VOLUME I

United States Department of Agriculture

Forest Service

Northern Region

FINAL ENVIRONMENTAL IMPACT STATEMENT

Bitterroot National Forest Plan

September 1987

ENVIRONMENTAL IMPACT STATEMENT

for the

Bitterroot National Forest

Land and Resource Management Plan

Ravalli and Missoula Counties, Montana
and Idaho County, Idaho

Type of Action	Administrative
Responsible Federal Agency	Forest Service, USDA
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Abstract	This Environmental Impact Statement describes alternatives, including the Preferred Alternative and "No Action" Alternative, for managing the land and resources of the 1.6 million acre Bitterroot National Forest. The National Forest land is in Missoula and Ravalli Counties in Montana, and Idaho County, Idaho. The alternatives provide different mixes of management prescriptions, resulting in different levels of outputs, goods, and services. The environmental consequences for the Preferred Alternative and other alternatives are displayed.

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SUMMARY

This is a summary of Chapters I through VI of the Final Environmental Impact Statement (FEIS) for the Bitterroot National Forest.

I. PURPOSE AND NEED

The Environmental Impact Statement (EIS) documents the analysis, and discloses the significant environmental effects, of the preferred alternative and other alternatives for the future management of land and resources of the Bitterroot National Forest. The preferred alternative is the basis for the Forest Land and Resource Management Plan (Forest Plan) which is described in a separate document. The Forest Plan will guide management of the Forest for the next 10 to 15 years unless conditions or demands significantly change (36 CFR 219.10). The analysis in the EIS projects outputs and effects for up to 150 years, to indicate the long-term implications of continuing an alternative for management. While long-range effects have been estimated, the Plan is only valid until it is revised, committing the Forest to a course of action no longer than 15 years.

This analysis and the Forest Plan are designed to: ensure multiple use; provide a sustained yield of goods and services from the Forest; maximize long-term net public benefits; and address public issues and management concerns in an environmentally sound manner. Net public benefits are the overall value to the Nation of all outputs and positive effects (benefits), less all associated Forest inputs and negative effects (costs) of producing priced and nonpriced outputs from National Forest lands.

Development of this EIS followed direction from the Forest and Rangeland Renewable Resources Planning Act (RPA), National Forest Management Act (NFMA), National Environmental Policy Act (NEPA), and implementing regulations of NFMA (36 CFR 219) and NEPA (40 CFR 1500-1508).

A. Planning Area

The Forest encompasses 1,577,883 acres of National Forest land located in west central Montana and east central Idaho. It contains the headwaters of the Bitterroot River in Montana and portions of the Selway and Salmon Rivers in Idaho. The Forest is located in two mountain ranges surrounding the Bitterroot Valley--the Sapphire Mountains on the east, and the Bitterroot Mountains on the west.

Seventy-one percent of the Forest is in Ravalli County, Montana; 29 percent is in Idaho County, Idaho; and less than 1 percent is in Missoula County, Montana. The Forest Supervisor's Office is in Hamilton, Montana.

Portions of three wildernesses and two wild and scenic rivers cover about 47 percent of the Forest. The Blue Joint and part of the Sapphire Montana Wilderness Study Act (MWSA) areas are on the Forest.

B. Issues, Concerns, and Opportunities

In 1980, six major public issues were identified from comments by individuals, organizations, and agencies who participated in public involvement activities for the Forest Plan. Additional public involvement was initiated in 1983 to aid in the inventory and evaluation of 405,000 acres of roadless land.

Comments received on the Draft EIS and Forest Plan were related to the six major issue statements developed at the start of the planning process. Issue statements are still relevant and little modification was necessary; however, public comments and Forest Service reviews did serve to reinforce or clarify specific concerns associated with each issue statement.

1. What timber harvest level can be sustained and how much should be offered and sold in the planning period (next 10 to 15 years)?

2. To what extent should visual quality considerations influence management activities?

3. How should Forest lands be managed to sustain wildlife and fish populations?

4. How can watersheds be managed to maintain or enhance water quality, soil productivity, and desirable streamflow?

5. How should undeveloped (roadless) areas be managed?

6. What management should be recommended for the Blue Joint and Sapphire wilderness study areas?

II. ALTERNATIVES

Alternatives were developed to respond to public issues, management concerns, opportunities, cost efficiency, and net public benefits. Public and other agency comments, and Forest Service review, following release of the Draft EIS and Forest Plan resulted in the modification of the Proposed Action (Alternative E) into the Preferred Alternative (E2).

A. Range of Alternatives

Once the issues, concerns, and opportunities were identified, information was needed to determine the Forest's capability to respond to the issues. This was done by analyzing resource data, economics information, and environmental and legal constraints, to establish a basis for the range of alternatives.

Resource supply potentials were determined by establishing minimum and maximum production levels called benchmarks, using the FORPLAN computer model. Laws and regulations that require measures to prevent significant impairment of the productivity of the land were identified as constraints, reducing the supply potential of alternatives. The range of alternatives included a market alternative which emphasized timber, livestock forage, and mineral production on lands outside existing wilderness. A low market alternative emphasized wilderness, recreation, wildlife, fish habitat, water quality, and scenery. The other alternatives provide varying degrees of response to the major issues.

B. Description of Alternatives

Ten alternatives were considered in detail. Each alternative would provide various levels of timber harvest, road construction, fish habitat, elk habitat, wilderness, roadless recreation, livestock grazing, minerals, and other activities. Alternatives vary by the intensity of management prescribed and the

land area assigned to various uses. Each alternative has an objective of maximizing present net value to assure cost efficiency. Alternatives prescribe different resource management activities for MWSA areas, but the wilderness potential will be maintained under all alternatives pending final resolution by Congress. Table S-1 at the end of this section compares the response of alternatives to major issues and management concerns.

Alternative A emphasizes timber outputs. It has the most extensive road system, enhancing opportunities for roaded recreation and mineral exploration. Visual quality is at the minimum level. No new wilderness is recommended.

Practically all tentatively suitable timberland will be managed for timber production. Timber volume for the first decade is nearly double the historic sold level. About 25 percent of the inventoried roadless area would be developed in the first decade. Viable populations of wildlife and fish are maintained, but on less than optimum habitat.

Present net value is the highest of any alternative, but returns in the first decade do not recover costs by a wide margin. There is a high potential for below-cost timber sales. The estimated budget is 49 percent above the current level. This is the only alternative that meets RPA targets for both timber and livestock forage.

Alternative B emphasizes timber outputs but responds to wilderness, visual quality, and elk and fish habitat issues that can be achieved with the least effect on market outputs. The extensive road system enhances opportunities for roaded recreation. A moderate level of visual quality is maintained in the foreground viewed from major travel corridors. Canyon mouths adjoining the Selway-Bitterroot Wilderness are recommended for wilderness. These have very high wilderness attributes, would compliment the existing wilderness and enhance its manageability.

Most tentatively suitable timberland would be managed for timber production. Timber volume for the first decade is about 70 percent above the historic sold level. About 20 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on heavily used winter range, and for fish along major streams.

Present net value is high, but returns do not recover costs in the first decade. There is a high potential for below-cost timber sales. The estimated budget is 49 percent above the current level.

Alternative C provides a mix of resource outputs emphasizing timber, but responding to wilderness, roadless, visual quality, and elk and fish habitat issues that can be achieved with minimal effect on market outputs. Roadless recreation is enhanced by designating high elevation land having diverse scenery, vegetation, wildlife, geology, lakes, and other attractions for roadless management. A moderate level of visual quality is maintained in the foreground viewed from primary and some secondary travel corridors. Wilderness recommendations include those identified in Alternative B, plus additions to the Frank Church-River of No Return and Anaconda-Pintler Wildernesses having high wilderness attributes.

About 90 percent of the tentatively suitable timberland would be managed for timber production. Timber volume for the first decade is about 65 percent above the average historic sold level. About 10 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on most winter range, and for fish along most larger fishery streams.

Present net value is high, but returns do not recover costs in the first decade. There is a moderate potential for below-cost timber sales. The estimated budget is 47 percent above the current level.

There is no Alternative D

Alternative E provides a mix of market and nonmarket outputs with substantial resolution of roadless, wilderness, elk and fish habitat, visual quality and timber issues. Roadless recreation and elk security are enhanced by designating widely dispersed areas having diverse scenery, vegetation, wildlife, geology, lakes, and other attractions for roadless management. A high level of visual quality is maintained in the foreground and middleground viewed from primary travel corridors. Canyon mouths adjoining the Selway-Bitterroot Wilderness and the Blue Joint drainage are recommended for wilderness. These have very high wilderness attributes, would compliment existing wilderness and enhance its manageability.

About 75 percent of the tentatively suitable timberland would be managed for timber production. Timber volume for the first decade is 20 percent above the average historic sold level. About 15 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on most winter range, and for fish along all fishery streams.

Present net value is moderate, but returns do not recover costs in the first decade. There is a high potential for below-cost timber sales. The estimated budget is 37 percent above the current level.

Alternative E1, which departs from nondeclining timber flow, is a modification of Alternative E. It provides for accelerated road development and harvest of lodgepole pine, on the premise that mountain pine beetle infestation will reach epidemic levels. All other objectives and constraints are the same as for Alternative E.

Timber volume for the first decade is about 45 percent above the average historic sold level. About 20 percent of the inventoried roadless area would be developed in the first decade. Fisheries would be placed at substantial risk due to sediment produced by accelerated road construction and timber harvest.

Present net value is moderate, but significantly reduced by a preponderance of inefficient timber sales in early decades. First decade returns do not recover costs by a wide margin. There is a very high potential for below-cost timber sales. The estimated budget is 63 percent above the current level.

Alternative E2 (Preferred Alternative) provides a mix of market and nonmarket outputs. It is a modification of Alternative E, but has a more economically efficient level of timber production in line with declining budgets, and better resolves water quality, fish, and elk habitat issues. It has a moderate resolution of roadless, wilderness, visual quality and timber issues.

Roadless recreation and elk security are maintained by designating widely dispersed areas having diverse scenery, vegetation, wildlife, geology, lakes, and other attractions for roadless management. A high level of visual quality is maintained in the foreground and middleground viewed from primary travel corridors, and immediate foreground adjacent to the larger streams. Canyon mouths adjoining the Selway-Bitterroot Wilderness and the Blue Joint drainage are recommended for wilderness. These have very high wilderness attributes, would compliment existing wilderness and enhance its manageability.

About 65 percent of the tentatively suitable land base would be managed for timber production. Timber volume for the first decade is about 100 percent of the average historic sold level. Less than 5 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on all winter range, and for fish along all fishery and nonfishery streams.

Present net value is moderate. First decade returns more nearly balance costs than for any other alternative. The potential for below-cost timber sales is low. The estimated budget is 14 percent above the current level.

Alternative F (Current Program) continues the current program and provides resource outputs consistent with current budget constraints. This is the "no action" alternative required by the National Environmental Policy Act. Management direction is provided by land management plans (Unit Plans) completed in the mid-1970's, as modified by Congressionally designated wilderness study areas (P.L. 95-150, November 1, 1977), wilderness legislation (P.L. 96-312, July 23, 1980), and RARE II (FEIS, January, 1979). It provides a mix of market and nonmarket outputs, and is responsive to issues that predate the current planning process.

Roadless recreation is enhanced by designating widely dispersed areas having diverse scenery, vegetation, wildlife, geology, lakes and other attractions for roadless management. A high level of visual quality is maintained in the foreground and middleground viewed from primary travel corridors. Canyon mouths adjoining the Selway-Bitterroot Wilderness are recommended for wilderness. These have very high wilderness attributes, would compliment existing wilderness and enhance its manageability.

About 75 percent of the tentatively suitable timberland is managed for timber production. Timber volume for the first decade is about 10 percent above the historic sold level. About 10 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on most winter range, and for fish along major streams.

Present net value is moderate, but returns do not recover costs in the first decade. There is a high potential for below-cost timber sales. The estimated budget is 22 percent above the current level.

Alternative G provides a mix of uses and outputs that address all major issues but emphasize nonmarket resources. It achieves a high resolution of wilderness, elk habitat and visual quality issues, and moderate resolution of roadless, fish habitat and timber issues.

Roadless recreation and elk security are enhanced by designating widely dispersed areas having diverse scenery, vegetation, wildlife, geology, and other attractions for roadless management. A high level of visual quality is maintained in the foreground and middleground viewed from primary and secondary travel corridors. Areas having high to very high wilderness attributes are designated for wilderness: canyon mouths adjoining the Selway-Bitterroot Wilderness, portions of the Stony Mountain roadless area, and portions of the Blue Joint and Sapphire Montana Wilderness Study Act areas.

About 80 percent of the tentatively suitable timberland would be managed for timber production. Timber volume for the first decade is 15 percent above the average historic sold level. About 10 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on all winter range, and for fish along fishery streams.

Present net value is moderate, but returns do not recover costs in the first decade. The potential for below-cost sales in the first decade is moderate. The estimated budget is 35 percent above the current level.

Alternative H generally limits market outputs to currently roaded land. Wilderness is recommended for most roadless area. On roaded land, this alternative responds to visual quality and elk and fish habitat issues that can be achieved with minimal effect on market outputs. A moderate level of visual quality is maintained in the foreground viewed from major travel corridors. Areas having moderate to high wilderness attributes are recommended for wilderness.

About 65 percent of the tentatively suitable timberland is managed for timber production. Timber volume for the first decade is about 90 percent of the historic sold volume. Less than 5 percent of the inventoried roadless area would be developed in the first decade. Near optimal habitat for elk is maintained on heavily used winter range, and for fish along major streams.

Present net value is moderate, but returns do not recover costs in the first decade. There is low potential for below-cost timber sales. The estimated budget is 22 percent above the current level.

There is no Alternative I

Alternative J emphasizes nonmarket values, especially wilderness, visual quality, wildlife and fish habitat, and water quality. Market opportunities are provided where consistent with these objectives. Roadless recreation and elk security are enhanced by wilderness recommendations. A very high level of visual quality is maintained on all land viewed from primary and secondary travel corridors. Practically all roadless area is designated for wilderness.

About 55 percent of the tentatively suitable timberland would be managed for timber production, with no riparian area in the suitable base. Timber volume for the first decade is 60 percent of the average historic sold level. No inventoried roadless area would be developed. Optimal habitat for elk and fish is maintained.

Present net value is low; returns do not recover costs in the first decade. The potential for below-cost timber sales is low. The estimated budget is 18 percent below the current level.

Table S-1
Response to Major Issues and Concerns

ISSUE	INDICATOR	UNIT 1/	ALTERNATIVES A	B	C	E	E1	E2	F	G	H	J	BENCH-MARK MAX PNV
TIMBER	--Portion of 586,300 acres of tentatively suitable timberland managed for timber production	%	97	97	89	77	77	66	77	79	63	54	100
	--Long term sustained yield	MMBF	59	59	52	46	46	42	40	44	40	30	60
	--Annual Allowable Sale Quantity (Decade 1)	MMBF	59	51	49	36	44	33	33	35	28	18	16
	Aerial yarding portion,	%	37	20	16	17	22	12	27	23	17	17	7
	Lodgepole pine	%	40	19	9	28	35	26	24	13	24	10	0
	Steep slopes, sensitive soils	M Ac	29	16	13	15	23	9	19	11	7	5	3
	Timber sale program excluding MWSA areas	MMBF	52	42	43	32	39	31	33	30	26	18	16
	Change from 10-year average sell of 30 1 MMBF	%	+96	+69	+63	+20	+46	+10	+10	+16	-7	-40	-47
	Change from Bitterroot share of log requirement expressed by Darby mill owners (40 3 MMBF)	%	+46	+27	+22	-11	+9	-18	-18	-13	-31	-55	-60
	--ASQ for four-Forest bid area	MMBF	282	263	259	195	227	188	204	193	168	159	NA
	Bid opportunity compared to 10-year average of 204 MMBF offered for sale	%	+39	+29	+27	-4	+11	-8	0	-5	-18	-22	NA
	Bid group 2/ share assuming all offered is purchased	MMBF	76	68	65	48	59	45	46	47	38	28	NA
	Change from 54 5 MMBF log requirements expressed by bid group mill owners	%	+39	+25	+19	-12	+8	-17	-16	-14	-30	-49	NA
	Change from 10-year average purchases of 40 6 MMBF	%	+87	+67	+60	+18	+45	+11	+13	+16	-6	-31	NA
	--Bid group share assuming continuation of the past short fall between offered and purchased	MMBF	56	50	48	36	44	33	34	35	28	21	NA
	Change from 54 5 MMBF log requirements expressed by bid group mill owners	%	+3	-8	-12	-34	-19	-39	-38	-36	-49	-61	NA
	Change from 10-year average purchases of 40 6 MMBF	%	+38	+23	+18	-11	+8	-19	-16	-14	-31	-48	NA
	--Potential for below-cost sales in Decade 1 3/	Rank	VH	H	M	H	VH	M	H	M	L	L	VL
VISUAL	--Visual quality objective as a percentage of suitable timber base												
	-Retention, activities evident	%				3	3	1	20	17		35	
	-Partial retention, activities subordinate	%		16	16	20	20	29	8	22	17	26	
	-Modification, activities dominate	%		11	23	29	29	44	11	14	15	39	
	-Maximum modification, activities dominate	%	100	73	61	48	48	26	61	48	68	0	100
WILDLIFE	--Winter range assigned to winter range prescription	%	0	25	46	51	51	51	19	25	22	24	0
	--Old growth on suitable timberland end of Decade 1	%	38	38	38	35	36	37	37	38	36	32	38

Table S-1 (continued)
Response to Major Issues and Concerns

ISSUE	INDICATOR	UNIT 1/	ALTERNATIVES A	B	C	E	E1	E2	F	G	H	J	BENCH-MARK MAX PNV
FISH	--Portion of riparian area assigned to riparian prescription.	%	0	17	18	36	36	100	28	38	21	NA	0
	--Current non-wilderness stream population compared end of Decade 1	%	85	92	85	86	76	100	86	86	86	100	100
WATER	--Increase in sediment above current level, Decade 1	%	11	12	11	9	13	5	8	8	6	4	4
ROADLESS	--Portion recommended for wilderness.	%	0	12	24	19	19	19	12	42	73	99	0
	--Portion to remain roadless.	%	33	25	27	49	49	58	60	24	18	0	0
	--Estimated development in Decade 1	%	26	21	9	17	19	4	11	11	4	0	0
	--Estimated development in later decades	%	41	42	40	15	13	26	10	23	5	1	100
BLUE JOINT MWSA	--Portion of 65 4 M acres recommended for wilderness	%	0	0	26	44	44	44	0	68	90	99	0
	--Portion designated to remain roadless	%	25	25	20	30	30	30	100	4	8	0	25
SAPPHIRE MWSA	--Portion of 44 1 M acres recommended for wilderness	%	0	0	6	0	0	0	0	46	82	99	0
	--Portion designated to remain roadless	%	24	24	35	61	61	62	100	11	16	0	24
ROADS	--Average annual road construction, Decade 1.	Miles	41	36	34	23	31	25	23	24	19	12	11
ECONOM-ICS	--Present net value	MM $	148	143	125	96	85	99	103	91	103	62	206
	--Cash Flow (annual, Decade 1) Annual receipts minus costs 4/	MM $	-4 8	-3 9	-3 7	-4 5	-5 8	-3 2	-4 5	-4 3	-4 0	-4.2	-2.1
	Timber receipts minus timber related costs 5/	M $	-1 8	-0 8	-0 4	-1 2	-2.4	+0.5	-1 9	-0.5	-0 7	-0 6	+0 5
	Wildlife, recreation, range, minerals receipts minus costs 5/	MM $	-0 4	-0 4	-0 6	-0 7	-0 7	-0 7	-0 3	-1 1	-0 7	-1 1	-0 1
	--Income from Forest related activities	MM $	26	24	23	20	23	19	19	20	18	15	14
BUDGET	--Change from FY 86 budget	%	+39	+39	+38	+30	+50	+14	+20	+29	+20	+12	-11
RETURNS	--To States, Decade 1.	M $	600	900	900	500	600	600	400	600	500	300	500
EMPLOY-MENT	--Change from current Forest related employment	%	+33	+25	+21	+8	+20	-1	+2	+6	-4	-16	-22

1/ MMBF = millions of board feet M $ = thousands of dollars
ASQ = allowable sale quantity MM $ = millions of dollars
M Ac = thousands of acres
2/ Darby and Missoula mills which have traditionally purchased Bitterroot timber
3/ Below-cost sales are those where timber receipts do not recover timber-related costs For more detail see EIS Chapter II, section 18
4/ Excludes Job Corps but includes road maintenance, fire protection, etc
5/ Excludes road maintenance, fire protection, etc

C. Economic Efficiency of Alternatives

In determining the most economically efficient alternative, the Forest Service uses an estimate of present net value (PNV), which is the difference between discounted benefits and discounted costs. In calculating PNV, a dollar value is assigned to various outputs. Some of these, such as timber, are determined in the marketplace and produce a revenue. Others, such as recreation, are assigned values derived through research and generally do not produce a revenue. And some resources, such as a scenic view, have no basis from which to estimate a value. Therefore, PNV cannot be the only criteria used in selecting the Forest Plan. The criteria used is called maximization of net public benefits, which includes both the net value of resources that produce revenue and consideration of those that do not.

