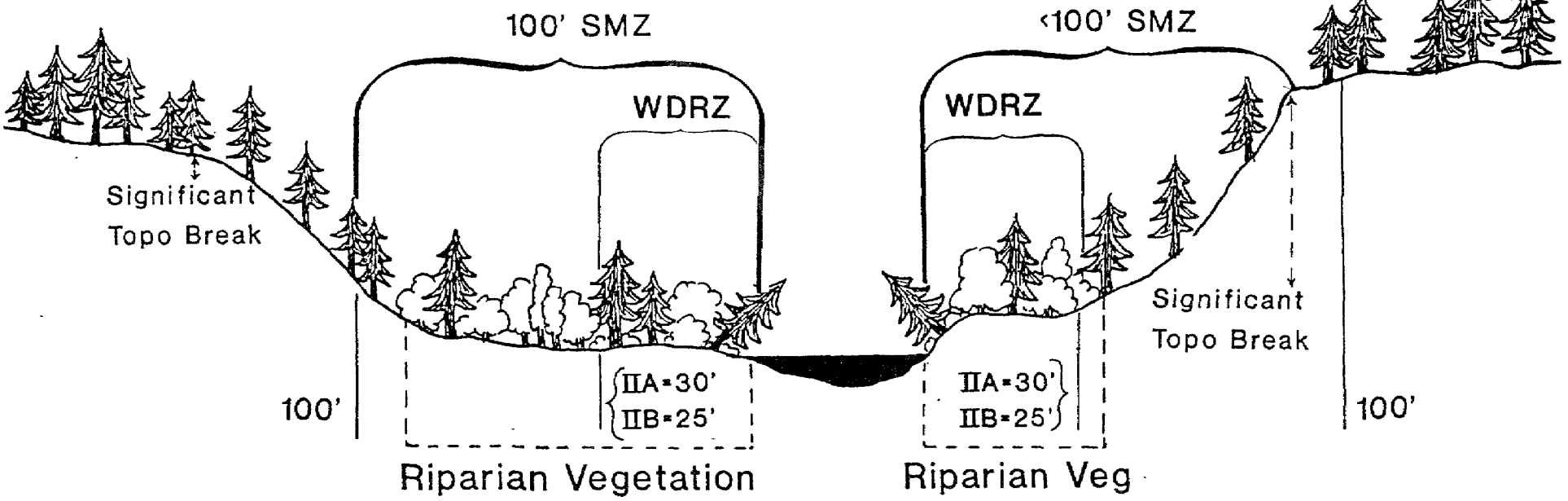
KNF Stream Class I - Large Perennial



KNF STREAM CLASS I DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
LARGE PERENNIALS: Contains limited (few or small amounts) of woody materials within stream channel. Most debris falling perpendicular to the streamflow is swept back parallel toward the banks or downstream.	**SMZ WIDTH** is 100' unless riparian vegetation extends beyond 100' (SMZ WIDTH IS THEN RIP VEG WIDTH); significant topo break is within 100' (SMZ WIDTH IS THEN TOP OF THE TOPO BREAK) **WDRZ WIDTH** is 50 lineal feet on each side of the stream.	Leave 30 trees per 1,000 feet on each side of the stream,(60 trees total); 12 inches DBH minimum, and 18+ inches DBH desirable.	**SMZ:** 1-4,6,7 **WDRZ:** 1-9 **OTHER:** 1,3,5