Table S-2 displays each alternative arranged in order of decreasing PNV. It also shows estimated outputs for some of the priced and nonpriced resources related to the major issues. Detailed discussion of the calculation of PNV is found in Appendix B of the Environmental Impact Statement. Following is a discussion of the reasons for PNV variations and first decade efficiency for alternative comparison.

Alternative A has the highest PNV, and with Alternative B would be the second most expensive to implement. PNV is 58 million dollars less than the maximum PNV benchmark. The reduction is primarily due to: scheduling a high level of timber harvest in the first decade, and continuing that level on land that does not become efficient for timber production until later decades when timber values are expected to be higher; dispersal of timber harvest to achieve a minimum visual quality objective; and increasing recreation management from a minimum to moderate level. Harvest is scheduled on 97 percent of the tentatively suitable timberland.

Alternative B has the second highest PNV, and with Alternative A would be the second most expensive to implement. The 5 million dollar reduction in PNV between Alternatives A and B is primarily due to increasing the visual quality objective adjacent to major travel corridors to a moderate level, and maintaining optimal cover/forage relationships on the most heavily used elk winter range. Timber harvest is scheduled on 97 percent of the tentatively suitable timberland.

Alternative C has the third highest PNV, and would be the fourth most expensive to implement. The 18 million dollar reduction in PNV between B and C is primarily due to reducing the suitable timber base to 88 percent of the tentatively suitable timberland. The reduction in timber benefits is somewhat offset by eliminating the high costs of providing access to isolated pockets and stringers of timberland. Increasing the area managed for optimal cover/forage ratios on elk winter range also causes a reduction in PNV.

Alternative H and Alternative F have the fourth highest PNV. Alternative H would be much less expensive to implement than Alternatives A, B or C since development is confined to currently roaded land. The 22 million dollar reduction in PNV between C and H is primarily due to reducing the suitable timber base to 62 percent of the tentatively suitable timberland. Most of the inventoried roadless area is not in the suitable base. The reduction in timber benefits is partially offset by limiting the area managed for optimal cover/forage ratios to the most heavily used portion of elk winter range.

Alternative F and Alternative H have the fourth highest PNV, and a moderate cost of implementation. Alternative F has a potentially higher PNV due to assigning 77 percent of the tentatively suitable land to the suitable base, and reducing the level of recreation management. This is offset by the higher costs associated with optimizing elk winter habitat, helicopter removal of timber from unroaded big-game security areas, and achievement of a high level of visual quality adjacent to major travel and recreation corridors.

Alternative E2 has the sixth highest PNV, and with Alternative J is the least costly to implement. There is a 5 million dollar drop in PNV between Alternatives F and E2, even though E2 has a potentially higher PNV because it schedules timber harvest at an efficient level and reduces the need for helicopter removal of timber. These savings are more than offset by the higher costs associated with maintaining fish habitat and water quality, increased visual quality adjacent to secondary travel and recreation corridors, management of only 66 percent of the tentatively suitable timberland for timber production, and increasing the trail restoration program to a moderate level.

Alternative E has a two million dollar lower PNV than Alternative E2, and a substantially higher cost of implementation. Alternative E has a potentially higher PNV because 76 percent of the tentatively suitable land would be managed for timber production, and there are fewer constraints to protect riparian habitat, water quality, and visual quality. These savings are offset by the high costs associated with scheduling timber harvest on land that does not become efficient for timber production until later decades, when predicted timber values are higher.

Alternative G has the third lowest PNV, and would be the sixth most expensive to implement. The 5 million dollar reduction between Alternatives E and G is primarily due to increasing visual quality objectives to the inventoried level, and increasing the recreation program to a high level. Timber harvest is scheduled on 79 percent of the tentatively suitable timberland.

Alternative E1 has the second lowest PNV, and the highest cost of implementation. The 6 million dollar reduction between G and E1 is due to maximizing timber harvest in the first decade, on land that does not become efficient for timber production until later decades. A potential increase in PNV due to lowered visual quality objectives and recreation program is more than offset by the very high costs associated with the first decade timber program.

Alternative J has the lowest PNV. With Alternative E2, it has the lowest cost of implementation. The 23 million dollar reduction between E1 and J is primarily due to scheduling timber production on only 54 percent of the tentatively suitable timber base, and increasing visual quality objectives. No harvest is scheduled from riparian or inventoried roadless areas.

Table S-2
Alternatives Ranked by PNV. Selected Priced and Nonpriced Outputs are shown.

			BENCHMARK	ALTERNATIVES									
		UNIT 1/	MAX PNV	A	B	C	H	F	E2	E	G	E1	J
PNV	Present Net Value (4%)	MM $	206	148	143	125	103	103	99	96	91	85	62
		Rank		1	2	3	4	4	6	7	8	9	10
	Reduction in PNV from maximum PNV benchmark	MM $	0	58	63	81	103	103	107	110	115	121	144
		Rank		10	9	8	6	6	5	4	3	2	1
EFFI-CIENCY	Average annual receipts minus costs, Decade 1 2/	MM $	-2 1	-4 8	-3 9	-3 7	-4 0	-4 5	-3 2	-4 5	-4 3	-5 8	-4 2
		Rank		9	3	2	4	7	1	7	6	10	5
	Average annual timber receipts minus timber costs 3 /	MM $	+0 5	-1 8	-0 8	-0 4	-0 7	-1 9	+0 5	-1 2	-0 5	-2 4	-0 6
		Rank		8	6	2	5	9	1	7	3	10	4
	Average annual wildlife, recreation, range minerals receipts minus costs 3/	MM $	-0 1	-0 4	-0 4	-0 6	-0 7	-0 3	-0 7	-0 7	-1 1	-0 7	-1 1
		Rank		2	2	4	5	1	5	5	9	5	9
BUDGET	To implement Forest Plan, Decade 1 2/	MM $	4 0	7 3	7 3	7 2	6 0	6 0	5 6	6 7	6 6	8 0	5 5
		Rank		8	8	7	3	3	2	6	5	10	1
	Compared to 1986	%	82	149	149	147	122	122	114	137	135	163	112
		Rank		8	8	7	3	3	2	6	5	10	1
EMPLOY-MENT	Change from current Forest related employment Decade 1	%	78	133	125	121	96	102	99	108	106	120	84
		Rank		1	2	3	9	7	8	5	6	4	10
INCOME	Change from current Forest related income Decade 1	%	74	137	126	121	95	100	100	105	105	121	79
		Rank		1	2	3	8	7	7	5	5	3	10
TIMBER	Suitable timberland	M Acres	586	570	569	518	366	451	390	449	464	449	316
		Rank		1	2	3	9	5	8	6	4	6	10
	Allowable sale quantity	MMBF	16	59	51	49	28	33	33	36	35	44	18
		Rank		1	2	3	9	7	7	5	6	4	10
	Change from Bitterroot share of log requirement expressed by Darby mill owners (40 3 MMBF) 4/	%	-60	+46	+27	+22	-31	-18	-18	-11	-13	+9	-55
		Rank		1	2	3	9	7	7	5	6	4	10
	Change from 10-year average sell of 30 1 MMBF	%	-40	+96	+69	+63	-7	+10	+10	+20	+16	+46	-40
		Rank		1	2	3	9	7	7	5	6	4	10
DIVER-SITY	Seedlings - suitable base at end of 100 yrs	%	42	37	40	34	33	30	24	28	26	31	24
	Poletimber - " "	%	34	29	29	27	27	25	26	25	23	24	20
	Sawtimber - " " "	%	12	25	20	21	22	21	29	29	24	25	24
	Old Growth - " "	%	11	9	11	18	19	24	21	18	26	20	33
	Old Growth - " " " Decade 1	%	38	38	38	38	36	37	37	35	38	36	32
VISUAL	High visual quality objective as a percent of the suitable timber base	%	0	0	16	16	17	28	30	24	39	24	61
		Rank		10	8	8	7	4	3	5	2	5	1
FISH/ WATER	Riparian area assigned to riparian prescription	%	0	0	17	18	21	28	100	36	38	36	N/A
		Rank		9	8	7	6	5	1	3	2	3	
	Nonwilderness catchable fish compared to current end Decade 1	%	100	85	92	85	86	86	100	86	86	76	100
		Rank		8	3	8	4	4	1	4	4	10	1
	Nonwilderness catchable fish compared to current end of 100 years	%	61	70	91	77	84	83	100	85	83	85	100
		Rank		10	3	9	6	7	1	4	7	4	1
	Sediment level above current end Decade 1	%	4	11	12	11	6	8	5	9	8	13	4
		Rank		3	2	3	8	6	9	5	6	1	10
WILD-LIFE	Elk winter range assigned to winter range prescription	%	0	0	41	62	22	32	51	41	40	41	39
		Rank		10	5	1	9	8	2	3	6	4	7
ROAD-LESS	Recommended for wilderness	M Acres	0	0	50	98	296	50	77	77	172	77	401
		Rank		10	8	4	2	8	5	5	3	5	1
	Designated to remain roadless	Acres	133	133	100	111	73	242	214	197	95	197	0
		Rank		5	7	6	9	1	2	3	8	3	10
ROADS	New roads annual average Decade 1	Miles	11	41	36	34	19	23	25	23	24	31	12
		Rank		1	2	3	9	7	5	7	6	4	10
	New roads annual average, Decade 3	Miles	53	39	35	30	19	22	22	22	22	22	13
		Rank		1	2	3	9	4	4	4	4	4	10
	Total new roads needed	M Miles	3 1	2 6	2 3	2 3	1 7	1 8	1 8	2 0	2 0	2 1	1 0
		Rank		1	2	2	9	7	7	5	5	4	10

1/ MM $ = Millions of dollars MMBF = Millions of board feet
% = Percent M Acres = Thousands of acres

2/ Excludes Job Corps but includes fire protection road maintenance etc

3/ Excludes fire protection, road maintenance, etc

4/ Darby and Missoula mills that traditionally have purchased Bitterroot timber

III. AFFECTED ENVIRONMENT

A. General Setting

The 1.6 million-acre Forest is located in two mountain ranges on the east and west sides of the Bitterroot River valley. The Bitterroot Range rises abruptly from the valley with many glaciated canyons, while the Sapphire Range rises gradually from grassy foothills to timbered slopes at the crest. Both mountain ranges are in full view of most valley residents and travelers.

The primary social and economic impact area for the Forest is Ravalli and Missoula Counties in Montana. The Forest has lesser impact on Idaho and Lemhi Counties in Idaho. National Forest timber supply, recreational opportunities, and Federal employment provide income for local residents. Direct returns to counties for their share of federal revenues is an economic stimulus.

B. Recreation

Main attractions are big game, scenery, wilderness, wild rivers, and historic scenic trails. Camping, hunting, hiking, fishing, and horse travel are major uses. Downhill skiing and other winter sport opportunities are available in the more accessible high elevation areas. There are 33 developed recreation sites, mostly campgrounds.

C. Cultural Resources

Native Americans inhabited a wide variety of areas; and sites have been located along the Magruder road corridor, Southern Nez Perce Trail, and Nez Perce Fork of the Bitterroot River.

D. Wilderness, Roadless, and Special Areas

Parts of the Selway-Bitterroot, Frank Church-River of No Return, and Anaconda-Pintler wilderness areas total 743,082 acres or 47 percent of the Forest. Eleven areas totaling about 405,000 acres outside of existing wilderness are roadless. The Forest has segments of the Salmon and Middle Fork of the Clearwater (Selway) Wild and Scenic Rivers, parts of the Lewis and Clark Historic and Continental Divide Scenic Trails, and four National Recreation Trails.

E. Visual Quality

Approximately 22 percent of the land outside wilderness is comprised of foreground viewing areas adjacent to major highways and roads, recreation routes or use areas, and residential private land. This portion is very sensitive to management activities which disturb the landscape.

F. Threatened and Endangered Species

Grizzly bears were known to occur until about 50 years ago, and some of the wilderness area has been identified as suitable habitat. Gray wolves have been sighted in three areas, and there seems to be some suitable habitat in wilderness. Peregrine falcons probably nested on cliffs on the west side of the valley, and the nesting habitat has not been altered. Bald eagles winter along the Bitterroot River, but no nesting activity has been observed. The Forest will cooperate in any future interagency recovery effort.

G. Wildlife

Many species of birds, small mammals, and furbearers are inhabitants, and there are sizeable populations of elk, moose, mountain goat, bighorn sheep, whitetail deer, mule deer, and black bear. The elk herd of about 5,700 animals is of national significance, and is hunted heavily in both Idaho and Montana.

H. Fish

About 1,900 miles of stream and 86 lakes provide habitat for fish. The Idaho portion of the Forest has runs of chinook salmon and steelhead trout.

I. Range

Livestock grazing is currently permitted at 14,200 animal unit months, but only about 11,200 are used by ranchers in the Bitterroot Valley. Numbers of livestock permittees and cattle grazed have decreased over the last 30 years.

J. Timber

Approximately 589,000 acres are available and tentatively suitable for timber production. An annual average of 30 million board feet of timber was sold from 1976 to 1985. Ravalli and Missoula County sawmills get about 14 percent of their raw materials from the Forest. The two sawmills in Ravalli County are more dependent, and get about three fifths of their logs from the Forest.

K. Watershed and Soils

Watershed conditions are good, and water quality is generally high. About 2.6 million acre-feet of water flows to the Columbia River system during an average year. Water from the Montana portion of the Forest is used to irrigate 117,000 acres in the Bitterroot Valley. Sediment is the major water quality variable affected by Forest management. Over 60 percent of the soils are associated with the moderately- to highly-erosive Idaho Batholith granitics. About 60 percent of the nonwilderness portion of the Forest has sensitive soils on steep slopes.

L. Minerals and Energy Resources

Exploration for gold and silver began in the 1860's. Fluorite and vermiculite were discovered and mined from 1930 to 1970. Small scattered discoveries of copper, iron, columbium, tin, molybdenum, barite, uranium, tungsten, and titanium have been made. Oil and gas have been leased on over 67,000 acres, and lease applications on additional areas are pending.

M. Road System

Approximately 3,500 miles of roads and logging spurs provide access to about 425,000 acres or 25 percent of the Forest. Most roads are single-lane dirt roads built by purchasers of National Forest timber within the last 30 years.

N. Fire, Insects and Disease

Past mountain pine beetle epidemics killed trees over large areas of the Forest, and large fires occurred in these areas in the 1960's. Some 200,000 acres with similar heavy fuels exist today. Fire management allows fire to play a more natural role in shaping and maintaining the ecosystem in wilderness areas.

O. Economy

In Ravalli and Missoula Counties, Federal and State Government employed 25 percent, and wood products manufacturing 10 percent, of the 1980 labor force. Missoula is the trade center for western Montana, and has a sizeable travel and tourism industry. Almost 50 percent of its labor force is employed in the trade and services sector. The economy in Ravalli County is similar to Missoula's. However, with the influx of commuters and retirees, the proportion of income generated from local employment is decreasing. More than 40 percent of personal income is not related to participation in the labor force in Ravalli County.

IV. ENVIRONMENTAL CONSEQUENCES

A. Introduction

Environmental consequences are the potential effects of activities scheduled to implement an alternative. They are described as quantitative or qualitative changes from the current situation in terms of significance, magnitude, and duration.

1. Wilderness

The establishment of new wilderness areas affects present net value because it eliminates the possibility of timber harvest and mineral production, reducing the contribution to local jobs and income. However, those businesses and individuals dependent on recreation would benefit, since recreation opportunities would be increased.

2. Semiprimitive Recreation

Managing areas for semiprimitive recreation affects PNV because relatively large areas are not available for timber harvest. The opportunity for more intense wildfires is increased by the buildup of fuels. Mineral exploration and development are limited by poor access. Recreationists and the businesses dependent on them benefit by maintaining a mix of recreation opportunities including semiprimitive.

3. Developed Recreation

The 461 acres occupied by developed sites have little or no effect on other resources. The lower the emphasis on developed recreation facilities, the greater the risk of environmental degradation from pollution by sewage facilities, garbage problems, and vandalism.

4. Dispersed Recreation

Dispersed recreation activities change among alternatives according to land uses. Roaded recreation depends on roads which are a result of timber harvest. Wilderness and semiprimitive recreation require a roadless setting.

5. Cultural Resources

Sites where ground-disturbing activities are planned will be inventoried. Some ground-disturbing activities will inadvertently enter and disturb some cultural resources.

6. Wildlife Habitat

Most of the wildlife habitat activity is a function of timber harvest and road building. About 285 acres per year are scheduled for burning, shrub planting or shrub pruning. Habitat improvement practices may cause short-term degradation of air or water quality.

7. Fish Habitat

A few bridges and culverts that were not properly designed for fish passage will be replaced in each alternative; the environmental consequences are inconsequential. Debris pools, created by felling large trees into stream channels, could raise the fish habitat carrying capacity of major streams. Increasing the capacity of the chinook salmon hatching channel on the Selway River is planned in all alternatives.

8. Minerals and Energy Resources

Roadless designation and wilderness recommendations decrease access to or foreclose exploration. Minerals and energy exploration and development activities affect the physical and biological environment. The degree of effect is dependent upon the size and nature of the operation, and the mitigation measures stipulated or negotiated in the plan or permit. Development and production of resources may increase job opportunities and affect community lifestyles, organizations and facilities.

9. Human and Community Development

Full-time and seasonal Forest employees live in nearby communities, and have a significant effect on the local economy. Trapper Creek Job Corps Center provides training for about 225 resident youths. About 300 person-years of employment result from implementation of any of the alternatives.

10. Special Uses

Special uses are mostly for water transmission facilities. Effects such as soil movement and low stream flow are drastic for the specific sites, but these uses are limited to a small acreage of the Forest.

11. Rights-of-Way and Cost-Share Agreements

Rights-of-way and cost-share agreements are mostly for roads. The environmental consequences of roads are discussed in section 26.

12. Property Boundary Location

Property boundary location results in few environmental consequences.

13. Landownership and Adjustment

The average of four land exchange proposals per year will be subjected to appropriate environmental analysis before they are acted on.

14. Buildings and Other Facilities

The 100 acres occupied by buildings and other facilities have significant consequences on the area, but when considered on a Forest-wide basis are inconsequential.

15. Fire Suppression

Successful fire suppression results in protection of valuable timber crops, and in forest stands developing into old growth. Fire suppression activities can result in soil erosion from fire lines, but may help to eliminate air quality degradation. The fire suppression program creates jobs.

16. Managed Fire

Some lightning-caused fires are allowed to burn in some areas, under a predetermined set of conditions and under close supervision. Managed fire is a part of the current management direction for the Selway-Bitterroot, Anaconda-Pintler, and Frank Church-River River of No Return Wildernesses. Management fires can result in short-term air quality degradation, and in soil erosion if high intensity rainstorms occur before vegetation recovers. Fire results in long-term vegetative changes that adversely affect some wildlife species and benefit others.

17. Range Management

Demand for livestock grazing is not expected to increase. Fences deter wildlife movement and other users. Water developments disperse livestock and are used by wildlife. Transitory range is created by timber harvest. Conflicts between wildlife and livestock are mainly on elk winter range and riparian areas. Cattle grazing in riparian zones can cause significant damage if not properly managed.

18. Utility Transportation Corridors

The construction of transmission lines can have significant environmental effects, but the existence of an unoccupied corridor has none. An appropriate environmental analysis would be required before construction.

19. Insects and Disease

The planned insect and disease program is based on silvicultural techniques discussed in sections 20 and 24. There are no plans for use of pesticides on the Forest under any alternative. Should the occasion arise, such proposals would be subjected to detailed environmental analysis prior to initiation.

20. Timber Harvest

Timber harvest and associated activities affect the physical and biological environment. Clearcut and shelterwood harvest are prescribed most of the time.

If suitable riparian timberland has even-aged (clearcut and shelterwood) management prescribed, fish populations are affected after the fourth decade. More forage for cattle and elk is produced by clearcutting than by other systems. Even-aged harvest causes reductions in big-game cover, but increases diversity.

Sediment increases from timber harvest and associated road construction contribute less than one percent of the sediment in the Bitterroot River at Stevensville.

The goal to maintain five percent of suitable timberland in old-growth forest was exceeded in all alternatives. Timber harvest can disrupt trail systems, recreation experiences, and visual quality.

Selection harvest, an uneven-aged system, is prescribed for riparian zones only.

21. Logging Methods

Soil disturbance occurs when tractors skid logs, and soil compaction may occur on wet soils. Erosion can occur with tractor and cable systems. Exposure of mineral soil during tractor logging may help seedling establishment, where compaction is not a problem and topsoil is not excessively disturbed. Slash disposal is difficult for skyline and aerial systems. Fewer roads are necessary for skyline or aerial logging systems than for tractor or cable systems. Any logging operation disrupts recreation experiences with noise and increased traffic.

22. Slash Control

Slash disposal reduces the potential for fire and the spread of insects and disease. Slash may be hand- or dozer-piled and burned, or broadcast or jackpot burned. Each method results in different environmental and economic consequences. Potential effects include short-term degradation of foreground viewing and air quality. The objective of slash control is to reduce the fire hazard to acceptable levels, prepare the site for reforestation and leave enough material on the ground for nutrient cycling, shade and wildlife habitat.

23. Site Preparation

Site preparation reduces competing vegetation for seedlings. Dozers are used on gentle slopes, but hand scalping is necessary on steeper slopes if competing vegetation needs control. Bare soil causes increased risk of erosion.

24. Tree Planting

Tree planting is used to obtain rapid regeneration, and speeds recovery of visual quality and hiding and thermal cover for wildlife. Costs are high, and planting has a marked effect on PNV; but most is done by contract which directly benefits the local economy.

25. Timber Stand Improvement

Precommercial and commercial thinnings are scheduled in some stands at about 30 and 70 years after regeneration. The objective is to maximize usable wood fiber production. The thinning slash created is a fire hazard for a few years. Hiding cover for big game may be lost for a few years until the canopy closes. Other effects are discussed in section 20 - Timber Harvest.

26. Road System

Road construction and maintenance has a greater effect on other resources than any other forest management activity, and is a major cost in all alternatives. Road construction displaces large amounts of soil, and in riparian zones the sediment produced affects fisheries. Roads cross game trails, change animal movement patterns, and increase access for hunters.

Road construction affects the basic character of the landscape, and eliminates wilderness and semiprimitive recreation opportunities. However, roads facilitate exploration and development of minerals.

B. Short-term Use Versus Maintenance of Long-Term Productivity

Management standards have been developed and provide specific direction and mitigation measures to assure that long-term productivity is maintained. Although long-term productivity of the land to produce resources and sustain use will be maintained, some alternatives place more emphasis on short-term uses, resulting in higher levels of short-term consequences.

C. Irreversible and Irretrievable Commitment of Resources

Construction of roads is considered irreversible since most will become permanent features on the landscape. The potential for wilderness, primitive and semiprimitive recreation, natural wildlife habitat, and vegetative cover in the road prism are lost. Mineral extraction is also an irreversible action.

The opportunity to utilize timber is foregone in roadless designations and wilderness; however, these decisions are reversible. Conversely, the natural environment is lost through timber management activities but will recover in time.

D. Adverse Effects That Cannot be Avoided

Implementation of any alternative would result in some adverse effects that cannot be avoided, even though management standards and mitigation measures serve to limit the extent and duration of these effects. These include:

- increased sedimentation resulting from soil disturbance.
- short-term effects on scenic quality from vegetation management and road construction.
- short-term effects on air quality from dust, smoke and automobile emissions.

- reduction in roadless area and primitive/semiprimitive recreation opportunities on land managed for timber production.

- reduced timber volumes due to roadless designations or wilderness recommendations.

V. LIST OF PREPARERS

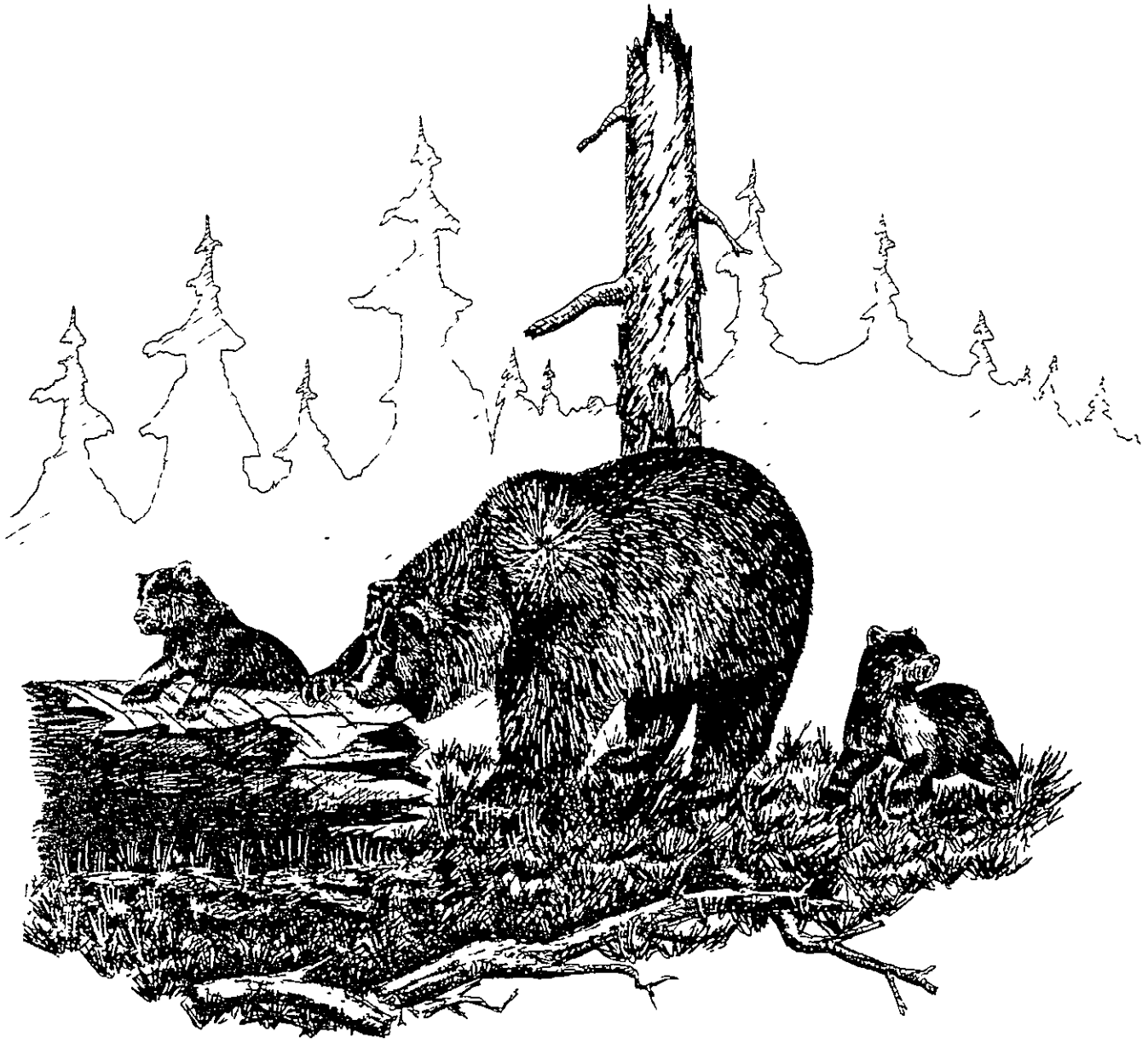
The Forest Plan and Environmental Impact Statement were prepared by Dick Strong, Planning Coordinator; and a Core Team that included Bob Bigler (forest ecologist), Laura Ceperley (economist), Norm Davis (soil scientist), John Ormiston (wildlife biologist), Tina Schwartzman (public affairs specialist), and Fred Stewart (economist). A support team of 11 other specialists prepared and reviewed technical analyses; work groups provided technical information. The Bitterroot Management Team, led by Forest Supervisor Bob Morgan, reviewed each step in the planning process. A technical group produced written reports, computer data bases, and graphics.

VI. CONSULTATION WITH OTHERS

The Forest has conducted an active public and interagency involvement program throughout the planning process. In March, 1985, the Draft Forest Plan and Environmental Impact Statement were released. Approximately 600 copies were sent to interested parties. The documents were reviewed at open houses in Darby, Hamilton and Stevensville; with individuals, and industry, trade and environmental groups; and by other Federal, State and local agencies.

Approximately 1,000 written comments were received on the draft documents. These were read, analyzed, and used in the development of Alternative E2, and to strengthen environmental and economic documentation in all documents. A specific response was developed for each comment received from individuals or groups and has been mailed to commenters.

Efforts were made to ensure that the preferred alternative was responsive to the goals of other public entities. Those principally involved were the Bitterroot Conservation District, Ravalli County Commissioners, and State of Montana (including the Governor's Interagency Planning Task Force; Department of Fish, Wildlife and Parks; the Division of Forestry; and Water Quality Bureau). Personal or mail contact was made with other Federal agencies having jurisdiction by law or expertise on water quality, threatened or endangered species, historic trails, cultural resources, and mineral and energy resources. Contact with Idaho agencies was not extensive, since all of the Forest land in Idaho, except for road corridors, is wilderness.



I. PURPOSE AND NEED FOR ACTION

A. Introduction

This Environmental Impact Statement (EIS) documents the analysis and discloses the significant environmental effects of a preferred and other alternatives for the future management of land and resources of the Bitterroot National Forest. The Preferred Alternative is the basis for the Final Forest Land and Resource Management Plan (Forest Plan) which is described in a separate document. The Forest Plan will guide management of the Forest for the next 10 to 15 years unless conditions or demands significantly change (36 CFR 219.10). The analysis in the EIS projects outputs and effects for up to 150 years to indicate the long-term implications of continuing with an alternative. While long-range effects have been estimated, the plan is only valid until it is revised, committing the Forest to a course of action no longer than 15 years.

This analysis and the Forest Plan are designed to: ensure multiple use; provide a sustained yield of goods and services from the Forest to maximize long-term net public benefits; and address public issues and management concerns in an environmentally sound manner. Net public benefits are the overall value to the nation, of all outputs and positive effects (benefits) less all associated Forest inputs and negative effects (costs), of producing priced and nonpriced outputs from National Forest lands.

Development of this EIS and Forest Plan followed direction from the Forest and Rangeland Renewable Resources Planning Act (RPA), the National Forest Management Act (NFMA), and the National Environmental Policy Act (NEPA). Further direction was given by the implementing regulations of NFMA (36 CFR 219) and NEPA (40 CFR 1500-1508).

Subsequent projects that implement Forest Plan direction will be tiered to this EIS. Environmental analyses will incorporate by reference and build on the general discussions in this EIS. Additional analyses will be done for projects not covered by this EIS.

B. National, Regional, and Forest Planning

The analysis and the Final Forest Plan will supersede all previous land and resource management plans prepared by the Forest. They are a direct local link to national and regional planning. The national program, required by RPA, sets national direction and output levels for National Forest system lands. These levels are based on suitability and capability information provided by Forest Service Regions. Each Region in a Regional Guide divides its share of the national production levels among the Forests. The Guide also delineates standards and guidelines for management within the Region. The share of production for each Forest is based on detailed information furnished by the Forest. Thus the Forest Plan includes direction provided by RPA, NFMA, and NEPA (including the implementing regulations) and the Regional Guide.

The EIS results from the first seven of 10 planning actions required by NFMA (36 CFR 219). These seven planning actions are:

1. Identification of issues, concerns and opportunities.
2. Development of planning criteria.
3. Inventory data and information collection.
4. Analysis of the management situation.
5. Formulation of alternatives.
6. Estimated effects of alternatives.
7. Evaluation of alternatives.

Refer to Appendices A and B for a detailed description of the process used in planning actions 1, 3, 4, 5, and 6.

The public, and governmental agencies were asked to comment on the Draft EIS and Proposed Forest Plan. Comments received were used to examine the results of the first seven planning steps and to modify the EIS and the Forest Plan. The Final EIS and Forest Plan were then used by the Regional Forester as the information base for the Record of Decision (ROD) to complete the planning steps:

8. Selection of the preferred alternative.
9. Plan implementation.
10. Monitoring and evaluation.

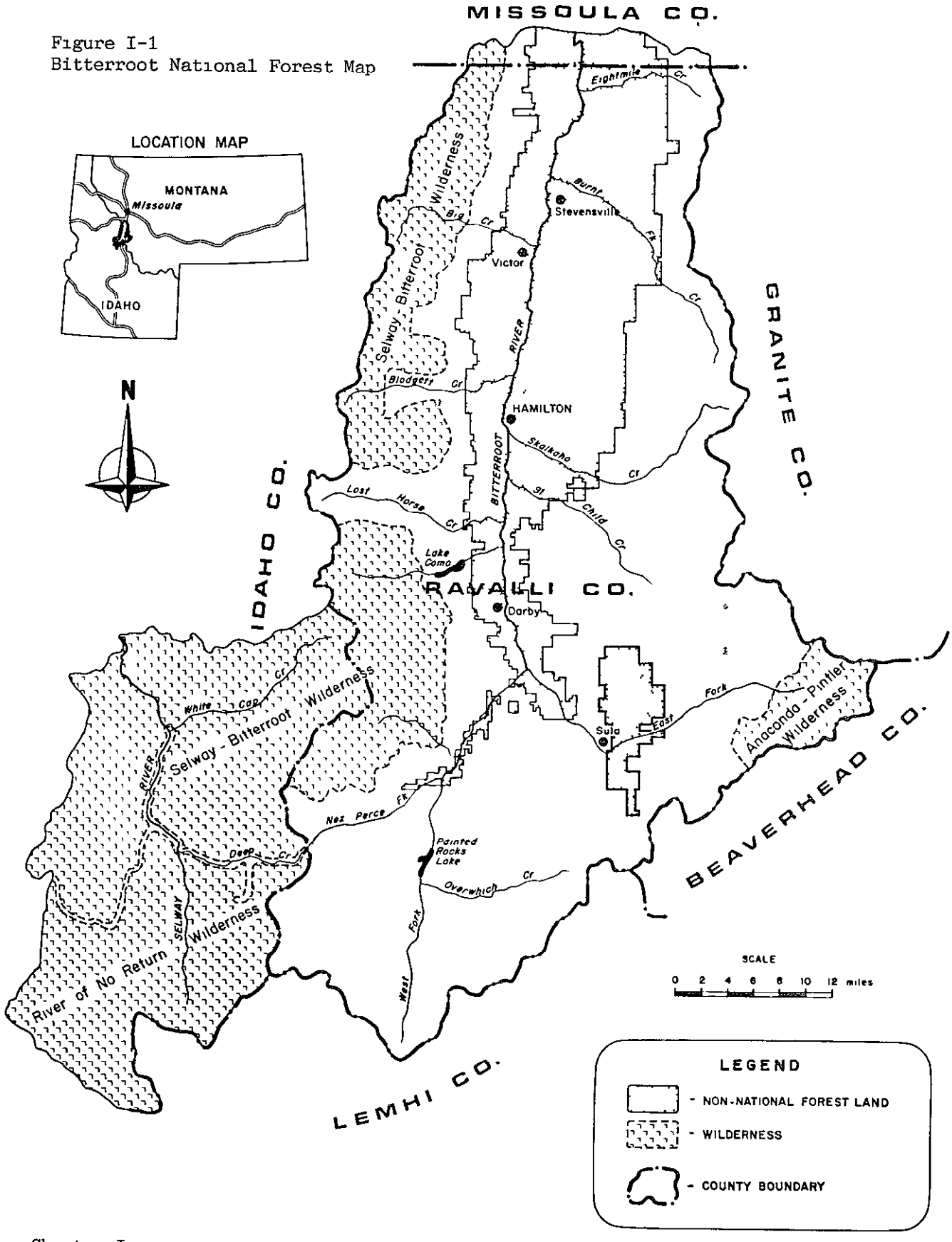
C. Planning Area (Figure I-1)

The Forest is located in west central Montana and east central Idaho. Seventy-one percent of the Forest is in Ravalli County, Montana; 29 percent in Idaho County, Idaho; and less than one percent in Missoula County, Montana. Since the Idaho portion is wilderness except for a road corridor, most of the planning impacts will occur in Ravalli County.

There are 1,652,443 acres within the Forest boundary. National Forest System land is generally in large blocks, with 74,560 acres of scattered private holdings inside the boundary. Much of the private land bordering the Montana portion has been subdivided for residential or recreational development, and about 650 landowners adjoin National Forest land along 700 miles of public land boundary. Treaty rights with the Nez Perce Tribe (6/11/1855) and the Flathead Nation (7/17/1855) entitle tribal members to fish, hunt, erect temporary buildings for curing, gather roots and berries, and pasture their horses and cattle upon most Forest land. They have chosen not to fully exercise these rights.

Portions of three wilderness areas and two components of the National Wild and Scenic River System cover about 47 percent of the Forest. Based on a September 1983 inventory, another 24 percent (approximately 405,000 acres) is currently roadless, including portions of two Montana Wilderness Study Act (MWSA) (P.L. 95-150) areas. Contiguous roadless lands have been identified on adjacent National Forests, and the entire roadless areas have been analyzed for wilderness and nonwilderness uses (Appendix C).

Figure I-1
Bitterroot National Forest Map



MWSA directs that certain areas in Montana be studied for wilderness designation, including the 65,690-acre Blue Joint area in the Bitterroot Range and the 114,581-acre Sapphire area in the Sapphire Mountains. Analysis and the Preferred Alternative for these areas are contained in this EIS, and recommendations are discussed in the Forest Plan Record of Decision. However, nonwilderness recommendations will not be implemented, and the wilderness character of both areas will be maintained, pending final action by Congress.

A separate report and record of decision will be prepared and transmitted to Congress for both wilderness and nonwilderness recommendations within MWSA areas, and for wilderness recommendations within the remaining roadless areas. These are preliminary administrative recommendations that will receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture and the President of the United States. The final decision on wilderness designation has been reserved by the Congress to itself.

Wilderness recommendations for the remaining roadless areas are also addressed in this EIS. These recommendations will be included in a separate report and record of decision transmitted by the administration to Congress for final action.

D. Issues, Concerns and Opportunities

The first of the 10 planning actions identified issues, concerns, and opportunities, to determine what benefits people want in terms of goods, services, uses and environmental conditions. Public workshops to identify issues were held during October 1980 in Stevensville, Darby, and Hamilton, Montana. They were followed in January 1981 with a mailing to 650 adjacent and intermingled landowners. Background information was also sent to Idaho and Montana state clearinghouses, local public officials and Indian tribes. Workshops on Montana Wilderness Study Act areas had been held in 1979.

Additional public involvement was initiated in September 1983 to aid in resolution of the roadless issue. Prior to this, Forest planning efforts had examined a broad range of uses for roadless areas but had not included an evaluation for wilderness designation, except for Montana Wilderness Study Act areas. The Forest had relied on earlier evaluations and recommendations made in the Roadless Area Review and Evaluation (RARE) II Final EIS. As a result of the Ninth Circuit Court decision on the RARE II EIS, the Forest included an evaluation of roadless areas for wilderness in the Forest planning process.

Over 600 comments were received during the initial public involvement process. With further analysis, this list was narrowed down to six major issues to be addressed in the Forest Plan. Criteria used to determine major issues included: ranking of issue at workshops, history of the issue, perceived intensity of conflict surrounding the current issue, and expected duration of the issue. Management concerns and opportunities were also consolidated into the major issues.

Comments received on the Draft EIS and Forest Plan were related to the six major issue statements developed at the start of the planning process. Issue statements are still relevant and little modification was necessary; however, public comments and Forest Service reviews did serve to reinforce or clarify specific concerns associated with each issue statement.

Broad resource-related issue statements addressed by the EIS and Forest Plan are displayed below. Specific concerns received after review of the DEIS and Forest Plan follow each issue statement. Appendix A contains a detailed description of each issue, and Chapter VI contains further detail on public comments.