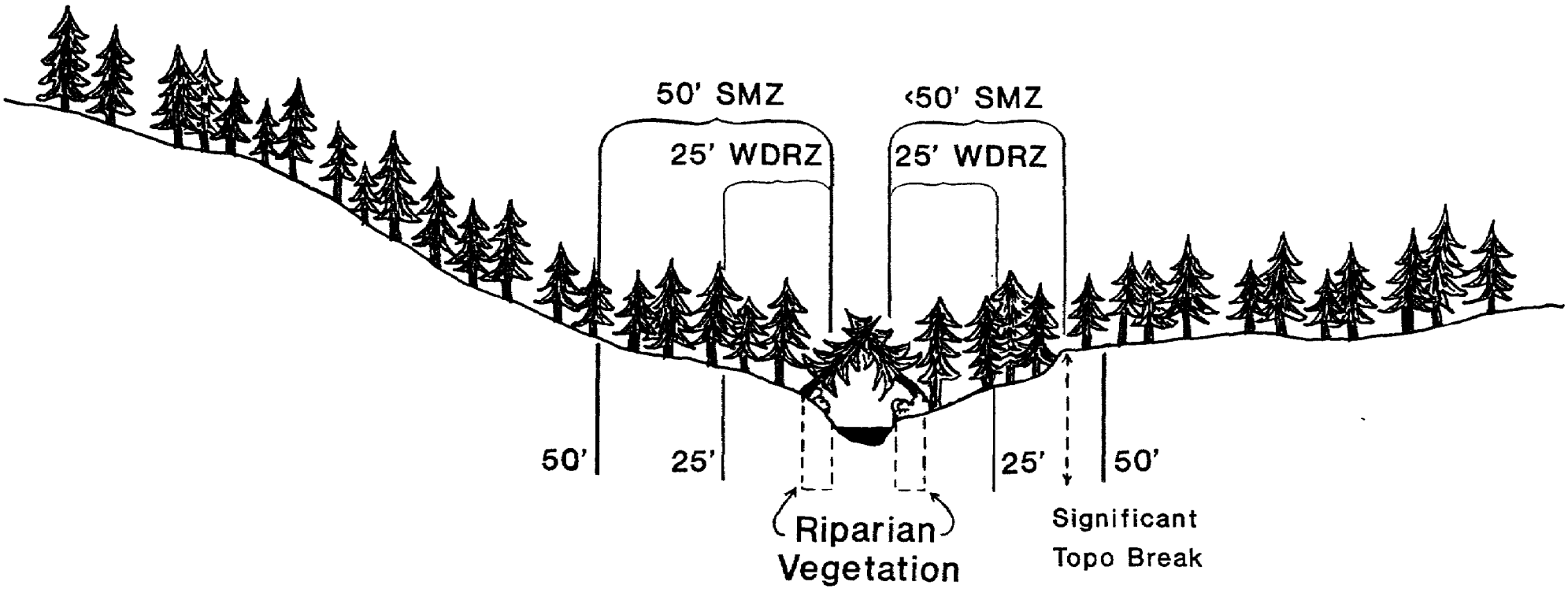
EXAMPLES:	D1: Lower Big Cr (No. Fork & below) D5: Lower Libby Cr (Old Town Bridge & below)	D3: Lower reaches of Grave Cr D6: Fisher River	D4: Lake Creek D7: Bull River

KNF Stream Class II A, II B
Small Perennials



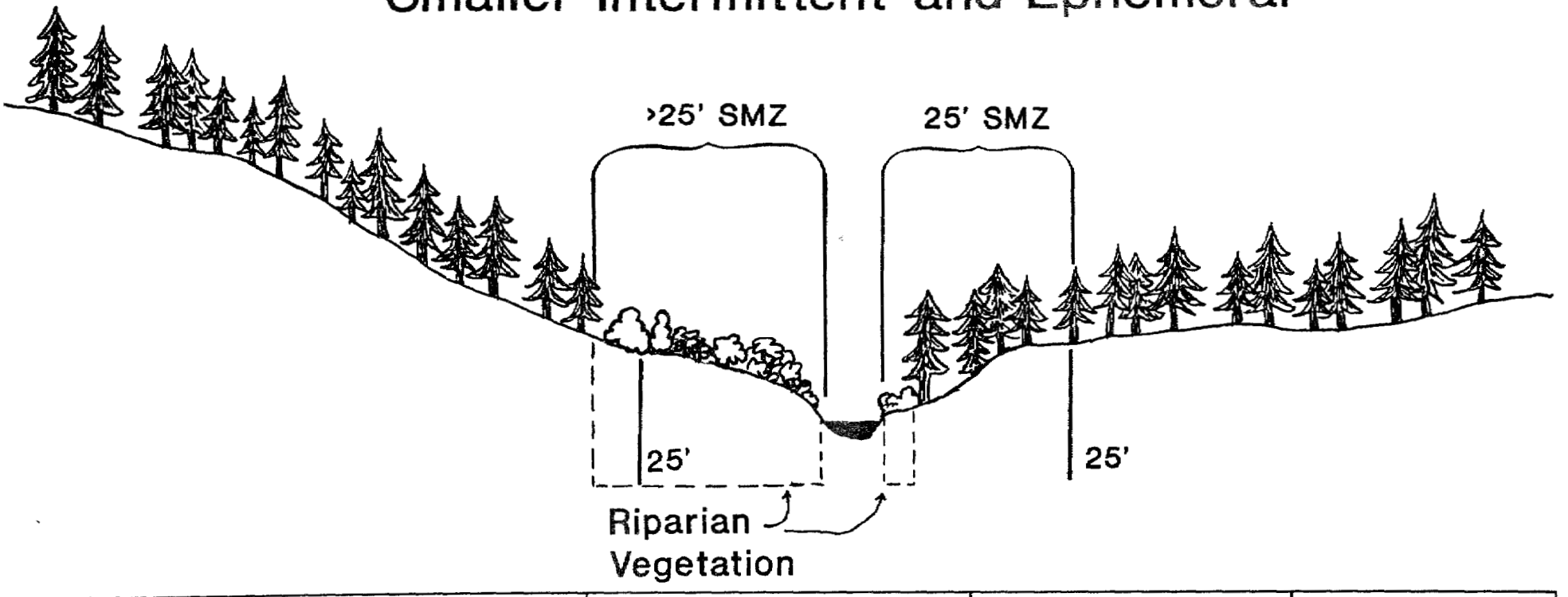
KNF STREAM CLASS II DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
IIA - SMALL PERENNIALS: Includes streams that flow at least 9.5 months of the year, with a **channel bank width of at least 10 feet**. In-channel woody debris perpendicular to flow path is abundant, creating sediment traps and potential fish habitat.	**SMZ WIDTH** is 100' unless the riparian vegetation extends on each side of the stream.100' - SMZ WIDTH IS THEN RIP VEG WIDTH; or significant topo break is within the 100' - SMZ WIDTH IS THEN TOP OF THE TOPO BREAK **WDRZ WIDTH** is 30 lineal feet on each side of the stream.	Leave 50 trees per 1,000 feet (100 trees total); 8 inches DBH minimum, 12+ inches DBH desirable.	**SMZ**: 1-4, 6,7 **WDRZ**: 1-9 **OTHER**: 1,3,5
EXAMPLES: D1: Sutton or Boulder Cr. D5: East Fork Pipe Cr.	D3: Lake, Lower Davis Cr D6: Bristow, Cripple Horse	D4: O'Brien Creek D7: S. Fork of Bull River	
IIB - SMALL PERENNIALS: Also includes streams that run at least 9.5 months, but has a **channel bank width of less than 10 feet**. In-channel woody debris perpendicular to flow path is abundant, creating sediment traps, flow energy dissipation, and fish habitat.	**SMZ WIDTH** is 100' unless the riparian vegetation extends past 100' - SMZ WIDTH IS THEN RIP VEG WIDTH; or a significant topo break is within the 100' - SMZ WIDTH IS THEN TOP OF THE TOPO BREAK. **WDRZ WIDTH** is 25 lineal feet on each side of the stream.	Leave 50 trees per 1,000 feet on each side of the stream (100 trees total); 6-8 inches DBH minimum acceptable, 12+ in DBH desirable.	**SMZ**: 1-7 **WDRZ**: 1-9 **OTHER**: 1,3,5
EXAMPLES: D1: N.Fk Parsnip Creek D5: Crazyman Creek	D3: Upper Davis Creek D6: Butler Creek	D4: Grizzly Creek D7: Snake Creek	