1. **What timber harvest level can be sustained and how much should be offered and sold in the planning period (next 10 to 15 years)?**

   Specific concerns focus on:

   - dependency of local mills for timber supply
   - waste of timber, if not used
   - contribution to economy, including jobs and returns to local government
   - below-cost sales
   - cost efficiency of timber program, particularly in the first and second decades
   - Forest-wide timber sale receipts not recovering timber-related costs
   - viability and cost-efficiency of helicopter yarding
   - effects of roads/logging on other resource values; e.g., fish, roadless, wildlife, visual, diversity
   - alternatives to clearcutting
   - validity of price trends and timber values used
   - process used to identify suitable lands
   - reforestation responsibility under NFMA
   - potential productivity to produce timber crops

2. **To what extent should visual quality considerations influence management activities?**

   Specific concerns focus on:

   - alternatives to clearcutting
   - high cost of roading/timber harvest to meet visual quality objectives
   - desirability of maintaining some widely recognized visual attractions in the timber base; e.g., Ward and Downing Mountains
   - validity of constraints on timber program to maintain visual quality objectives

3. **How should Forest lands be managed to sustain wildlife and fish populations?**

   Specific concerns focus on:

   - acceptability of decrease in fish populations
   - acceptability of increased sediment
   - fish population estimates
   - adequacy of fish/sediment monitoring and ability to monitor under reduced budgets
   - cumulative downstream effects of sediment on fish

- calibration of R1/R4 sediment fish models for Bitterroot National Forest
- timber/road access program that loses $1.2 million per year and puts other resources at risk
- validity of fish loss/displacement by management, then costly mitigation by habitat improvement
- maintaining hunting opportunities
- economic values used for big-game hunting
- forage and elk population increases attributed to timber management
- mileage and density of projected road system
- importance, maintenance and distribution of old-growth forests
- management of National Forest lands to compensate for cover, forage or security imbalance on private lands
- reduction in unroaded security areas

4. **How can watersheds be managed to maintain or enhance water quality, *soil productivity, and desirable streamflow*?**

   Specific concerns focus on:

   - projected sediment increases
   - sensitivity of steep slopes and granitic soils to development
   - vegetation potential of granitic soils
   - potential for reducing productivity of soils by development
   - effects of road/timber harvest on stream flow and timing of runoff
   - meeting state water quality standards
   - soil and water conservation practices (SWCP's)

5. **How should undeveloped, roadless areas be managed?**

   Specific concerns focus on:

   - effect of reduction in timberland base on employment and economy
   - *designation of suitable timberland for roadless or wilderness* management
   - need for roadless semiprimitive motorized recreation
   - need to fill out the recreation opportunity spectrum (ROS) by maintaining some roadless land for semiprimitive recreation use
   - reduction in roadless designation from Unit Plans
   - having more than our share of wilderness now
   - wilderness coalition alternative (W)
   - Governor's wilderness recommendation
   - Congressional delegation's wilderness recommendations
   - validity of maintaining all management options for future decision-makers where management opportunities are not all that clear
   - improvement of portion of Selway-Bitterroot Wilderness boundary by placing it on topographic features

6. **What management should be recommended for the Blue Joint and Sapphire Wilderness study areas?**

   Specific concerns focus on:

   - proximity of existing wilderness
   - type and amount of motorized recreation use
   - timber potential, and sensitivity to timber development
   - hardrock oil and gas potential
   - cost-efficiency of developed types of use

E. Changes Between the Draft and Final EIS

Following publication of the Draft EIS and Proposed Forest Plan in March 1985, the Forest held open houses and meetings with interested groups and organizations. Newspaper articles appeared in local papers, and members of the Forest staff made personal contacts to inform the public about the EIS and Forest Plan. Approximately 1,000 written responses were received covering a wide variety of subjects. A summary of the public involvement, comments received and Forest Service response are found in Chapter VI, along with verbatim comments from and response to government agencies, elected officials and Indian tribes that responded to the DEIS/Forest Plan documents.

All other public comments, including Forest Service response, are contained in Appendix D. Due to the size of this document, it has been printed separately in limited numbers and is available for review at Bitterroot National Forest offices, public libraries in towns and cities adjacent to the Forest, and is also available on loan from the Forest.

The combined input from all comments, including In-Service reviews, was the source for changes made.

1. **Categories and highlights of the changes**

   a. **Modification of the proposed action to form a new preferred alternative identified as E2.**

   b. **Editorial corrections throughout the text.**

   c. **Factual corrections:**

      - fish population adjustments (Chapters II and III)
      - timber conversions from cubic to board feet (Chapter II)
      - miscellaneous throughout text

   d. **Clarification:**

      - new or revised tables throughout document
      - miscellaneous throughout the text
      - listing of specific concerns under major issues (Chapter I)
      - clarification of the Plan period, decade 1, and future projections for decade 2 and beyond, throughout the text and tables

e. **Improvement of analyses and displays:**

- timber supply and demand analysis (Chapters II and III)
- summary of reforestation success (Chapter III)
- timber sensitivity tests (timber values, appreciation rates, costs, etc.) (Appendix B)
- minerals discussion (Chapter II)
- comparison of timber utilization standards (Chapter II)
- below-cost timber sales (Chapters II and III)
- display of 10 and 3 year timber supply schedules.

f. **Revised management standards and guidelines (Forest Plan Chapter III):**

- strengthened standards for nonfishery riparian areas
- mitigation of sediment entering streams from existing roads
- Forest-wide (rather than Management Area) guidelines for elk habitat effectiveness
- other minor changes throughout Chapter III of the Forest Plan

g. **Monitoring Plan changes (Forest Plan Chapter IV):**

- increased fish/sediment monitoring
- statement of intent that activity levels will be balanced by an appropriate level of monitoring

h. **New material:**

- EIS Chapter VI as discussed above
- EIS Appendix D as discussed above
- modification of the proposed action to form a new preferred alternative (summarized in the Record of Decision, detailed in the Final Forest Plan, and discussed as Alternative E2 in Chapters II and IV)
- Wild and Scenic Rivers eligibility and classification

2. **Timber Supply**

Extensive testing of the allowable sale quantity (ASQ) has been conducted in response to economics, community stability, projected timber demand, and capital investment concerns. Results of this analysis show that increasing the ASQ to 95 to 100 percent of the maximum possible for a given set of goals and objectives increases costs substantially. Extensive development of roadless areas, steeper terrain, costly harvest systems, and low value species are the major reasons for increased costs.

Information from the 1987 Montana Timber Supply and Demand Study indicates that the industrial forest lands in the southwest region would supply less volume over time. A predicted demand for timber in the Bitterroot market area could begin to exceed local timber supply about the year 2005. An evaluation of the timber resource land suitability in the preferred alternative was done to examine opportunities that would be available to respond to changes in supply/demand. Opportunities are available but they are costly.

Chargeable volume sold during the past 5, 10, and 15-year periods has averaged 25.4, 28.7, and 27.2 MMBF per annum respectively. Consequently, the preferred alternative ASQ of 33.4 MMBF would maintain historic supply levels but would not meet the 40 MMBF Bitterroot Forest share of the volume requested by mill owners.

A portion of the timber base and ASQ lies within the Blue Joint and Sapphire MWSA areas. Congress has reserved to itself the right to make wilderness, nonwilderness decisions for these areas. Consequently, until such time that Congress has made a final decision both areas will be managed to maintain their presently existing wilderness character and the programmed sell reduced accordingly.

3. **Roading**

The amount of road construction in the early decades, including the first decade, is reduced which reduces the sediment impact on fish habitat and the need for capital investment funds.

4. **Wild and Scenic Rivers**

Wild and Scenic Rivers eligibility and probable classification have added to the EIS as a result of public response to some DEIS's in the Region, and National direction to include this information for all Forests.

5. **Changes in the Preferred Alternative**

a. **Pace of Development**

The pace of roading and timber harvest is reduced which allows for calibration of sediment and fisheries models and validation of effects to fisheries on a drainage-by-drainage basis. Road requirements will reduce but not eliminate the need for capital investment funds which are used to preroad areas that can pay for the road system in the long run but not in the first entry.

b. **Riparian Areas**

Nonfisheries riparian area standards for permanent and intermittent streams have been strengthened to provide for continual debris recruitment, filter strips, longer rotations, and additional old growth. This will help to maintain optimal channel and riparian conditions and minimize the risk of adversely affecting downstream fisheries. Changes are in response to fisheries and water quality concerns.

c. **Elk Winter Range**

The winter range prescription assignment has been changed to include winter range on steep slopes that are not heavily used but are surrounded by prime winter range. These areas serve as resting and cover areas. Changes are in response to wildlife concerns.

d. Timber Prescription

The timber prescription has been changed to provide a better balance of multiple uses. Approximately 6,000 acres adjacent to secondary travel and stream corridors will be managed to meet partial retention visual quality objectives in recognition of a higher concentration of recreation use. Examples of these corridors include the Burnt Fork, Sleeping Child Creek above the hot springs, Meadow Creek, Warm Springs Creek, Overwhich Creek, Deer Creek, Soda Springs Creek, and Piquett Creek. These corridors have not been mapped but will generally include the immediate foreground area less than one-sixteenth of a mile on either side of the stream or travel corridor. These corridors will be defined by project ID teams. The remainder of this prescription area will be managed to meet inventoried modification and maximum modification visual quality objectives.

e. Visual

Most of the unroaded retention prescription, helicopter logging, areas on the west side were reassigned to semiprimitive recreation use.

f. Sediment

Mitigation of sediment entering streams from existing roads was overlooked in the Draft Forest Plan. High priority work has since been identified and scheduled in the Forest Plan. In general, this includes surface and ditch stabilization and additional cross-drainage for road sections immediately adjacent to or crossing stream courses.

g. Elk Habitat Effectiveness

Road closures have been increased to provide better security for animals and to provide standards that can more easily be monitored.

h. Monitoring

Fish and sediment monitoring has been improved to assure that adequate information is available to determine the affects of management activities.

The level of monitoring will be balanced with the level of activity.

F. Changes Specific to Forest Service Reviews

1. Plan Period

Displays and narratives in the DEIS led many people to view the Forest Plan as a 50-year management commitment. This is not the case. By law, any alternative selected as the Forest Plan will guide management of the Forest for no longer than 15 years, and the plan will normally be revised at 10-year intervals (36 CFR 219.10). Displays and narratives for all alternatives have been revised to correct this misconception. The plan period is the first decade. Outputs and activities for this period have been identified as "planned." Outputs and activities for all other decades are identified as "projected" to show future outputs, activities and conditions expected if the alternative was implemented and carried forward in time.

2. Even- and Uneven-aged Silvicultural Systems

Acreage and volume figures displayed by harvest method (clearcut, shelterwood, selection) in the EIS do not represent targets by harvest method. They do show appropriate ways of meeting alternative objectives and accounting for costs; however, the final determination of the silvicultural system (even- or uneven-aged) and harvest method used (clearcut, shelterwood, seed tree, single tree or group selection) will be made by a certified silviculturist following site-specific analysis. This has been clarified in appropriate section of the EIS.

The Forest Plan, Appendix B, and the EIS, Chapter IV, have been strengthened to clarify where and under what conditions each harvest method is appropriate or optimal for use. Tables displaying area and volume harvested by harvest method are estimates since final determination will be made following site-specific analysis.

G. Reader's Guide

The remainder of the EIS is organized as follows:

Chapter II describes alternatives by showing the resource outputs, costs, benefits, and major effects of meeting the objectives of each alternative. The environmental, economic, and social effects of alternatives are briefly compared.

Chapter III provides a brief discussion of the existing condition of physical, biological, social, and economic components of the environment that may be affected by Forest management.

Chapter IV identifies the environmental consequences which could result from Forest management activities scheduled in each alternative.

Chapter V lists the people directly involved in the preparation of EIS and Forest Plan documents.

Chapter VI summarizes public comments to the draft documents and Forest Service response to the comments. The full text of comments received from and response to government agencies and elected officials is shown.

Chapter VII is a glossary of technical terms and abbreviations used in the EIS.

Chapter VIII is the Index.

Appendices provide detailed subject information: issue identification in Appendix A description of the analysis process in Appendix B, and site-specific roadless area data in Appendix C.

Appendix D contains all written comments, except those included in Chapter VI, on the DEIS and Draft Forest Plan, and Forest Service response to these comments. Due to the size of the document, it has been printed separately in limited numbers and is available for review at Forest offices local public libraries, or on loan from the Forest.

Planning records, which document the planning process, are available for review at the Forest Supervisor's Office, 316 North Third Street, Hamilton, Montana.

II. ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

A. Introduction

This chapter presents the development, description, and comparison of alternative ways of managing the Forest's land and resources. The development process described in Section B includes an analysis of the management situation quantifying the capabilities of the Forest to produce goods and services.

The alternative descriptions in Section C identify the objectives of each alternative, where the alternative fits in the range of alternatives, and how the alternative responds to issues. Alternatives are compared by resource outputs, social and economic effects, response to major issues, and nonpriced benefits in Section D.

Maps which display the proposed land uses for each alternative are provided in the map packet that accompanies the EIS.

B. Alternative Development

1. Overview

Forest planning began by identifying public issues and management concerns. Refer to Appendix A for a description of this process. After the issues were known, information was needed to determine the Forest's capability to respond to each issue. This step was the analysis of the management situation; resource data, economic information and environmental/legal constraints were examined. Benchmarks were developed and analyzed to measure resource and economic interrelationships, and output ranges for alternative development.

Alternatives were developed that were responsive to issues and contributed differentially to present net value (PNV) and net public benefit (NPB). The net public benefit of Forest management is the overall value to the nation of all benefits minus all costs, regardless of whether the costs and benefits are expressed as priced or nonpriced.

Present net value is the primary measure of all priced outputs. All costs of managing the Forest are included in PNV. All priced benefits, market and nonmarket, with assigned values are also included. These include timber; grazing; developed, dispersed and wilderness recreation; and hunting.

The nonpriced outputs considered in this analysis include visual quality, wildlife habitat, mineral development availability, water quality and quantity, old growth/habitat diversity, fisheries, community well being, and threatened and endangered species habitat protection. The nonpriced components of net public benefits are subjectively evaluated.

Starting with the Maximum PNV Benchmark as the base, net public benefit is improved when the subjectively evaluated benefits of providing additional nonpriced objectives exceed the decrease in PNV of doing so. A single, numeric NPB value is not calculated since monetary values associated with some resources such as timber (priced benefit) cannot be added to qualitative values such as a

scenic view (nonpriced benefit). The alternatives examined a range of tradeoffs between PNV and the nonpriced components of net public benefit. These were measured against the issues and concerns facing the Bitterroot National Forest.

An understanding of the various types of values and interrelationships associated with Forest outputs aids decision makers in the selection of an alternative that most closely maximizes net public benefit. See the glossary for definitions of PNV and NPB. See Sections D.20 and D.21 of this Chapter, and Appendix B, Section IV for further discussion of NPB and PNV.

The alternative development process used here is outlined in 36 CFR 219.12 which includes the following goals for alternative formulation:

- Provide a basis for identifying the alternative that maximizes net public benefits.
- Distribute alternatives between the minimum and maximum resource potential; and reflect a range of environmental, resource use and expenditure levels.
- Facilitate analysis of opportunity costs and tradeoffs.
- Facilitate evaluation of effects on present net value, benefits, and costs.
- Provide different ways to respond to major public issues.

Changes in Chapter II between the Draft and Final EIS include:

- Development of a new alternative, E2, responding to fisheries, water quality, elk habitat and timber supply concerns that surfaced or were reinforced during the Proposed Forest Plan/Draft Environmental Impact Statement review period.

- Changes in text and tables for clarification and to disclose new findings.

- Timber board foot volumes have been adjusted to Regional Guide utilization standards; about a 10 percent increase over the board foot volumes shown in the DEIS. The DEIS board foot volumes were incorrect. All board foot volumes displayed in the FEIS are based on Regional Guide utilization standards except for Tables II-13 and II-26. Table II-13 compares the effects of Regional Guide utilization standards with those currently used in timber sale contracts. Table II-26 compares Regional Guide board foot volumes with those currently in use and with those displayed in the DEIS.

- Additional analysis and sensitivity testing has also been done in response to specific concerns (see Appendix B for details):

  - Maintaining fish populations without the need for habitat improvement.

  - Timber receipts not recovering timber-related costs. Need for capital investment road funds is a part of this issue.

  - Marginal costs of adding timber increments above an efficient level.

- Effect of reducing costs on the efficient timber level and marginal costs of adding increments above that level.

- Effect on the suitable timberland and volumes when price trends are removed.

- Effect on suitable timberland and volumes using reduced price trends and new values for timber and range.

- Analysis of the planned timber sale program and adjustment of road needs.

- First decade timber supply and demand analysis for the bid area is documented in Chapter III.

2. Analysis of the Management Situation

The analysis of the management situation determined resource supply potentials by establishing minimum and maximum production levels called benchmarks from which the costs and effects of applying regulation and policy constraints were measured. Production capabilities were determined for single resources and for a set of multiple resource outputs that maximized present net value. This analysis established the benchmark levels required by 36 CFR 219.12(e). The benchmarks are listed and briefly described beginning on page II-5. A detailed discussion of benchmarks, minimum management requirements, and results can be found in Appendix B, Section VI.

All benchmarks were designed to meet the minimum management requirements (MMR's) in 36 CFR 219.27. The MMR's (1) protect soil productivity and water quality by controlling timber harvest, timber intensity, logging system, road density, fuel treatment, site preparation, and watershed condition; (2) minimize hazards from flood, wind, wildfire, erosion, or other physical forces; (3) reduce hazards from pest organisms; (4) protect riparian zones by specifying silvicultural system, unit size, and road design; (5) maintain diversity; (6) provide for adequate fish and wildlife habitat to maintain viable populations; (7) assure consistency with multiple-use laws; (8) protect threatened and endangered species habitat; (9) provide for utility and transportation rights-of-way and corridors; (10) maintain road construction standards; (11) provide for temporary road revegetation; (12) maintain air quality; (13) assure reforestation; and (14) assure a 40-acre clearcut limit.

Constraints common to all benchmarks except the minimum level were (see Appendix B, Section VII for details):

- Comply with MMR's.

- Ensure sustained timber yield beyond the 150 year planning horizon, by applying an ending inventory constraint at least equal to the volume that would occur on a regulated forest.

- Set timber rotation at 95 percent of the culmination of mean annual increment.

- Use the objective function which maximizes present net value.

- Maintain existing wilderness.

- Use timber price and cost trends.

a. **Benchmark Descriptions** (see Appendix B, Section VI for details).

(1) **Maximize Present Net Value (Benchmark K)**

This benchmark established the mix of resource uses, and schedule of outputs and costs, that maximized present net value using market and nonmarket assigned values. Timber harvest flow was nondeclining. The resource outputs, scheduling, benefits, and costs were used as reference points for all benchmark and alternative comparisons.

(a) **Variations of Benchmark K.**

N - determine the cost to PNV of meeting MMR's.

O - determine the cost to PNV of meeting 5 percent old growth constraint.

P - determine the effect on PNV of departing from nondeclining timber flow.

Q - determine the effect on PNV, timberland base, and resource mix, using only those resource values having an established market price.

R - help determine the marginal cost of adding timber increments above the efficient level.

S - help determine the marginal cost of adding wilderness increments to the existing level.

V - determine the effect on PNV and suitable timberland of removing price trends.

(b) **Variations of Benchmark K between Draft and Final.**

Y - effect on PNV and the efficient level of timber production, using reduced price trends and new resource values.

Z - effect on PNV, suitable timberland, and efficient level of timber production, using new resource values and no price trends.

(2) **Maximize Timber (Benchmark W)**

The maximum legal capability of the Forest to produce timber was established by this benchmark. Timber production was maximized in decade 1 based on nondeclining flow. This benchmark was used to develop the range of timber outputs in alternatives.

(3) **Maximize Elk Habitat Potential (Benchmark U)**

This benchmark established the potential for elk, based on the availability of forage on winter range. It was not used to develop alternatives since the major elk issue is providing hunting opportunities, which involves cover/forage relationships and security areas, not just forage.

(4) **Maximize Livestock Potential (Benchmark T)**

Livestock forage production was maximized to determine the potential on suitable rangeland. This benchmark was used to develop the range of alternative livestock outputs, and test the feasibility of meeting RPA targets.

(5) **Maximum Wilderness (Benchmark L)**

Wilderness designation was maximized to determine the foregone monetary values and resource outputs, in comparison with Benchmark K. This benchmark was used to develop a wide range of roadless area recommended for wilderness. Timber flow was nondeclining.

(6) **Minimum Level (Benchmark M)**

This benchmark defined the minimum costs of public landownership, and the resource outputs which are incidental to Forest management. It was a reference point for estimating alternative activities, outputs, and costs which result from Forest Service activities.

(7) **Current Direction (Benchmark X)**

Benchmark X defined the current and expected future level of outputs if current management direction continued. This benchmark followed existing unit plan management area direction, with no budget constraint. It was the basis for the current program or no action alternative, which has current budget restrictions.

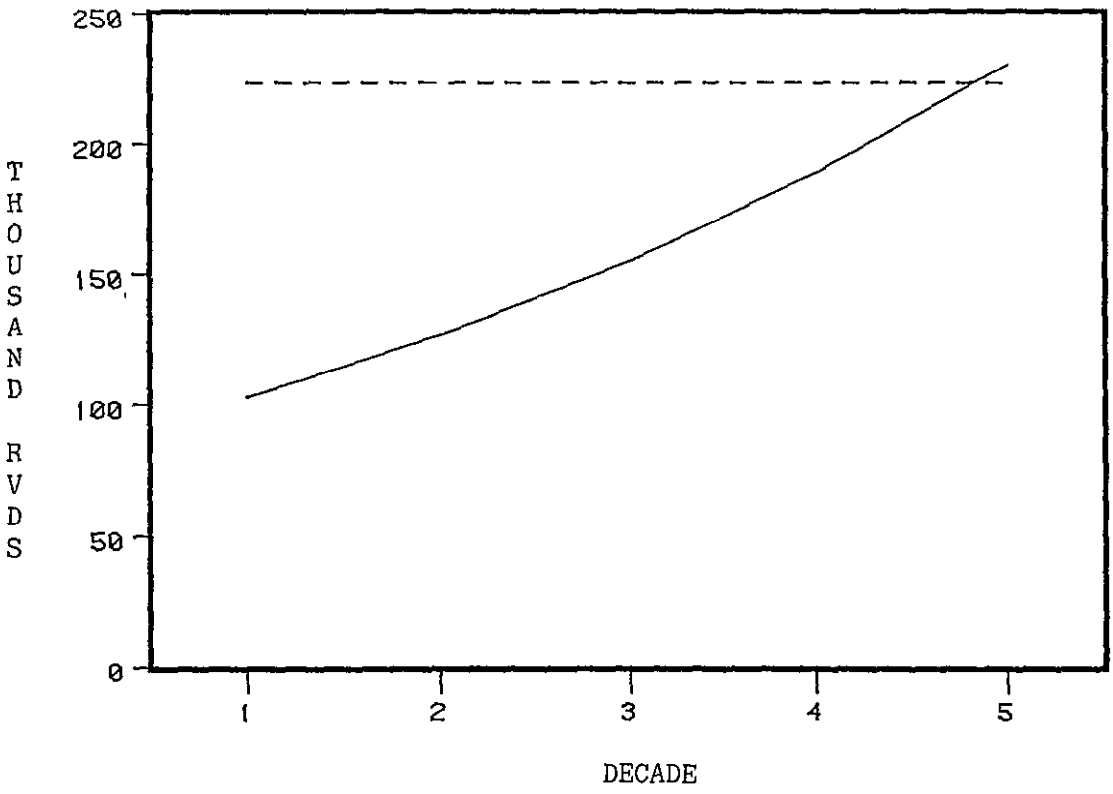
b. **Benchmark Analysis**

Analysis of the benchmarks established upper and lower potential production levels for selected resources (See Appendix B for more detailed discussion). Additional analysis was done to estimate projected use levels. The following resources were analyzed.

(1) Developed Recreation

Developed recreation sites - including campgrounds, boating sites, picnic sites, and a ski area - are adequate to meet projected use, except for Lake Como day-use and campground facilities. The expansions at Lake Como would increase capacity and quality of experience (Figure II-1).

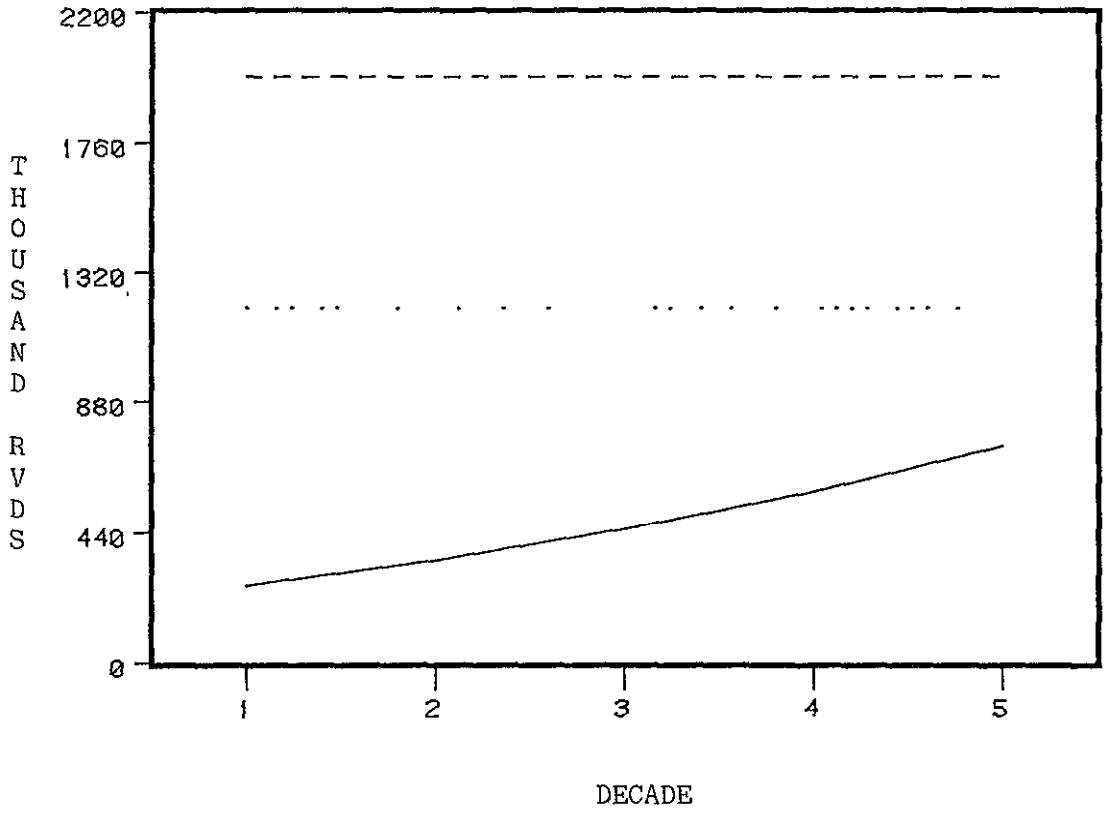
Figure II-1
Developed Recreation



(2) Roaded Dispersed Recreation

Current roaded dispersed recreation capacity is ample to meet anticipated use for the next 50 years (Figure II-2). The quality of hunting, fishing, firewood cutting, berrypicking, camping, picnicking, and driving for pleasure experiences will decrease as the population increases, unless the area roaded increases proportionally.

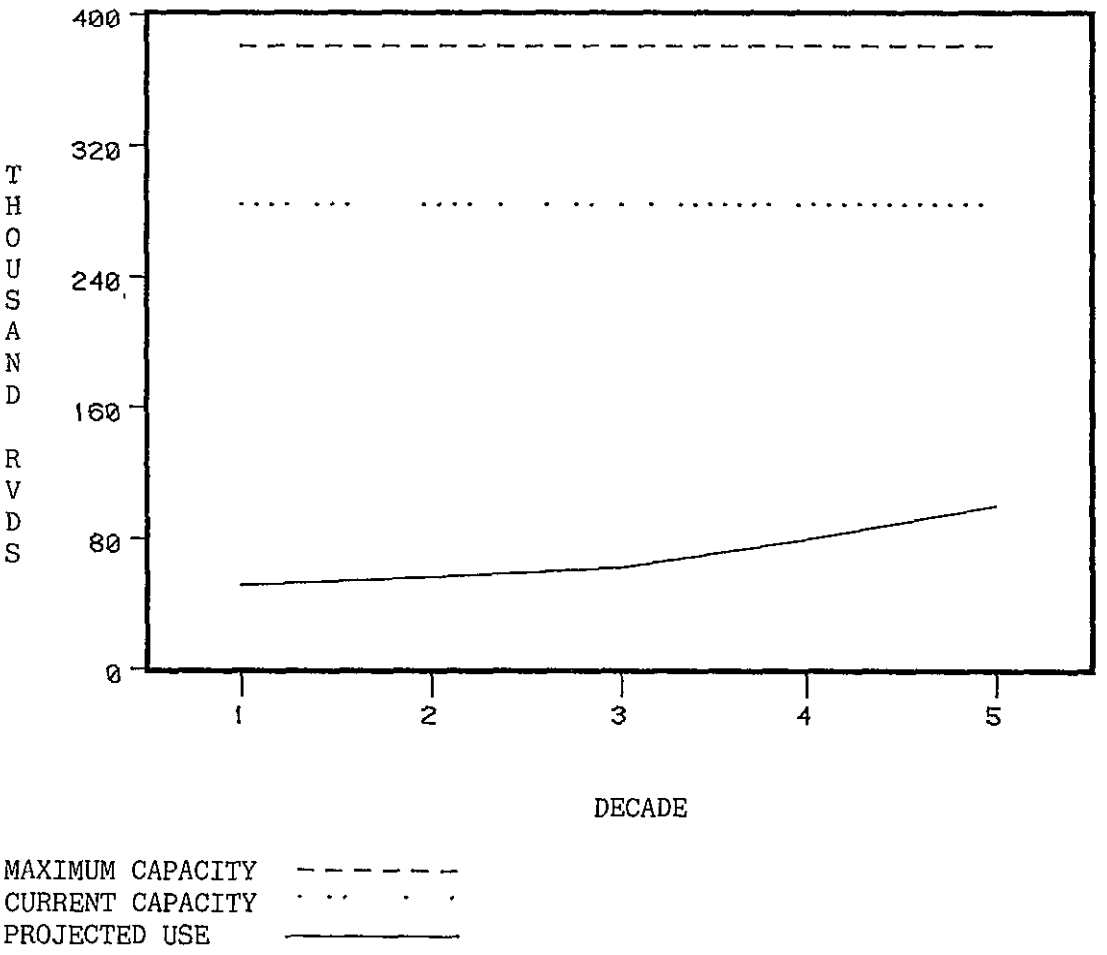
Figure II-2
Roaded Dispersed Recreation



(3) Roadless Semiprimitive Recreation

Existing and projected roadless, semiprimitive recreation use can be met by managing current roadless area for semiprimitive recreation (Figure II-3). Projected use can be met in 2025 by managing 190,000 acres of roadless land for semiprimitive recreation. Below this level, the quality of experiences in semiprimitive areas would be reduced, and some use would shift to wilderness areas.

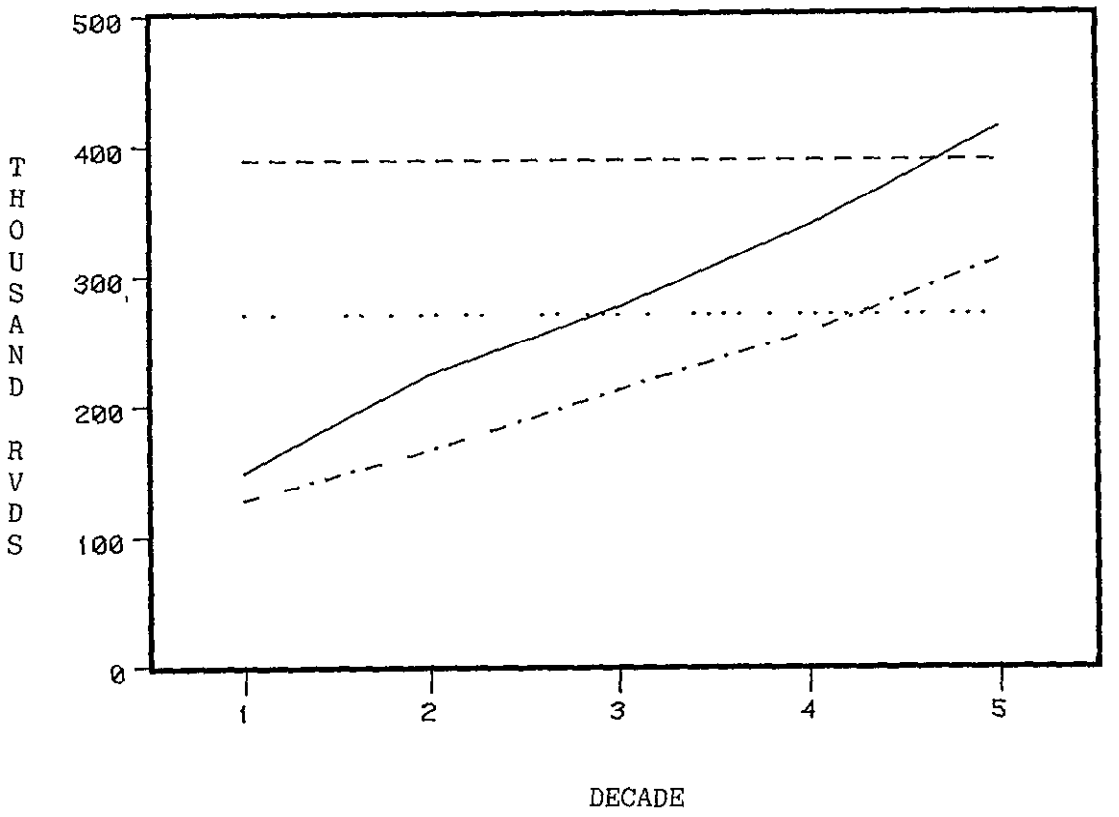
Figure II-3
Roadless Semiprimitive Recreation



(4) Wilderness

Potential wilderness capacity exceeds projected use until the fifth decade. Maximum use occurs when other roadless lands are developed and semiprimitive use is shifted to wilderness areas. If there are sufficient semiprimitive recreation opportunities, then wilderness use will be only 85 to 90 percent of the projected use shown in Figure II-4.

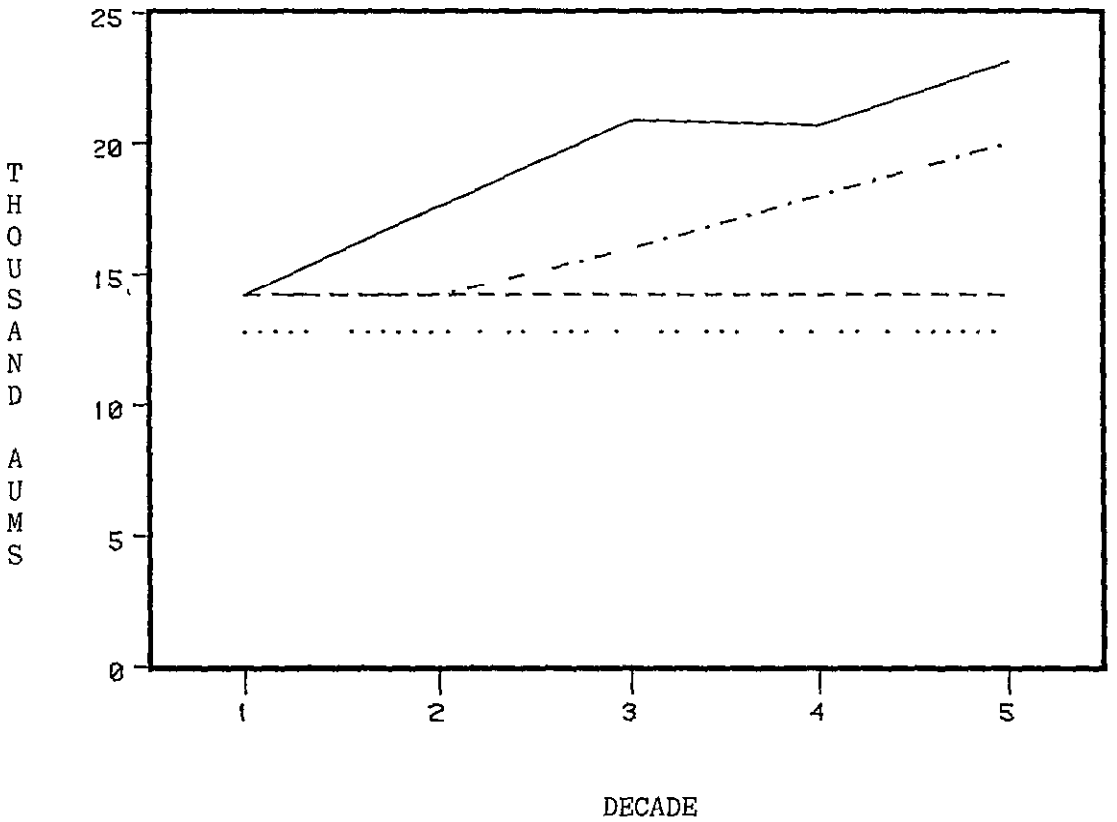
Figure II-4
Wilderness



(5) Livestock Range

The capacity of suitable rangeland to support livestock exceeds current actual and permitted use, as shown in Figure II-5. There is an opportunity to increase livestock forage by harvesting timber on suitable rangeland.

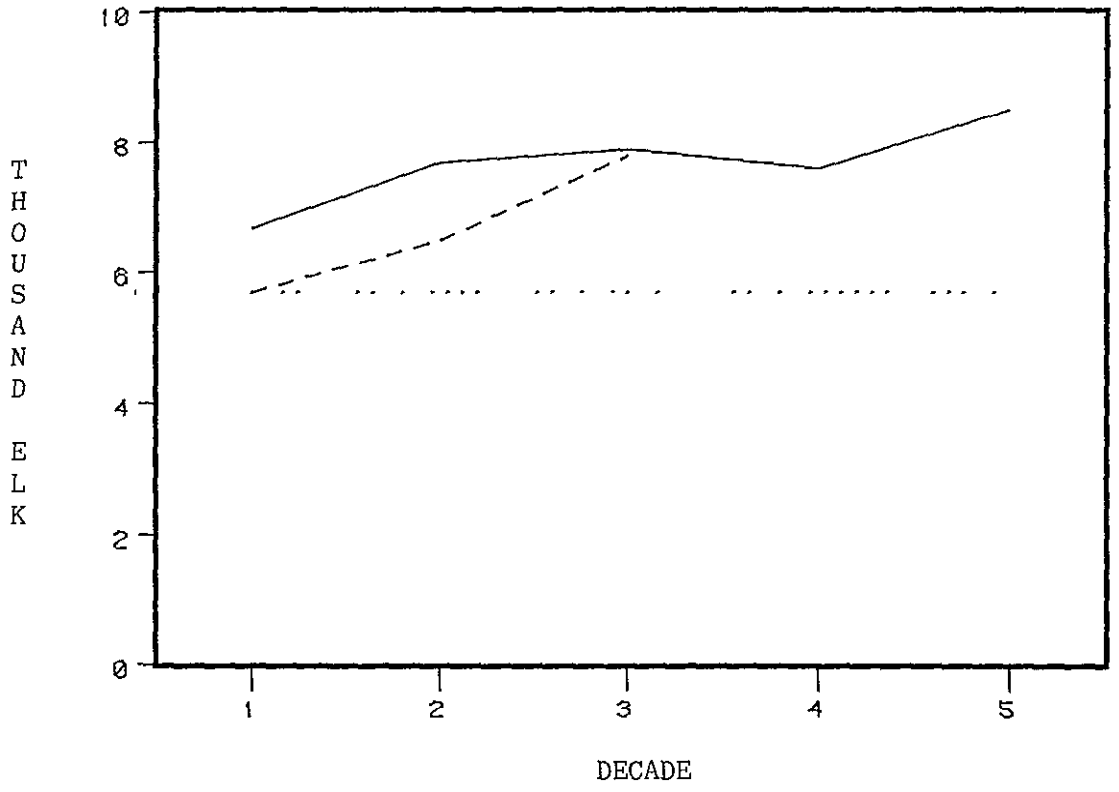
Figure II-5
Livestock Range



(6) Elk Winter Range

The capacity of National Forest winter range to support elk, Regional Guide targets, and current population are shown in Figure II-6. The current population is composed of 2,660 elk in Idaho on wilderness winter range and 3,000 elk in Montana on winter range outside wilderness.