KNF Stream Class IIIA
Large Intermittent and Ephemerals



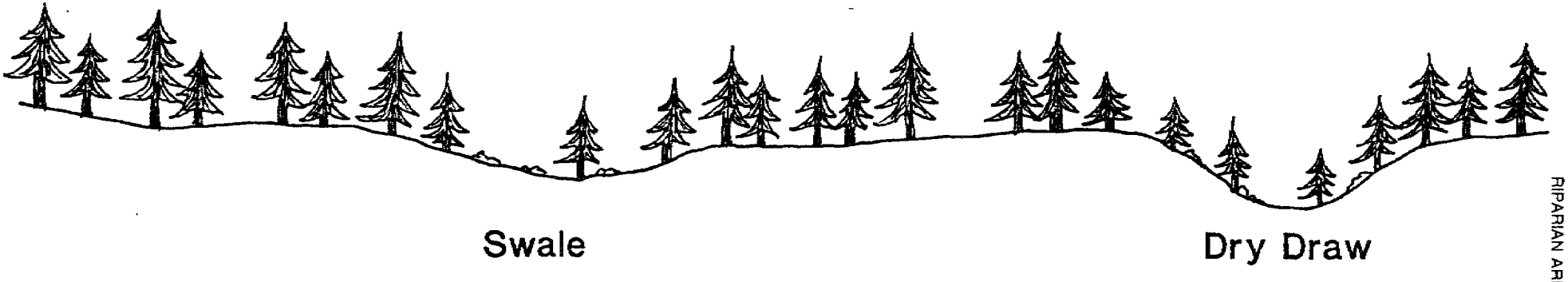
KNF STREAM CLASS IIIA DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
LARGE INTERMITTENT AND EPHEMERAL: These are channels that flow less than 9.5 months of the year, but have a **channel bank width of at least 3 feet.** Downed woody materials are common and important in these channels for flow energy dissipation, sediment storage, and protection of downstream, larger channel conditions.	**SMZ WIDTH** is 50' unless the riparian vegetation extends beyond 50' (SMZ WIDTH IS THEN RIP VEG WIDTH); or a significant topo break is within 50' (SMZ WIDTH IS THEN TOP OF THE TOPO BREAK). **WDRZ WIDTH** is 25 lineal feet on each side of the stream.	Leave 50 trees per 1,000 feet on each side of the stream (100 trees total); 6-8 inches DBH minimum acceptable, except it is desirable to leave larger (12+ inches DBH) cull trees in steep draws and where it will be difficult to protect from burning.	**SMZ:** 1,3,6,7 **WDRZ:** 1-7, 9 **OTHER:** 1,3,5