Figure II-6
Elk Winter Range

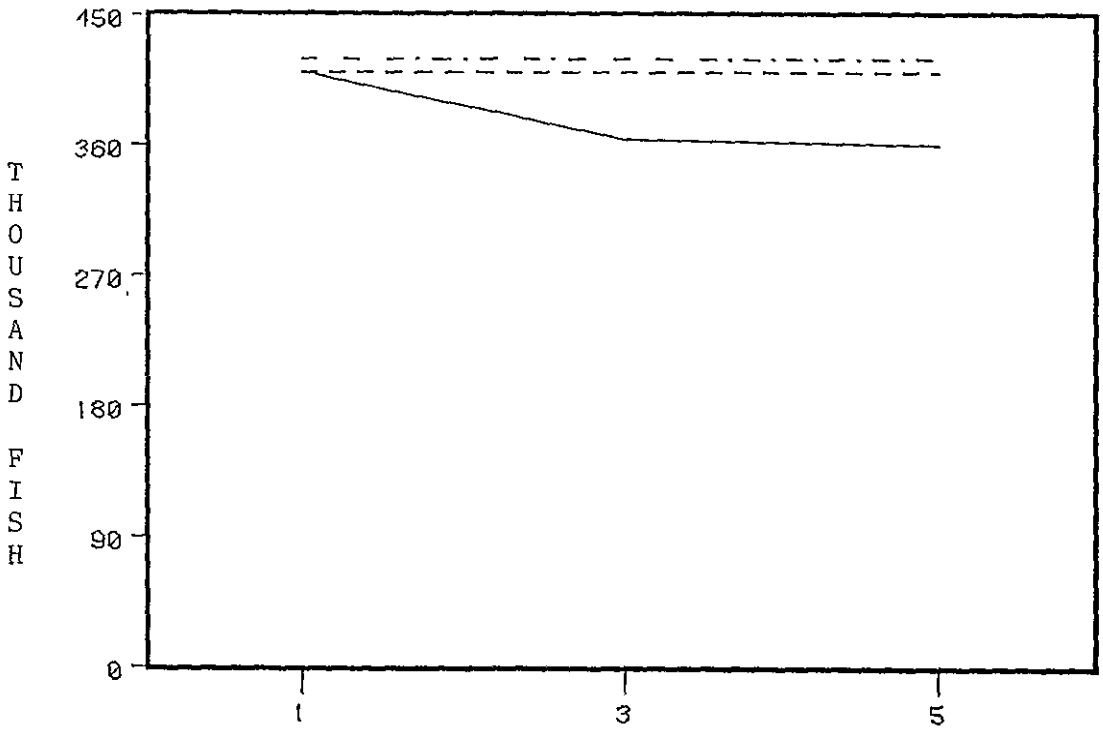


(7) Fisheries

The Idaho portion of the Forest supports anadromous steelhead trout and spring chinook salmon. However, the rivers are in wilderness, and are affected little by Forest management activities. There is a resident westslope cutthroat trout fishery throughout the Forest. The population that varies depending on management activities is the catchable trout stream population outside of wilderness, and it declines in direct proportion to the amount of stream sedimentation caused by timber harvest and road construction activities.

The current wilderness stream population and Forest lake population is approximately 248,500 catchable trout. The current stream population outside of wilderness is approximately 161,200 fish. The current total population is about 410,000 trout, and the opportunity exists to improve habitat through direct habitat improvement projects and increase the population by about 9,000 trout. Figure II-7 displays the maximum potential population, the current population, and the projected effect of Benchmark K on current population.

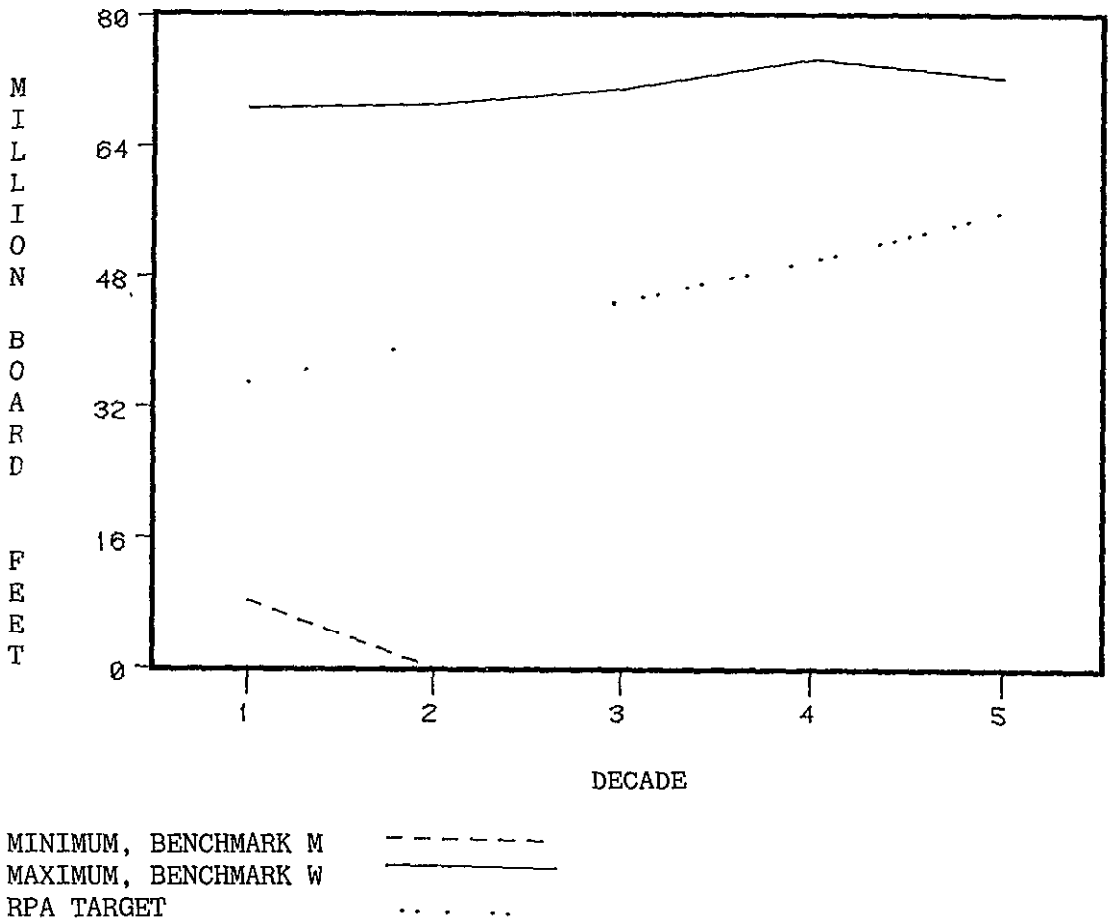
Figure II-7
Catchable Trout



(8) Timber

The land base tentatively suitable for timber production has the capacity to meet all RPA targets for the next 50 years. In the minimum level benchmark only the volume currently under contract is harvested. The maximum and minimum potential are shown in Figure II-8.

Figure II-8
Timber



Lands suitable for timber management range from no acres in Benchmark M, to 451,000 acres in the current direction (X), to 561,000 acres in maximum timber (W), and a maximum of 586,000 acres in Benchmark K.

(9) Present Net Value (PNV)

The maximum PNV of the Forest is $206 million as defined by Benchmark K, which meets minimum management requirements, precludes timber management from existing wilderness, and meets nondeclining timber harvest flow.

(10) Discounted Cost

The minimum discounted cost of maintaining the Forest in public ownership is $80 million as represented by Benchmark M.

(11) Employment

The Forest currently contributes 1,052 jobs annually to Ravalli and Missoula Counties' economies. In decade 1 employment ranges from 390 in Benchmark M to 1,790 jobs in Benchmark W.

3. Range of Alternatives

a. Information Used to Develop Alternatives

The benchmarks presented in the previous section were used to develop alternatives that represent a range of resource outputs. For example, the timber and minimum level benchmarks show that the timber base sale levels can range from a minimum of zero to a maximum of 68 MMBF per year in decade 1. Alternatives were then designed to span the benchmark range, while meeting policy constraints such as minimum visual quality and minimum acceptable harvest levels. The PNV benchmark was used to determine the cost of meeting alternative objectives. It provided a basis for changing alternative activities to optimize PNV, while still meeting the objectives of the alternative. The current direction benchmark was used to develop the current program (no action) alternative.

The timber, elk, roadless, wilderness, and visual quality issues led to alternatives which emphasize specific issues or address most issues. The soil and water issue was incorporated into the minimum management requirements, and was the basis for providing various levels of riparian habitat protection above these requirements. The levels of protection range from removing riparian zones from timber production, to meeting the requirements while maximizing timber and livestock forage production. Objectives which slow the pace of roading and timber harvest (e.g., optimizing cover and forage requirements for elk, meeting visual quality objectives, and roadless and riparian designations) address the fish issue by reducing the adverse impacts on fish populations.

b. Adequate Range of Alternatives

Required alternatives were developed first. These included one that emphasized market outputs (Alternative A), one that emphasized nonmarket outputs (Alternative J), the current program or no action alternative (Alternative F), one that recommended wilderness on roadless lands and optimized market outputs on roaded lands (Alternative H), and one that met RPA targets required by the Regional Guide (Alternative A).

Alternatives B and C were market-oriented but addressed other issues such as elk cover/forage relationships, visual quality, roadless semiprimitive recreation, and wilderness.

Alternative G was developed to emphasize nonmarket values while providing some market outputs. Roadless elk security, semiprimitive recreation and wilderness were emphasized on the most significant or high-use areas. Inventoried visual quality objectives were maintained to protect the visual corridors. Market outputs were emphasized on remaining lands.

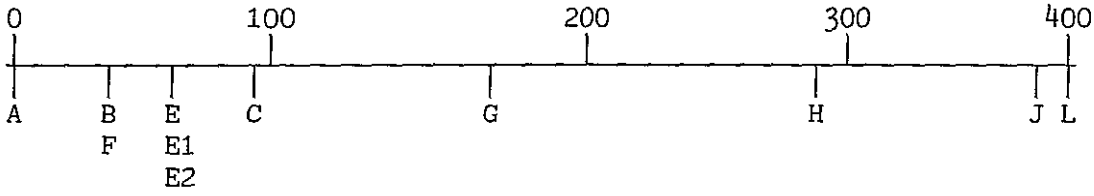
The criteria developed to evaluate alternatives were used to design an alternative that addressed all issues and concerns to some degree: Alternative E. Roadless lands with unique features were recommended for wilderness, and other roadless lands would remain unroaded to meet semiprimitive recreation and elk security needs. Visual quality was protected along heavily traveled corridors. Thermal cover was maintained above the optimum level of 25% of the big-game winter range area. On remaining lands timber production was optimized. A departure from nondeclining timber harvest was also analyzed for this set of objectives and constraints, resulting in Alternative E1.

A new preferred alternative, E2, has been developed. It is similar to Alternative E, falls within the range of alternatives displayed in the DEIS, and responds further to specific elk habitat, fishery, visual and timber supply concerns that were either raised or reinforced in comments on the DEIS and Forest Plan.

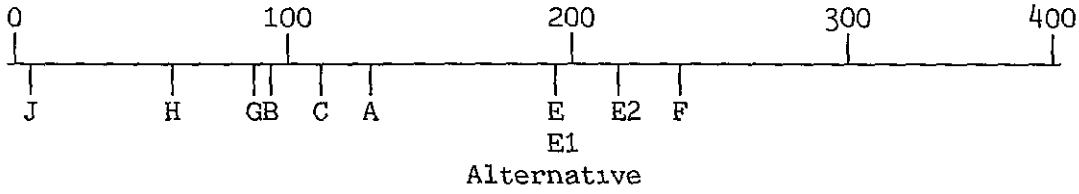
These 10 alternatives were tested against the benchmark capacities in order to determine if a wide range had been provided to respond to major issues. The comparison is shown in Figure II-9 and in section D of this Chapter. Proposed land uses for alternatives are shown in Table II-1.

Figure II-9
Range of Alternatives

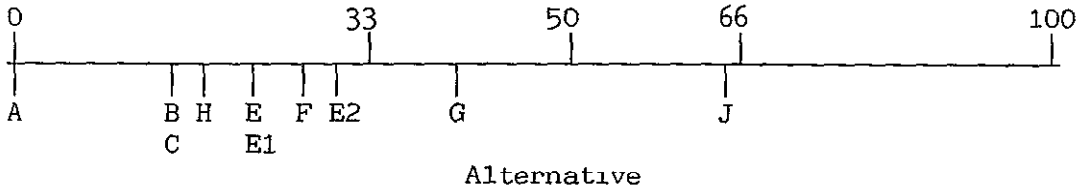
New Wilderness Recommendation (thousand acres)



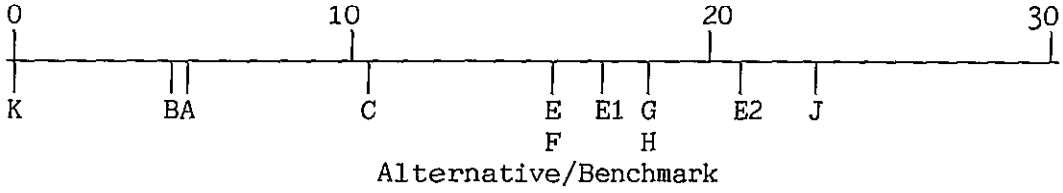
Roadless Semiprimitive Management (thousand acres)



Retention and Partial Retention Visual Quality Objectives
(percent suitable timberland)



Old Growth (percent on suitable timberland in 100 years)



Elk Cover (percent cover outside wilderness in 100 years)

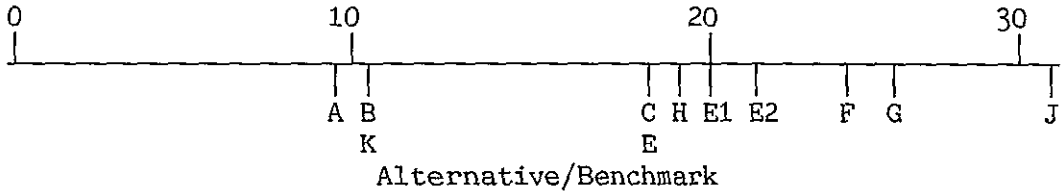
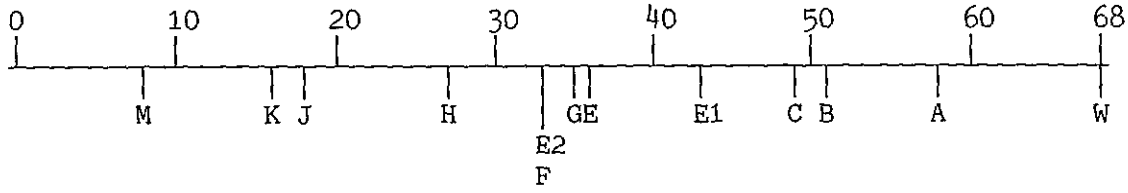
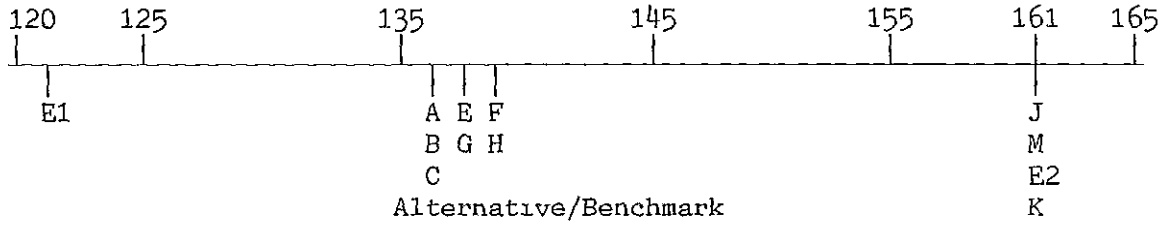


Figure II-9 cont.

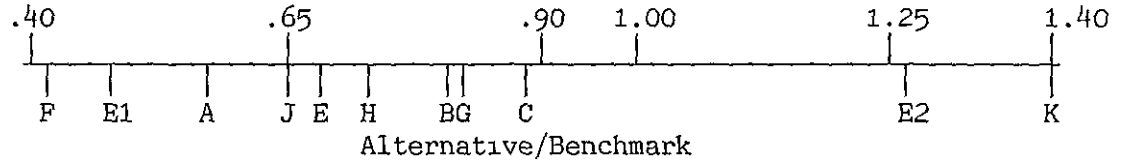
Timber Harvest (annual average decade 1 ASQ, million board feet)



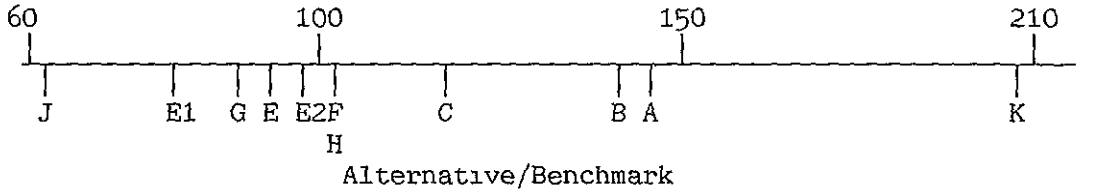
Catchable Trout (end of decade 1 nonwilderness streams without habitat improvement, thousand fish)



Benefit/Cost Ratio - First Decade Timber Program



PNV (millions of $)



Average Annual Road Construction (decade 1 miles)

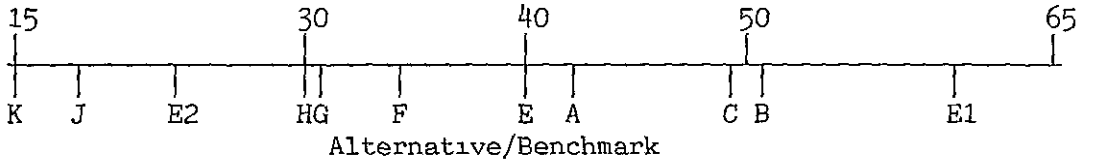


Table II-1
Proposed Land Uses by Management Prescriptions for Alternatives
(thousand acres)

Alternative	Management Emphasis: Timber	Winter Range	Range	Riparian	Partial Retention	Roaded Retention	Unroaded Retention	Minimum Level	Semiprimitive Recreation	Wilderness
A	586	0	23	0	0	0	0	93	133	743
B	408	104	7	9	80	1	0	76	100	793
C	311	157	4	9	74	1	0	71	110	841
E	267	105	0	19	115	5	10	23	213	820
E1	267	105	0	19	115	5	10	23	213	820
E2	194	129	0	50	104	7	0	35	233	820
F	180	81	105	4	35	48	39	51	242	793
G	206	103	16	9	91	56	22	66	95	914
H	280	55	10	7	54	1	0	58	73	1040
J	56	100	6	0	83	111	0	83	0	1144

Analysis of these comparisons showed that there was an adequate range of resource outputs and land uses, except that semiprimitive recreation did not approach 405,000 acres. However, these are the same 405,000 acres as the potential wilderness, and the combination of wilderness and semiprimitive recreation does fulfill a complete range from none to nearly 405,000 acres.

Inventoried visual quality objectives are met in several alternatives. In some alternatives, more land is assigned to retention and partial retention objectives than is necessary to meet inventoried visual quality objectives. In others, visual quality objectives are below the inventoried level.

Allowable sale quantities range from a maximum of 59 MMBF while meeting policy objectives, to 18 MMBF which would only maintain a small, local forest products industry work force.

c. Constraints Used to Develop Alternatives

Existing wilderness was maintained in all alternatives. Therefore, the primary focus of alternative discussions is on the 830,000 acres of nonwilderness lands.

There is no potential for a power corridor across the Forest; therefore there is no alternative analysis or comparison for this. Potential east-west power corridors were located across the Forest from Lost Trail Pass and the head of the East Fork, through the Magruder corridor. The classification of the Frank Church-River of No Return, and additions to the Selway-Bitterroot Wildernesses, reduced the Magruder corridor to widths of 66 to 600 feet. The Central Idaho Wilderness Act establishing these wilderness areas specified that the Magruder corridor should be maintained as it is.

Mitigation measures were incorporated into the management prescriptions, standards, guidelines, and minimum management requirements discussed in Appendix B, Sections III and VI.

Common alternative constraints are described in detail in Appendix B, Section VII B. Common constraints provide for nondeclining flow (except for Alternative E1), maintenance of timber inventory, and protection of riparian zones and old growth. They also specify road densities and logging systems, and assure that all alternatives maximize their present net value and meet minimum management requirements.

Alternative constraints are discussed in Appendix B, Section VII C. The constraints used to meet alternative objectives follow.

- Visual quality, diversity, and cover/forage objectives are met by constraining access and entry into individual analysis areas, by constraining the amount of area that can be cutover and unrecovered by habitat type-land type combinations, and by applying a harvest acreage constraint to future decades.

- Old-growth objectives are met by applying a constraint to habitat type-land type combinations where necessary to meet minimum requirements.

- Output objectives, such as the RPA target for livestock or timber, are met by placing scheduled output constraints on the applicable resource.

- A first decade timber harvest floor requires scheduling 95 percent of the maximum possible timber harvest, subject to meeting management objectives of the alternative.

Additional analysis between the draft and final has been accomplished in response to specific concerns, to test the economic appropriateness of the established floors. Specifically this entailed:

- determining the marginal cost of adding timber increments above the efficient level to reach established floors.

- sensitivity of the efficient timber level to reduced price trends, timber values, and timber harvest costs.

4. Benchmarks and Alternatives Eliminated From Further Consideration

The following benchmarks were eliminated from further detailed development and analysis, because they do not meet minimum visual quality policy constraints. Additional reasons are specified where appropriate:

K - Used in the development of Alternative A.

P - Used in the development of Alternative E1 which evaluates departure from nondeclining flow.

Q - Valid only to ascertain the effect of resources with assigned values on PNV and outputs.

R - Used to extensively test alternatives, to determine the marginal costs of adding timber increments above the efficient level.

L & S - Used to develop a full range of wilderness for alternatives.

T & U - Forage production is a by-product of timber harvest for which a full range has been developed in alternatives.

V, Y & Z - Removal of all price trends is not realistic, since economic conditions in the recent past are not of sufficient duration to warrant changes in long-term trends. The benchmarks were used to test the sensitivity of output schedules, timber land base, and PNV, attributable to price trends and timber values. These benchmarks provided insights when further testing alternatives, to determine the marginal costs of adding timber increments above the efficient level.

W - Used for developing a full range for timber in alternatives.

X - Used in the development of the current direction Alternative F, along with the reality of budget constraints.

N & O - Variations of Benchmark K. They are valid only in determining the cost of meeting minimum management requirements.

M - Used to identify the fixed costs of public land ownership.

Several alternatives were considered, but eliminated from detailed development and analysis. One was formulated to determine the highest timber and road construction level that would maintain existing fish populations. Outputs and roading were slightly higher than, but similar to Alternative J. Consequently, it was dropped from further consideration.

Variations of Alternative B and E were formulated, to determine and analyze the marginal costs of adding timber increments to the first decade allowable sale quantity (see Appendix B for details of these tests). Results of this analysis show that initial increments above the maximum present net value level for an alternative are relatively inexpensive. Each additional timber increment becomes more expensive as the volume approaches the biological maximum for the alternative. As the first decade volume is increased from 15 to 43 MMBF/year for Alternative B, the marginal cost of adding volume increases from $0 to $76/MBF. As the first decade volume increases from 8 to 29 MMBF/year for Alternative E, the marginal cost of adding volume increases from $0 to $87/MBF. Although the marginal costs of timber volume increments was determined only for Alternatives B and E, the same conclusion applies in a general sense to all alternatives, i.e., each increment of additional timber volume will have increasing costs associated with it.

Other variations were made on Alternative E to analyze the effect of changes in timber prices and management costs, price/cost trends, harvest constraints, nontimber output values, and road modeling methods. Results of this analysis are presented in Appendix B.

Additional variations of these alternatives were designed to analyze the effect on the efficient level and increment, by reducing costs and reducing timber values.

One preliminary alternative, Alternative D, was considered but eliminated from further analysis. This alternative recommended all potential wilderness in the Montana Wilderness Study Act (MWSA) areas for wilderness, and provided fairly high levels of elk and timber. The Ninth Circuit Court decision on the RARE II EIS resulted in a reevaluation of roadless areas and required that all or most roadless area, not just the MWSA areas, be recommended for wilderness in at least one alternative. All alternatives were reevaluated to provide a wide range of wilderness. As a result, Alternative D was no longer needed to help fill the range of wilderness or roadless management, or resource outputs.

An alternative using a predominantly uneven-aged silvicultural system (individual and group selection) was considered, but was eliminated from detailed study following review of research (USDA, 1983) and the Regional Guide. Land suited for biologically sound uneven-aged management is very limited. Lodgepole pine, Douglas-fir and spruce fir types normally develop naturally in even-aged stands as a result of wildfire. Insect and disease problems, particularly western spruce budworm and dwarf mistletoe, are widespread and often associated with heavy fuel accumulations and/or steep slopes. Converting these types and conditions to uneven-aged management is risky, often resulting in extensive windthrow, carryover of insect/disease problems to new stands, and untenable fuel problems. Uneven-aged systems have been and will continue to be considered where biologically appropriate, such as for ponderosa pine types and riparian areas.

C. Description of Alternatives

The 10 alternatives considered in detail, including a new preferred alternative, are described in this section. Each alternative has a schedule of resource outputs and economic data projected for 15 decades (Table II-26). Section h. under each alternative now incorporates a timber supply analysis; Section i. has been rewritten to better portray the effect on mineral and energy opportunities; timber board foot volumes have been corrected to Regional Guide utilization standards; and Section f. now includes fish habitat improvement as an option for all alternatives. See Appendix C for roadless area discussion.

1. Alternative A--High Market Emphasis

This alternative emphasizes timber outputs and livestock use. It was designed to meet RPA targets assigned by the Regional Guide. A high level of timber production is required to create and maintain forage levels. Consequently, timber outputs not only meet but exceed timber targets in the five decade RPA period. Alternative A has the most extensive road system of any alternative, thereby enhancing opportunities for minerals exploration and development and roaded recreation, but issues other than timber are not specifically addressed.

a. Roadless Area

Of the 405,000 acres of roadless area, about 67 percent would be managed for timber production. The 33 percent not suitable for timber production would be available for unroaded recreation use, including portions of the Selway-Bitterroot, North Big Hole, Blue Joint, Allan Mountain, Sapphire, and Stony Mountain roadless areas.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 47 percent primitive, 8 percent semiprimitive motorized, and 45 percent roaded. A low level of maintenance is provided for campgrounds and trails. No expansion or new development is planned. RPA recreation use targets are met except for developed recreation in decade 1. Estimated first decade use is about 6% below the target in this and all other alternatives.

c. Wilderness

No new wilderness is recommended.

d. Visual Quality

Management activities, mostly timber harvest and roading, will dominate all landscapes outside of existing wilderness. Some unroaded areas not suitable for timber production, about 132,000 acres, would not be roaded unless accessed for mineral exploration and development.

e. Elk and Old Growth

Because timber harvest is high, elk winter forage production is high. Elk habitat improvement is only a function of the target but is adequate to meet the elk targets in decades 1 and 2. Cover on winter ranges will be in short supply. Road closures will provide a little security during hunting season but unroaded security areas will steadily decrease as roads are built into them. Easier access and decreased cover will result in more restrictive hunting seasons.

Old growth decreases rapidly as undeveloped areas are logged, but timber harvest schedules are constrained to maintain at least 5 percent old growth on suitable timberland.

f. Fish and Water Quality

Non-wilderness stream catchable trout populations are projected to decrease 15 and 30 percent by the end of decades 1 and 3 respectively, due to sedimentation from roads and removal of woody material that is necessary to maintain debris pools. Populations then recover to, and remain at, about 20 percent below current levels. Fish habitat improvement could reduce losses by about 20 percent during periods of high road development (decades 2 and 3). The RPA water acre foot target is exceeded by this alternative. Soil and water resource objectives can be met by about 6% of the improvement work targeted by RPA.

g. Range

The objective is to meet or exceed RPA targets. Forage production increases from 14,000 animal unit months (AUM's) to about 20,000 AUM's in decade 7. Forage supply greatly exceeds expected demand in the early decades.

h. Timber

First decade timber outputs are emphasized. Approximately 97 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 59 MMBF/year is 96 percent above the 1976 to 1985 sold level. The sustained yield capacity is 59 MMBF/year. Timber harvest and reforestation RPA targets are significantly exceeded in all decades, but the additional harvest is needed to meet RPA range forage targets. The TSI programmed meets the objectives of the alternative, but is less than the RPA target.

In the early decades, 83 percent of harvest is clearcut and 17 percent is shelterwood cut. Lodgepole pine accounts for 40 percent of the allowable sale quantity in decade 1, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 46 percent more timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near all lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 63 percent of these lands, special mitigation or conditions would be required on 37 percent, and no lands are proposed for withdrawal from entry.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS by referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values needing special protection to meet the alternative management objectives. This alternative provides for the case load identified in RPA.

j. Road System

Approximately 2,600 miles of road are needed to complete the system. Annual road construction in decade 1 is 41 miles, with 14 miles of capital investment roads.

k. Socioeconomic

Alternative A is expensive in terms of direct costs, because of large timber and road construction programs. However, the returns are also high because the most valuable timber is harvested. Annual Forest expenditures in decade 1 are $9.2 million or 39 percent above the present level. The annual returns are $2.5 million, 56 percent above present returns. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $6.4 million. The RPA human resource program is provided for with this alternative.

Discounted costs for 150 years are $235 million and benefits are $383 million, so the present net value of the Forest is $148 million. It isn't higher due to the harvest of 59 MMBF/year, and the dispersal of harvest activities to meet minimum visual quality objectives. Alternative A will increase the local jobs provided by Forest outputs 33 percent above the 1980 level, due to high levels of timber harvest and Forest expenditures. The budget is less than the RPA target.

1. Utility Transportation Corridors

Corridor segments R27 across the Sapphire mountains and R29 along Highway 93 will be in land designations which provide for roading and development. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

2. Alternative B--Market Emphasis with Limited Response to Nonmarket Issues

This alternative emphasizes timber and mineral opportunities, and addresses the most significant components of the wilderness, visual quality, and elk habitat issues that can be achieved with the least effect on market outputs.

a. Roadless Area

Twelve percent of the 405,000 roadless acres is recommended for wilderness. Another 25 percent is not suitable for timber production and will generally remain unroaded, including portions of the North Big Hole, Selway-Bitterroot, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain roadless areas. About 63 percent is scheduled for roading and development.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 50 percent primitive, 6 percent semiprimitive motorized, and 44 percent roaded. A low level of maintenance is provided for campgrounds and trails. No expansion or new development is planned.

c. Wilderness

About 1,800 acres in Swift and Needle Creeks, and 48,300 acres of the Selway-Bitterroot roadless areas, are recommended for wilderness. The Selway-Bitterroot areas have very high wilderness attributes, potential to improve the current wilderness boundary, complete features like an entire canyon, and major travel corridors to the existing wilderness. Wilderness designation of all the areas will have little effect on market outputs; and the areas have longstanding public support for wilderness.

d. Visual Quality

A high level of visual quality is maintained adjacent to residential areas, and a moderate level in the foreground viewed from major existing travel corridors. Management activities here may be evident but subordinate to characteristic landscape patterns. Elsewhere, timber harvest and roads will dominate the landscape.

Visual quality objectives outside of existing wilderness are: preservation on six percent of the area, the land recommended for wilderness; partial retention on 13 percent of the area, the land near residential areas and travel corridors; and modification or maximum modification on 69 percent. The remaining 12 percent, 100,000 acres, is unroaded area not suitable for timber production, but is available for mineral exploration and development. These lands will be managed for semiprimitive recreation opportunities unless accessed for minerals.

e. Elk and Old Growth

Cover/forage ratios on elk winter range will be maintained or improved on a small area. Forage will be increased on most areas. Road closures will provide some security during hunting season, but unroaded security areas will decrease as roads are built into them. Easier access and decreased cover will result in more restrictive hunting seasons. More than five percent old growth is maintained on suitable timberland although existing old-growth area is reduced rapidly by timber harvest.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due mostly to sedimentation from roads. Fish habitat improvement could reduce losses by about 25 percent during periods of high road development such as decades 2 and 3.

g. Range

The current level of livestock use will be maintained or increased. Forage supply greatly exceeds expected demand in the early decades.

h. Timber

The objective is to maintain high timber production. Approximately 97 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 51 MMBF/year is 69 percent above the 1976 to 1985 sold level. Projected outputs increase to the sustained yield capacity of 59 MMBF in decade 4. RPA targets are significantly exceeded in all decades except the third.

Clearcut, shelterwood, and selection harvest systems are 76, 23, and 1 percent respectively of the acreage harvested in early decades. Lodgepole pine accounts for 19 percent of the allowable sale quantity in decade 1, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 27 percent more timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near all lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 61 percent of these lands, special mitigation or conditions would be required on 39 percent, and no lands are proposed for withdrawal from entry.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 2,300 miles of road are needed to complete the system. Annual road construction in decade 1 is 36 miles, with 12 miles of capital investment roads.

k. Socioeconomic

Alternative B is expensive in terms of direct costs, due to large timber and road construction programs. The returns are also fairly high because low objectives for nonmarket resources allow for fairly efficient timber harvest. Annual expenditures in the first decade are $9.2 million, or 39 percent above the present level. Annual receipts are $3.4 million, or 113 percent above present receipts. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $7.3 million.

Costs discounted over 150 years are $233 million, and benefits are $376 million, so the present net value of the Forest is $143 million. It isn't higher due to the objective to harvest 51 MMBF annually in the first decade. Alternative B will increase the local jobs provided by Forest outputs 25 percent above the 1980 level, due to high levels of timber harvest and Forest expenditures.

l. Utility Transportation Corridors

Corridor segments R27 across the Sapphire mountains and R29 along Highway 93 will be in land designations which provide for roading and development. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

3. Alternative C--Market Emphasis with Response to Nonmarket Issues that can be Achieved at Little Cost

This alternative provides a mix of resource outputs, with emphasis on timber outputs, but addresses those wilderness, unroaded recreation, visual quality, and elk habitat issues which can be achieved with minimal effect on market outputs.

a. Roadless Area

Of the 405,000 roadless acres, about 24 percent is recommended for wilderness; and 27 percent would be managed for roadless semiprimitive recreation, including portions of the North Big Hole, Selway-Bitterroot, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain roadless areas. About 49 percent would be roaded and developed.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 53 percent primitive, 8 percent semiprimitive motorized, and 39 percent roaded. The areas managed for semiprimitive recreation include four relatively large, high elevation parcels which have diverse scenery, vegetation, wildlife, geology, lakes and other attractions. Current recreation use is moderate to high in these areas.

A low level of maintenance is provided for campgrounds and trails. No expansion or new development is planned.

c. Wilderness

Approximately 98,000 acres are recommended for wilderness including Swift Creek, Needle Creek, and portions of the Selway-Bitterroot, Sapphire, and Blue Joint roadless areas. These areas have moderate to high wilderness attributes, public support for wilderness but to a lesser degree than in Alternative B, and low effect on market outputs.

d. Visual Quality

A high level of visual quality is maintained adjacent to residential areas, and a moderate level in the foreground viewed from existing and potentially major travel corridors. Management activities here may be evident but subordinate to characteristic landscape patterns. Elsewhere, timber harvest and roads will dominate the landscape.

Visual quality objectives outside existing wilderness are preservation on 12 percent of the area (recommended for wilderness), partial retention on 12 percent (near residential areas and travel corridors), and modification or maximum modification on 62 percent. The remaining 14 percent (117,000 acres) is unroaded area mostly not suitable for timber production. These lands will be managed for semiprimitive recreation opportunities and retention visual quality, unless accessed for mineral exploration and development.

e. Elk and Old Growth

Cover/forage ratios will be maintained or improved on the best quality winter range, and some elk security areas will remain roadless to maintain hunting opportunities. Winter forage production increases to about 20 percent above the current level. A moderate road closure program will be implemented to limit hunter access and maintain hunting season length. More than five percent old growth is maintained as a result of soil, water, and visual constraints but there is a moderate reduction of old growth over time.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due mostly to sedimentation from roads. Fish habitat improvement could reduce losses by about 20 percent during the period of high road development in decades 2 and 3.

g. Range

The current livestock use level will be maintained. Forage supply exceeds expected demand in the early decades.

h. Timber

The objective is to maintain a high level of timber production on a compact land base by removing narrow and isolated parcels from the timber base. Approximately 88 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 49 MMBF/year is 63 percent above the 1976 to 1985 sold level. Projected outputs increase to the sustained yield capacity of 52 MMBF/year in decade 4. RPA targets are exceeded in all decades except decade 3.

Clearcut, shelterwood, and selection harvest systems are 72, 27, and 1 percent respectively of the area harvested in early decades. Lodgepole pine accounts for 9 percent of the allowable sale quantity in decade 1, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 22 percent more timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 80 percent of all lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 52 percent of these lands, special mitigation or conditions would be required on 46 percent, and 2 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein.

Special stipulations are used whenever the leased area has surface resource values needing special protection to meet the alternative management objectives.

j. Road System

Approximately 2,300 miles of road are needed to complete the system. Annual road construction in decade 1 is 34 miles, with 11 miles of capital investment roads.

k. Socioeconomic

Alternative C is expensive in terms of direct costs, due to timber and road construction programs and recreation management. The returns are also fairly high, because the low nonmarket resource objectives allow for fairly efficient timber harvest. Annual expenditures in the first decade are $9.1 million, or 38 percent above the current level. Annual receipts are $3.5 million, or 119 percent above the present level. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $7.4 million.

Costs discounted over 150 years are $228 million, and benefits are $353 million, so the present net value of the Forest is $125 million. The primary reasons it isn't higher are the harvest of 49 MMBF of timber annually in the first decade, dispersal of harvest activities to meet visual quality objectives, preclusion of timber harvest for a moderate amount of roadless/wilderness management, and provision of a moderate level of recreation management. Alternative C will increase the local jobs provided by Forest outputs 21 percent above the 1980 level, due to high levels of timber harvest and Forest expenditures.

l. Utility Transportation Corridors

Corridor segment R29 along Highway 93 will be in land designations which provide for roading and development. Segment R27 through the Sapphire Mountains is partially blocked by a wilderness recommendation and constrained by a roadless semiprimitive recreation designation, but a window is provided through Moose Creek near Frogpond Basin. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

4. Alternative E--Moderate Response to all Market and Nonmarket Outputs

This alternative was designed to resolve major issues and management concerns with a mix of market and nonmarket uses and outputs. Emphasis is on roadless recreation, wilderness, elk habitat, water quality, fisheries, visual quality, and timber issues.

a. Roadless Area

About 19 percent of the 405,000 acres of roadless area is recommended for wilderness; 49 percent will be managed for roadless semiprimitive recreation; 1 percent will be unroaded but available for timber management; and 32 percent will be roaded and developed. Parts of the North Big Hole, Selway-Bitterroot, Sleeping Child, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain areas are managed for roadless recreation.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 52 percent primitive, 13 percent semiprimitive motorized, and 35 percent roaded. Areas managed for semiprimitive recreation include six larger parcels which have a diversity of scenery, vegetation, wildlife, geology, lakes, and other attractions. Current recreation use in these areas is moderate to high.

A moderate level of maintenance is provided for campgrounds and trails. Expansion of recreation facilities at Lake Como is planned. About 25 percent of existing trails will be reconstructed over 25 years to minimize boggy sections, tread erosion, and safety problems.

c. Wilderness

Approximately 77,000 acres are recommended for wilderness, including portions of the Selway-Bitterroot and Blue Joint roadless areas. These areas have very high wilderness attributes, longstanding support for wilderness, good topographic boundaries, and low effect on market outputs.

d. Visual Quality

A high level of visual quality is maintained in the foreground and middleground near residential areas and fisheries streams. Management activities will not be evident on unroaded land, major wilderness access routes, and fisheries streams. Activities will be evident, but subordinate to characteristic landscape patterns, on roaded areas on the Bitterroot Mountain face. A moderate level of visual quality will be maintained in the foreground and middleground viewed from existing major travel corridors where management activities will be evident but subordinate.