KNF Stream Class IIIB
Smaller Intermittent and Ephemeral



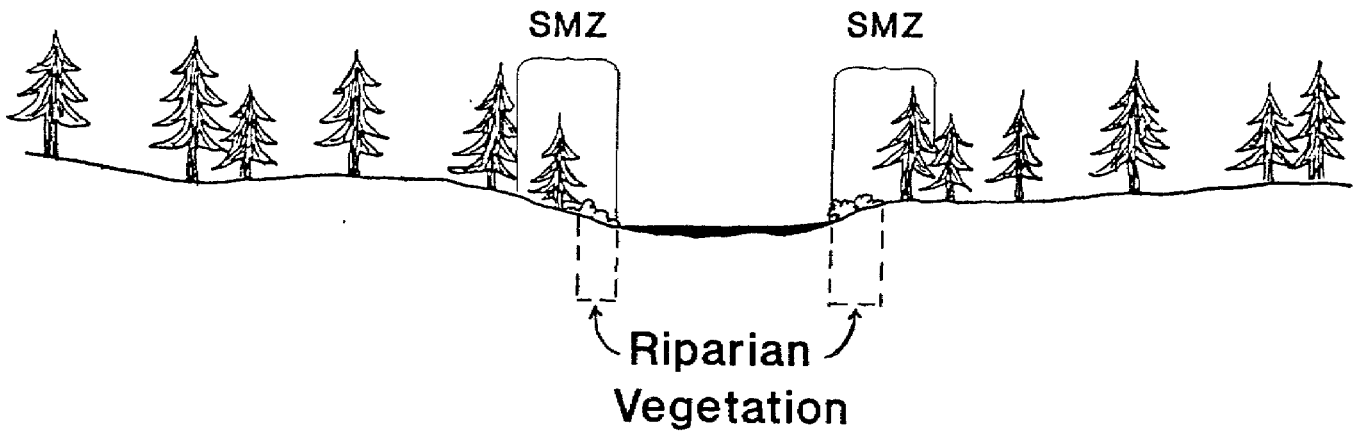
KNF STREAM CLASS IIIB DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
SMALLER INTERMITTENT AND EPHEMERAL: These are channels that flow less than 9 5 months of the year, but have a **channel bank width of less than 3 feet**. Downed woody materials are common and important in these channels for flow energy dissipation, sediment storage, and protection of downstream, larger channel conditions.	**SMZ WIDTH** is the edge of the riparian vegetation but not less than 25'.	None Required.	**SMZ**: 1,3,6,7,8 **OTHER**: 1,3,5

KNF Stream Class IV - Dry Draws and Swales
(no identifiable channel, no riparian area involved)



KNF STREAM CLASS IV DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
DRY DRAWS AND SWALES: without identifiable channel.	None specified.	None specified.	**OTHER:** 2,4,5

Small Ponds and Bogs
(between 1/10 and 2 acres)



KNF STREAM CLASS DESCRIPTION AND CHARACTERISTICS	TREATMENT ZONE WIDTHS (see diagram above)	LEAVE TREE REQUIREMENTS IN WDRZ	RESOURCE GUIDES FOR TREATMENT ZONES
SMALL PONDS AND BOGS: Contains water throughout the summer season and is between 1/10 of an acre and 2 acres in size at maximum height.	**SMZ Width:** provide for a 25-foot-wide special treatment zone around the water body. **WDRZ Width**: is the same as the SMZ and overlaps.	Leave a minimum of 3 trees per 100 feet of perimeter (30 trees per 1,000 feet); 10 inches DBH minimum and 12+ inches DBH desirable. For shade tree considerations, leave all deciduous vegetation and sub-merchantable conifers.	**SMZ:** 1,3,6,7 **WDRZ:** 6,7,9
For **PONDS and BOGS greater than 2 acres** in size, follow the Guidelines for **Stream Class IIB**.			

RESOURCE GUIDELINES FOR TIMBER HARVEST WITHIN STREAMSIDE MANAGEMENT ZONES (SMZ's) ON THE KOOTENAI NATIONAL FOREST

SMZ'S:

1. Leave all deciduous brush and trees, and snags standing in the SMZ (unless they constitute a safety hazard), and leave all unmerchantable conifers in the WDRZ, to provide for filter strip maintenance, and stream channel stability.
2. In areas with multiple channels, use the *outermost channel bank* as the measurement point under these guidelines (see Appendix 1).
3. The SMZ is a zone of exclusion for heavy equipment and machinery. To keep heavy equipment out of the SMZ, "Protected Streamcourse Designation" signs will be needed and should be placed along the SMZ boundary to maintain the integrity of the filter strip (see Appendix 4).
4. Total SMZ harvest is limited to 1,200 feet per mile per decade with a limit of any individual SMZ harvest to 600 feet maximum stream length The exception is on KNF Stream Class IIB which can accommodate an individual SMZ harvest unit of 1,000 feet and 1,500 feet total harvest per mile per decade. Existing riparian and/or streamside harvest units must be considered in the calculations (see definition of Past Riparian Harvest). Stagger SMZ harvest to provide adequate shading for water temperature maintenance (no harvest in the adjacent or opposite stand for approximately 30 years or until the harvested unit has 8-inch DBH trees) (See Appendix 2 for suggested long-term harvest strategy).
5. When several short streamcourses are encountered in a drainage, add them all together to estimate the total amount that can be harvested.
6. Use directional felling to fall timber outside the SMZ and whole-tree skidding to reduce the amount of logging slash and potential heat kill of the smaller leave trees in the WDRZ (those less than 12 inches DBH).
7. Thinning is allowed in the SMZ but deciduous brush and trees should not be cut.
8. Burning prescriptions for slash treatment in harvest units must include methods to minimize damage to SMZ vegetation left as described in SMZ1. Where necessary, this may require removal of logging-derived slash prior to ignition, use of a sprinkler system, or modified ignition patterns to reduce fire intensity.

OTHER:

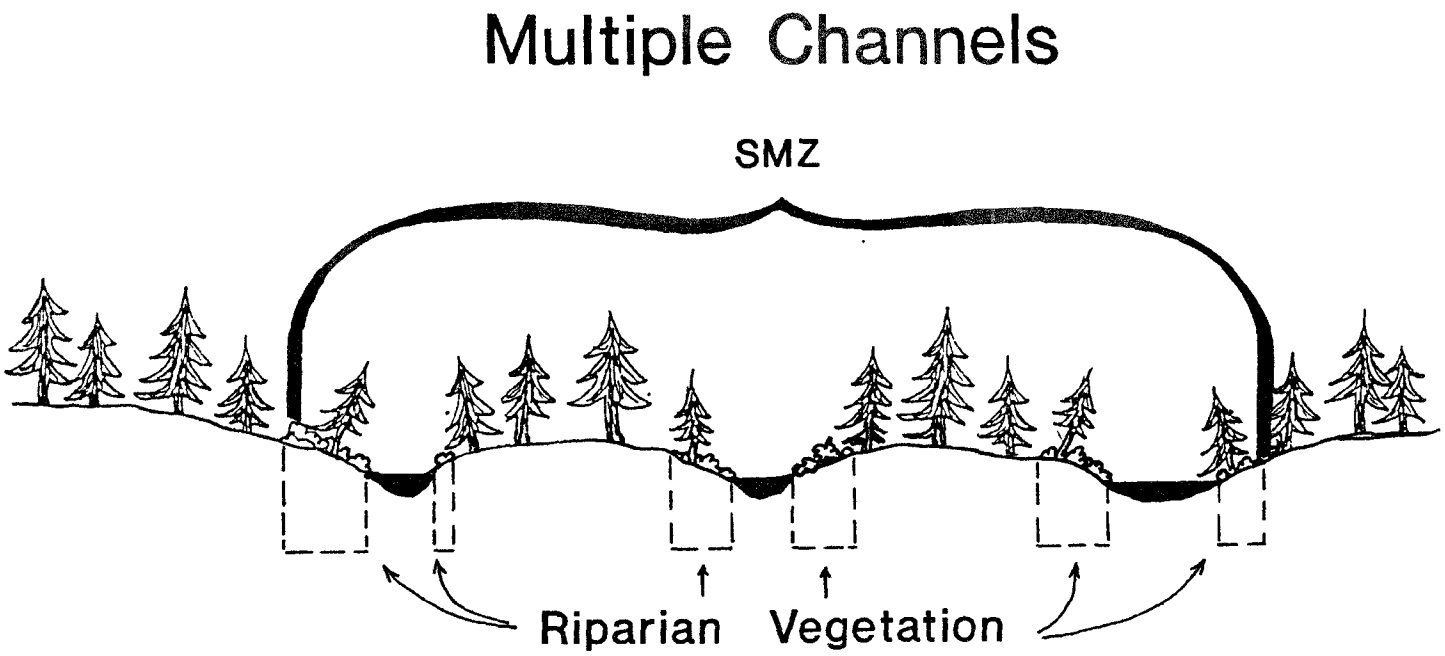
1. Firelines and skid trails will be located away from live water to reduce potential sedimentation and to retain deciduous vegetation.
2. Skidding up-and-down the depression and slash piling within these swales, dry-draws, and small channels should be prohibited where possible. Firelines should be located out of, and all crossings should be made at right angles to, the flow direction in these depressions.
   Directional felling should be required to preclude skidding or piling within the depression.
3. Do not clean streamcourses of any naturally occurring pre-harvest woody debris. Selectively leave harvest debris if quantities of naturally occurring woody debris are low: suggest 1 piece of debris per 25 lineal feet of channel with a minimum size of 6 inches DBH and 8 feet in length.
4. Leave all deciduous brush and trees to provide for litter fall.
5. All streamcourses 50-100 feet above all culverts and bridges will be inspected to determine potential problems with any naturally-induced woody debris to insure the continued safe functioning of the drainage structure and roadway.

WDRZ'S:

1. Trees that are either ***rooted within the stream bank or leaning towards the channel*** are the most desirable to leave and protect.
2. Maintain a mix of species and sizes if possible, but try to meet the desirable DBH sizes as the first priority for marking. Remember that trees 12 inches DBH and larger survive logging debris slash burning better than trees with smaller DBH's.
3. Within reason for safety during burning, leave the existing dead and down trees within the WDRZ, and give priority to cull trees and low-value species for leave trees.
4. Utilize the debris recruitment leave trees as harvest unit boundary trees and/or cavity habitat in the layout process whenever possible.
5. Large woody material that is suspended over a streamcourse should be left. Parts of longer logs may be removed providing the majority is retained for bank stability. If bucking is needed for fire containment, buck at the edge of the channel (not in the stream center) to retain the value of a viable potential sediment trap.
6. Use existing size, species, and location of natural debris for potential debris recruitment and bank stabilization whenever possible instead of marking additional trees (i.e. existing hardwoods or extensive brush cover may be adequate to maintain or enhance stream protection objectives).
7. Natural blowdown is expected and a moderate level is acceptable. However, where severe blowdown appears probable, a modification of the adjoining harvest block should be considered.
8. Leave trees should be evenly distributed along streams, if possible, except for clumps left at the outside of meander bends.
9. Burning prescriptions for the harvest unit must include methods to protect the WDRZ leave trees. Examples of methods to protect leave trees include removal of fuels from the SMZ prior to ignition, running a sprinkler system as needed to reduce fire intensity, foaming leave trees, or modified ignition patterns to reduce fire intensity.

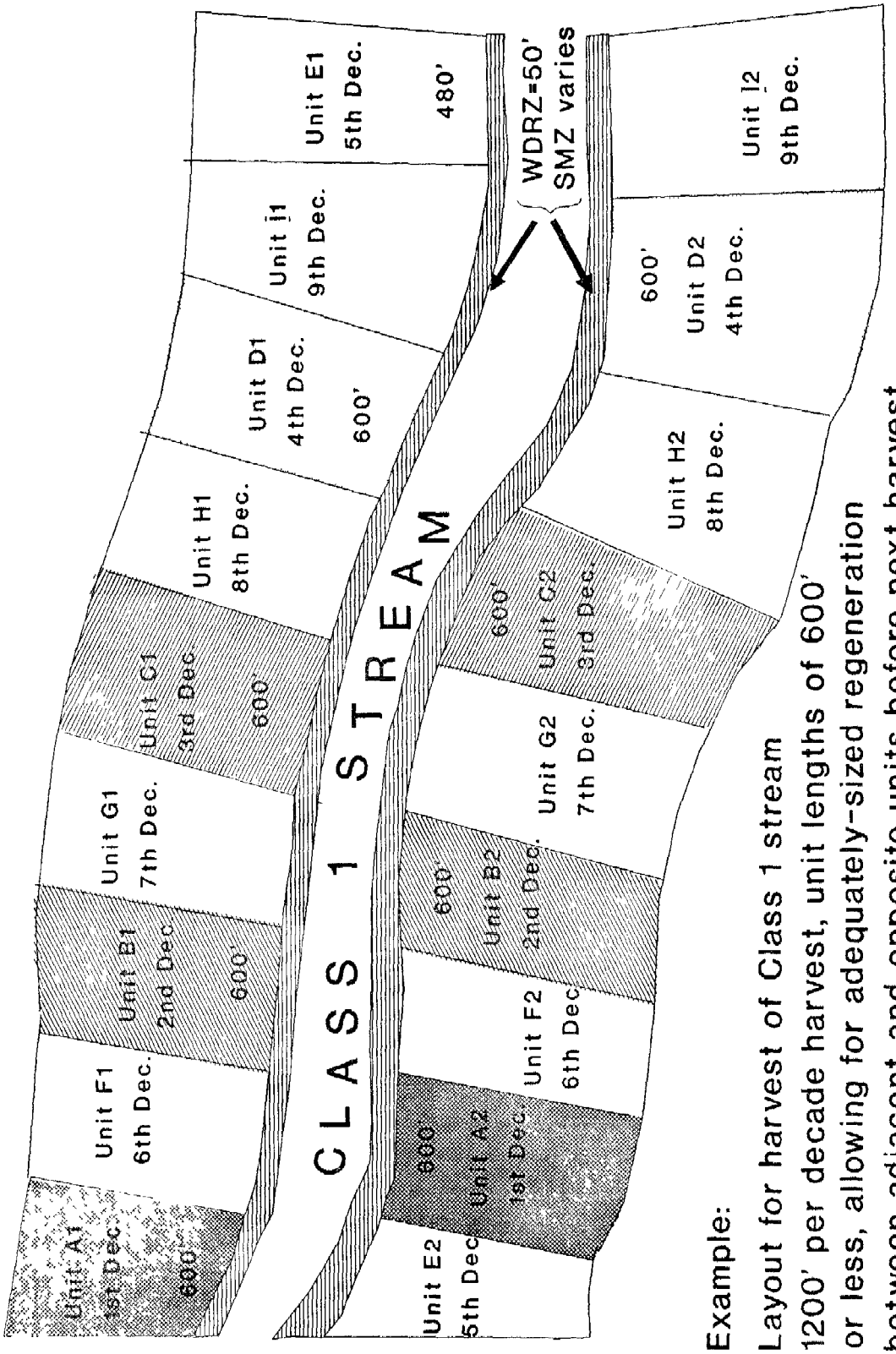
APPENDIX 1

DIAGRAM FOR SMZ DELINEATION IN MULTIPLE CHANNEL STREAMS
(See Resource Guideline Item SMZ-2)



APPENDIX 2

Timber Harvest Guidelines within SMZ's on the KNF



Example:

Layout for harvest of Class 1 stream
1200' per decade harvest, unit lengths of 600'
or less, allowing for adequately-sized regeneration
between adjacent and opposite units before next harvest.
(to accompany Resource Guideline Item SMZ-4)

APPENDIX 3

C-Provision and **Handbook Supplement** for implementation of Kootenai National Forest Riparian Area Guidelines

C6.50# - STREAMSIDE MANAGEMENT ZONES. (12/90) A Streamside Management Zone (SMZ) is a zone that contains riparian vegetation and other special characteristics. Areas identified as Streamside Management Zones (SMZ's) are shown on the Sale Area Map and designated ____1/_____.

Timber designation, conduct of logging, and/or slash treatment may differ in the SMZ from the rest of the unit. Unless otherwise agreed to in writing, and not withstanding the contract requirements otherwise applicable to each cutting unit, the following special requirements apply to the SMZ of the cutting units specified below:

Streamside Management

Cutting Unit Zone Requirements

XXXXXXXX XXXXXXXX

FOREST SERVICE HANDBOOK
Libby, Montana

TITLE 2409.18 - TIMBER SALE PREPARATION HANDBOOK

Kootenai Supplement No. 1

POSTING NOTICE: Ref. FSM 1135.21

Page Code Superseded New
(Number of sheets)

25.32--1 THRU 25.32-- 0 3

Digest:

Provides instructions for use of Streamside Management Zone contract provisions.

JAMES F. RATHBUN
Forest Supervisor

25.32--1

TIMBER SALE PREPARATION HANDBOOK

Streamside Management Zones. Streamside Management Zones (SMZ) are areas identified adjacent to streams and/or wet areas where special treatment is required to protect water quality and riparian features. The streamside management zone identified on the ground marks the outermost limit where special treatment is needed. In most cases, it marks the limit beyond which equipment operations are prohibited, except under specific approved conditions. There are different objectives within the SMZ. The following list of approved requirements is designed to allow contract preparers to select appropriate requirements to achieve various objectives. Select only the requirements necessary to achieve the particular objectives that pertain in each case.

There are numerous contractual provisions that are used to achieve streamside and erosion control measures. None of the provisions by themselves accomplish all objectives. Provision C(CT)(BA) 6.50# shall be used in all contracts with designated and identified Streamside Management Zones. This provision is the vehicle by which management objectives and special treatment objectives are carried through to the contract, to accomplish debris recruitment objectives, filter strip objectives, etc.

This provision does not replace provision B(T)6.5- Streamside Protection, or C(T)6.6 Erosion Prevention and Control provisions.

Streamside management zones will be marked on the ground, and shown on the Sale Area Map. This will be the general procedure for all streams with identifiable channels. It is not feasible to mark SMZ's on all draws, where the primary emphasis from a water and soil quality standpoint is to prevent yarding and skidding directly up and down the depressions. In this situation, these areas need to be identified during presale, highlighted on work maps, and the information needs to be passed on to Sale Administrators via good prep notes. These can be used by Sale Administrators when approving skid trail or corridor locations. These notes are especially critical for winter operations.

Sale Area Map:

Symbol Title Shown in Legend Remarks

SMZ Streamside Management Zone There may be situations where different requirements are needed for SMZ's within a cutting unit. If so, the SMZ's may be identified by number on S.A.M. and in the "C" provision to identify different situations

25.32--2

Optional Fill-in Statements

Objective: Designation of trees *to be left* within the debris recruitment zone or entire SMZ, that may be different than rest of the unit.

Sample Statements:

All coniferous trees marked with paint above and below stump height shall be left uncut within the SMZ. (NOTE: paint color may be specified)

All coniferous trees less than DBH shall be left uncut within *feet* of the streambanks (NOTE: distances may be specified that correspond to riparian guide woody debris recruitment zone distances. DBH limits can be varied depending on the individual stream situation.)

All coniferous trees marked with paint above and below stump heights, and all coniferous trees less than DBH shall be left within the streamside management zone.

All hardwoods (aspen, cottonwood, etc.) shall be left uncut within the SMZ.

Objective: Designation of trees *to be removed* within the SMZ., that may be different than rest of unit.

Sample Statements:

All coniferous trees (less than*DBH)(greater than * DBH) (of ****** species meeting merchantablity specifcations) (marked with paint) are designated for removal within the SMZ. (NOTE: select statement in parenthesis that is applicable. Fill in DBH limits, or species identification, or paint color)

Objective: Protection of debris recruitment trees from being destroyed in slash /site preparation treatments.

Sample Statements:

All logging slash generated within the SMZ shall be endlined, or otherwise removed to a point outside the SMZ.

Slashing requirements, if any, specified in the Slash Treatment Plan do not apply within(of the streambanks), or(within the SMZ). (NOTE:specify distance)

Objective: Protection of filter strips, and reduction of soil disturbance within the SMZ.

25.32--3

Sample Statements:

Skidding with shall not be permitted within the SMZ, except in places approved in advance by the Sale Administrator. (specify type of equipment not allowed, i.e. wheeled, track)

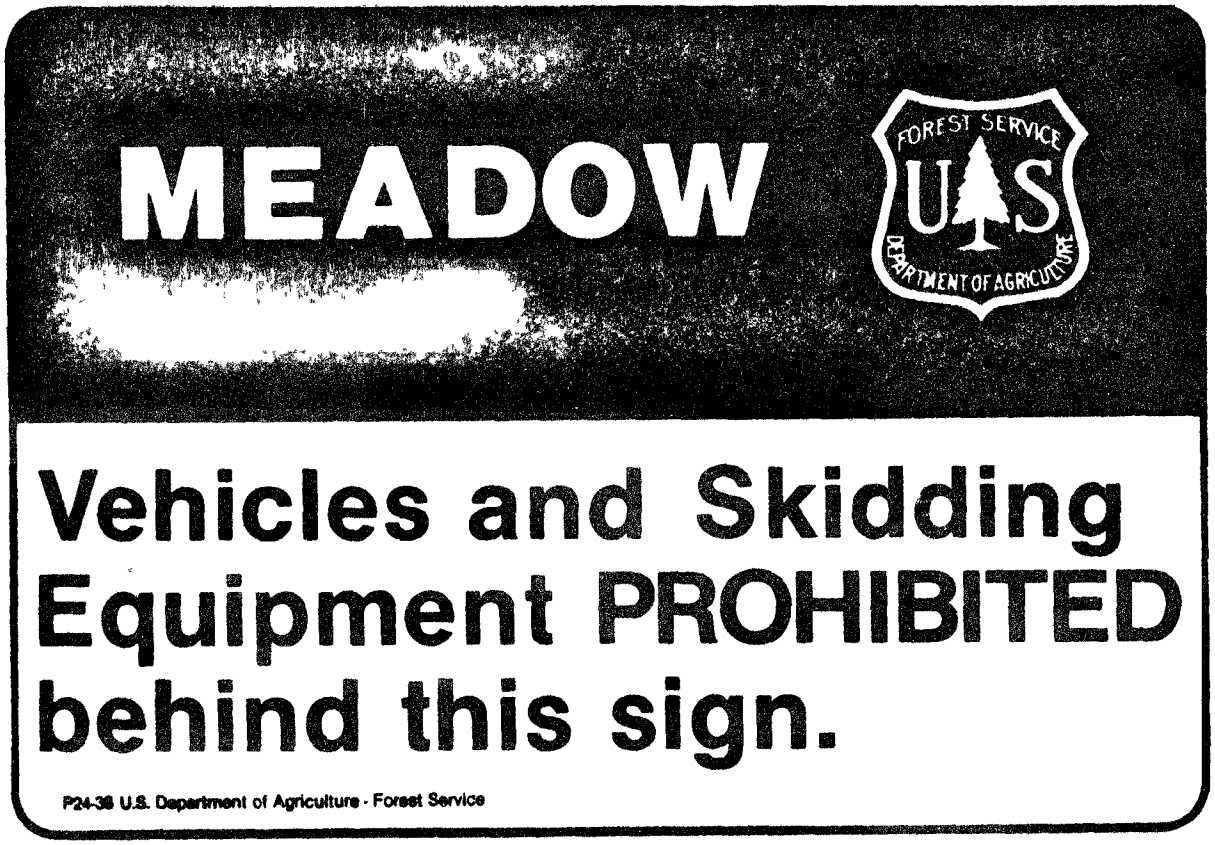
equipment will be allowed within the SMZ upon approval, for specific purposes such as designated crossings, or tree removal. (specify type of equipment that will be allowed, such as horses, flotation, full suspension)

Cable corridors will not be located immediately above and parallel to the SMZ.

Logs or trees shall be yarded from outside the SMZ using winchlines, or other cable systems.

Machine scarification requirements specified elsewhere, do not apply to the area within the SMZ.

APPENDIX 4 (SIGNS)



APPENDIX 5

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APPENDIX 6

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