Visual quality objectives outside existing wilderness are: preservation on 9 percent of the area, which is the land recommended for wilderness; retention and partial retention on 15 percent (the land near residential areas, travel corridors, and fishing streams); and modification or maximum modification on 51 percent. The remaining 25 percent will be managed for semiprimitive recreation and retention visual quality, but will be available for mineral exploration.

e. Elk and Old Growth

Nearly optimal cover/forage ratios will be maintained on the best quality elk winter range. Hunting opportunities will be maintained by designating unroaded security areas for roadless management, and by closing some roads.

Elk winter forage production will increase slightly above the current level. More than five percent old growth is maintained as a result of soil, water, and visual constraints; however, there is a moderate decrease in old growth over time.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due to sedimentation from roads. Provisions for adequate woody material, to replace debris dams, prevent further losses. Fish habitat improvement could reduce losses about 40 percent.

g. Range

Current livestock use will be maintained in decade 1. Forage production slowly increases from slightly above the current use level to 16,000 AUM's in decade 5, and then declines.

h. Timber

Timber objectives are to: manage most lands having the capacity to produce more than 50 cubic feet per acre per year of wood fiber, for timber production; meet the first decade RPA target of 31 MMBF; achieve a species mix more nearly proportional to standing volume; provide for early entry and removal of lodgepole pine; minimize aerial yarding; and use shelterwood harvest on severe south- and west-facing sites that have been difficult to regenerate. Approximately 77 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 36 MMBF/year is 20 percent above the 1976 to 1985 sold level. Projected outputs increase to about 46 MMBF/year in the fourth decade, which approximates sustained yield capacity. Timber production is slightly below RPA targets.

Clearcut, shelterwood, and selection harvest are 52, 44, and 4 percent, respectively, of the acreage harvested in early decades. Lodgepole pine accounts for about 28 percent of the first decade allowable sale quantity, compared to 26 percent of standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 11 percent less timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 66 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 40 percent of these lands, special mitigation or conditions would be required on 56 percent, and 4 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values needing special protection to meet the alternative management objectives.

j. Road System

Approximately 2,000 miles of road are needed to complete the system. Annual road construction in decade 1 is 23 miles, with 8 miles of capital investment roads.

k. Socioeconomic

Alternative E is moderately expensive in terms of direct costs, due to timber and road construction programs and recreation management. Returns are moderate, because nonmarket resource objectives allow for moderately efficient timber harvest. Annual expenditures in the first decade are $8.6 million, or 30 percent above the present level. Annual receipts are $2.2 million, or 38 percent above the present level. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $6 million.

Over 150 years, discounted costs are $213 million and benefits are $309 million, so the present net value of the Forest is $96 million. The primary reasons it isn't higher are: the harvest of 36 MMBF of timber annually in the first decade; dispersal of harvest activities for moderate levels of visual quality; protection of wildlife habitat and riparian zones; preclusion of timber management from a moderate amount of roadless area; and provision of a moderate level of recreation management. The potential for local jobs dependent on Forest outputs will increase 8 percent below the 1980 level, due to a larger timber sales program.

1. Utility Transportation Corridor

Corridor segment R29 along Highway 93 will be in land designations which provide for roading and development. Segment R27 through the Sapphire Mountains is constrained by roadless semiprimitive recreation land designation. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

5. Alternative E1--Same Management Emphasis as Alternative E but with Departure From Nondeclining Timber Flow

This alternative was designed to depart from the nondeclining timber flow in Alternative E. All other objectives and constraints are the same as Alternative E.

a. Roadless Area

Same as Alternative E.

b. Recreation and Trails

Same as Alternative E.

c. Wilderness

Same as Alternative E.

d. Visual Quality

Same as Alternative E.

e. Elk and Old Growth

Cover/forage on winter range, and hunting opportunities, are the same as Alternative E. There is a rapid decrease in old growth, but more than five percent is maintained as a result of soil, water, and visual constraints.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 25 percent by the end of decade 1, due to sedimentation from roads. Populations then recover to and remain about 15 percent below current levels, due to provisions for adequate woody material to maintain debris dams. Fish habitat improvement could reduce losses by about 25 percent during the period of high road development in decades 1 and 2.

g. Range

Same as Alternative E.

h. Timber

Timber harvest deviates from nondeclining flow, and first decade volume is maximized. Thereafter, timber outputs are limited to a 25 percent change from this level. The primary purpose is to determine whether the departure will: better meet RPA targets; reduce the potential for loss from a mountain pine beetle infestation; improve the distribution of timber age classes; and increase or stabilize local wood products employment.

The first decade allowable sale quantity of 44 MMBF/year is 46 percent above the 1976 to 1985 sold level. Outputs decline to about 35 MMBF/year in the next two decades, then increase and decline significantly on a 60-year cycle. Outputs exceed RPA targets in decade 1, but are significantly below targets in the remaining four decades. Lodgepole pine accounts for 35 percent of the first decade allowable sale quantity, compared to 26 percent of standing inventory. There is no significant difference in age class distribution between this alternative and Alternative E.

Assuming all the timber volume offered is sold, the alternative provides about 9 percent more timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Same as Alternative E.

j. Road System

Approximately 2,100 miles of road are needed to complete the system. Annual road construction in decade 1 is 31 miles, with 10 miles of capital investment roads.

k. Socioeconomic

Alternative E1 is expensive in terms of direct costs, due to large timber and road construction programs and moderate recreation management. Returns are moderate because nonmarket resource objectives allow for moderately efficient timber harvest. Annual expenditures in the first decade are $9.9 million, or 50 percent above the present level. Annual returns are $2.2 million, or 38 percent above the present level.

When assigned values for recreation and livestock grazing are included, total annual benefits in the first decade are $6.1 million.

Over 150 years, discounted costs are $221 million and benefits are $306 million, so the present net value of the Forest is $85 million. The primary reasons it isn't higher are: the harvest of 44 MMBF annually in the first decade; dispersal of harvest activities for moderate levels of visual quality and wildlife habitat, and high level of riparian zone protection; preclusion of timber management from a moderate acreage of roadless areas; and provision of a moderate level of recreation management. The first decade potential for local jobs dependent on Forest outputs will increase 20 percent above the 1980 level, because timber harvest is slightly higher than 1980.

1. Utility Transportation Corridors

Same as Alternative E.

6. Alternative E2 (Preferred Alternative)--Moderate Levels of all Market and Nonmarket Outputs

This alternative is similar to E, the proposed action displayed in the DEIS. It responds to fish, water quality, timber supply, and budgetary issues or management concerns that surfaced or were reinforced in comments received on the DEIS. It also was designed to resolve major issues with a mix of market and nonmarket uses and outputs. Emphasis remains on roadless recreation, wilderness, elk habitat, water quality, fisheries, visual quality and timber issues. Changes give additional emphasis to minimizing adverse effects on fish populations. Several less significant changes are incorporated in the following discussion.

a. Roadless Area

About 19 percent of the 405,000 acres of roadless area is recommended for wilderness; 53 percent will be managed for roadless semiprimitive recreation; and 26 percent will be roaded and developed. Parts of the North Big Hole, Selway-Bitterroot, Sleeping Child, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain areas are managed for roadless recreation.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 52 percent primitive, 9 percent semiprimitive motorized, and 56 percent roaded. Areas managed for semiprimitive recreation include six larger parcels which have a diversity of scenery, vegetation, wildlife, geology, lakes, and other attractions. Current recreation use in these areas is moderate to high.

A moderate level of maintenance is provided for campgrounds and trails. Expansion of recreation facilities at Lake Como is planned. About 25 percent of existing trails will be reconstructed over 25 years to minimize boggy sections, tread erosion, and safety problems.

c. Wilderness

Approximately 77,000 acres are recommended for wilderness, including portions of the Selway-Bitterroot and Blue Joint roadless areas. These areas have high wilderness attributes, longstanding support for wilderness, good topographic boundaries, and low effect on market outputs.

d. Visual Quality

A high level of visual quality is maintained in the foreground and middleground near residential areas and fisheries streams. Management activities will not be evident on unroaded land, major wilderness access routes, and fisheries streams. They will be evident, but subordinate to characteristic landscape patterns, on roaded areas on the Bitterroot Mountain face. A moderate level of visual quality will be maintained in the foreground and middleground viewed from existing major travel corridors and in the foreground from secondary travel corridors where management activities will be evident but subordinate.

Visual quality objectives outside existing wilderness are: preservation on 9 percent of the area which is the land recommended for wilderness; retention on the 4 percent which will remain unroaded, except where necessary to provide access to adjoining suitable timberland; retention and partial retention on 19 percent (the land near residential areas, travel corridors, and fishery/ nonfishery streams); and modification or maximum modification on 39 percent. The remaining 29 percent will be managed for semiprimitive recreation and retention visual quality, but will be available for mineral exploration.

e. Elk and Old Growth

Except for the more stringent visual constraints adjacent to travel corridors, optimal cover/forage ratios will be maintained on elk winter range. Hunting opportunities will be maintained by designating unroaded security areas for roadless management, and by closing some roads.

Elk winter forage production will increase slightly above the current level. More than five percent old growth is maintained as a result of soil, water, and visual constraints, but there is a moderate decrease in old growth over time.

f. Fish and Water Quality

Catchable trout populations are projected to remain at current levels, because management activities will be conducted to minimize sediment production and maintain existing habitat potential. There are provisions for adequate woody material to replace debris dams.

g. Range

Current livestock use will be maintained in decade 1. Forage production slowly increases from slightly below the current permit level to 14,500 AUM's in decade 5, and then declines.

h. Timber

The objectives are to: manage for timber production most land having the capacity to produce 50 or more cubic feet per acre per year of wood fiber; maintain the 1976 to 1985 sold level; achieve a species mix more nearly proportional to standing volume; provide for early entry and removal of lodgepole pine; and use shelterwood harvest on severe south- and west-facing sites that have been difficult to regenerate. Approximately 66 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable

sale quantity (ASQ) of 33 MMBF/year is 10 percent above the 1976 to 1985 sold level. Projected outputs increase to about 42 MMBF/year in the fourth decade, which approximates sustained yield capacity. Timber production is below RPA targets.

Clearcut, shelterwood, and selection harvest are 60, 36, and 4 percent, respectively, of the acreage harvested in early decades. Lodgepole pine accounts for about 26 percent of the first decade allowable sale quantity, which is the percent of lodgepole pine in the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 18 percent less timber volume than the stated need of mills in the vicinity of the Forest, and equals the historical purchases from the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 64 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 28 percent of these lands, special mitigation or conditions would be required on 68 percent, and 4 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 1,800 miles of road are needed to complete the system. Annual road construction in decade 1 is 25 miles, with 8 miles of capital investment roads.

k. Socioeconomic

Alternative E2 (Preferred Alternative) is comparable to the least expensive alternatives in terms of total costs. This alternative has relatively low road costs and hence low timber costs. In all other cost categories, Alternative E2 is very comparable to other alternatives. Returns are similar to those of Alternative E, because nonmarket resource objectives allow for moderately efficient timber harvest. Annual expenditures in the first decade are estimated to be $7.5 million, or approximately 14 percent above the present level. Annual returns are $2.4 million, or 50 percent above the current level. Adding the assigned values for grazing and recreation brings the total annual benefits in the first decade to $6.0 million.

Over 150 years, discounted costs are $191 million and benefits are $290 million, so the present net value of the Forest is $99 million. The primary reasons it isn't higher are: the harvest of 33 MMBF of timber annually in the first decade; protection of fishery and water resources; dispersal of harvest activities for relatively high levels of visual quality, wildlife habitat, and riparian zone protection; preclusion of timber management from a roadless area that is 15 percent larger than in Alternative E; and provision for a moderate level of recreation management. The potential for local jobs dependent on Forest outputs will decrease approximately one percent from the 1980 level.

1. Utility Transportation Corridors

Corridor segment R29 along Highway 93 will be in land designations which provide for roading and development. Segment R27 through the Sapphire Mountains is constrained by roadless semiprimitive recreation land designation. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

7. Alternative F--Current Program (No Action)

This alternative was designed to continue the current program according to existing management plans, policies, standards and guidelines; and provide resource outputs consistent with current budget levels. Because of budget constraints, some programs and services are at a reduced level.

a. Roadless Area

Of the 405,000 roadless acres, 12 percent are recommended for wilderness; 60 percent would be managed for roadless semiprimitive recreation; 9 percent are available for timber harvest but would remain unroaded; and 19 percent would be roaded and developed. Areas managed for roadless recreation include Blue Joint, Sapphire, and portions of North Big Hole, Selway-Bitterroot, Stony Mountain, and Allan Mountain roadless areas.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 50 percent primitive, 15 percent semiprimitive motorized, and 35 percent roaded. Semiprimitive recreation areas are dispersed across the Forest and contain a diversity of scenery, vegetation, wildlife, geology, lakes, and other attractions. Current recreation use in these areas is moderate to high.

Campgrounds in competition with the private sector would be closed, or turned over to private persons for operation and maintenance. Other lightly used campgrounds would also be closed. Major mountain trails will be cleared annually; most others would be cleared on a 2- or 3-year schedule or by users. Lightly used trails would be abandoned. No new facilities are planned.

Wilderness and dispersed area administration would be at a very low level. Visitor contacts, user education, clean-up, and enforcement would focus on the most heavily used areas.

c. Wilderness

Approximately 50,000 acres are recommended for wilderness including Swift Creek, Needle Creek, and part of the Selway-Bitterroot roadless areas. Wilderness potential will be maintained in MWSA areas until Congress acts on them.

d. Visual Quality

A high level of visual quality is maintained adjacent to residential areas, and in the foreground and middleground viewed from major existing travel corridors. Management activities here are either not evident to the casual observer, or are evident but subordinate to characteristic landscape patterns. Elsewhere, timber harvest and roads will dominate the landscape.

Visual quality objectives outside existing wilderness are: preservation on 19 percent of the area (land recommended for wilderness, and MWSA areas); retention and partial retention on 18 percent of the area, the land near residential areas and travel corridors; and modification or maximum modification on 47 percent of the area. The remaining 16 percent will be managed for semiprimitive recreation and retention visual quality, but will be available for mineral exploration.

e. Elk and Old Growth

Big-game and old-growth objectives are essentially the same as for Alternative E, but a decrease in timber harvest results in slightly less winter forage and more cover.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due to sedimentation from roads. Provisions for adequate woody material to replace debris dams prevent further losses. Fish habitat improvement could reduce losses by about 40 percent.

g. Range

The objective is to provide for livestock use, consistent with objectives for elk winter range and visual quality. Forage production is slightly above existing use in the first decade.

h. Timber

The objective is to produce timber at a level consistent with objectives to resolve other resource issues, while maintaining nonmarket direction for Montana Wilderness Study Act areas. Approximately 77 percent of tentatively suitable timberland is managed for scheduled timber outputs.

The first decade allowable sale quantity of 33 MMBF/year is 10 percent above the 1976 to 1985 sold level. Projected outputs gradually increase to the sustained yield capacity of 40 MMBF/year in decade 10. Timber production is below RPA targets. Clearcut, shelterwood, and selection harvest are 41, 49, and 10 percent respectively, of the area harvested in early decades. Lodgepole pine accounts for 24 percent of the first decade allowable sale quantity, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 18 percent less timber volume than the stated need of mills in the vicinity of the Forest, but 10 percent more than the historical volume purchased from the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 60 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 36 percent of these lands, special mitigation or conditions would be required on 64 percent, and none are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 1,800 miles of road are needed to complete the system. Annual road construction in decade 1 is 23 miles, with 8 miles of capital investment roads.

k. Socioeconomic

Alternative F is inexpensive in terms of direct costs, because unit costs are reduced for general administration, road maintenance, and fire control as a result of an expenditure constraint, unique to this alternative, that maintained expenditures at levels experienced from 1980 to 1982. The returns are moderate, because the level of nonmarket resource objectives allows moderately efficient timber harvest. Annual expenditures in the first decade are $7.9 million, 20 percent above the present level. Annual returns are $1.5 million, or 6 percent below the present level. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $5.2 million.

Over 150 years, the discounted costs are $191 million and benefits are $294 million, so the present net value of the Forest is $103 million. The primary reasons for the foregone investment opportunity are: the harvest of 33 MMBF/year the first decade; dispersal of harvest activities for moderate levels of visual quality, wildlife habitat, and riparian zone protection; preclusion of timber management from roadless areas; and provision of a moderate level of recreation management. The potential for local jobs dependent on Forest outputs will increase slightly to 2 percent above the 1980 level, because the timber output is higher.

l. Utility Transportation Corridors

Same as Alternative E2.

8. Alternative G--Nonmarket Emphasis with Limited Market Outputs

This alternative provides a mix of resource uses and outputs that is moderately responsive to all major issues, but with emphasis on nonmarket values.

a. Roadless Area

Of the 405,000 roadless acres, 42 percent are recommended for wilderness; 24 percent will be managed for roadless semiprimitive recreation; 7 percent will remain unroaded but available for timber harvest; and 27 percent will be roaded and developed. Portions of the Selway-Bitterroot, Sleeping Child, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain areas will be managed for roadless recreation.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 58 percent primitive, 7 percent semiprimitive motorized, and 35 percent roaded.

A moderate level of maintenance is provided for campgrounds and trails. Expansion of recreation facilities at Lake Como and Larry Creek, and a new visitor center at Lost Trail Pass, are planned. Reconstruction of about 25 percent of existing trails is scheduled over 25 years to minimize boggy sections, tread erosion, and safety problems.

c. Wilderness

Approximately 172,000 acres are recommended for wilderness including Swift Creek, Needle Creek, and parts of the North Big Hole, Selway-Bitterroot, Sapphire, Stony Mountain, and Blue Joint areas. These areas have high wilderness attributes, public support for wilderness, reasonable boundaries, and low to moderate effect on market outputs.

d. Visual Quality

A high level of visual quality is maintained adjacent to residential areas, and in the foreground and middleground viewed from existing and potential major travel corridors. Also, a moderate level is maintained adjacent to other significant travel corridors, where management activities are either not evident to the casual observer, or are evident but subordinate to characteristic landscape patterns. Elsewhere, timber harvest and roads will be evident.

Visual quality objectives outside existing wilderness are: preservation on 20 percent of the area (the land recommended for wilderness); retention and partial retention on 25 percent of the area (the land near residential areas and travel corridors); and modification or maximum modification on 42 percent. The remaining 13 percent will be managed for semiprimitive recreation opportunities and retention visual quality, but will be available for mineral exploration.

e. Elk and Old Growth

Roadless security areas will be well-distributed over the high-use summer/fall ranges. Adequate cover is provided on winter ranges, and longer timber rotations allow a slight increase in winter forage that is maintained over time. Old growth is maintained at a high level.

f. Fish and Water Quality

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due to sedimentation from roads. Provisions for adequate woody material to replace debris dams prevent further loss. Fish habitat improvement could reduce losses by about 40 percent.

g. Range

Forage production gradually increases from about 12,000 AUM's to about 16,000 AUM's in decade 5, then gradually declines. Forage production is somewhat above expected demand in the early decades.

h. Timber

The objective is to maintain a moderate level of timber production, consistent with emphasis on nonmarket issues. Approximately 79 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 35 MMBF/year is 16 percent above the 1976 to 1985 sold level. Projected outputs gradually increase to the sustained yield capacity of 44 MMBF/year in decade 10. Timber production is below RPA targets. Clearcut, shelterwood, and selection harvest are 58, 41, and one percent respectively of the acreage harvested in early decades. Lodgepole pine accounts for 13 percent of the first decade allowable sale quantity, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 13 percent less timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 69 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 35 percent of these lands, special mitigation or conditions would be required on 53 percent, and 12 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 2,000 miles of road are needed to complete the system. Annual road construction in decade 1 is 24 miles, with 8 miles of capital investment roads.

k. Socioeconomic

Alternative G is moderately expensive in terms of direct costs, due to timber and road construction programs and moderate recreation management. Returns are moderate, because nonmarket resource objectives allow for moderately efficient timber harvest activities. Annual expenditures in the first decade are $8.5 million, or 9 percent above the present level. Annual returns are $2.3 million, or 44 percent above the present level. When assigned values for recreation and livestock grazing are included, total annual benefits in the first decade are $6.2 million.

Over 150 years, discounted costs are $214 million and benefits are $305 million, so the present net value of the Forest is $91 million. The primary reasons it isn't higher are: the harvest of 35 MMBF/year the first decade; dispersal of harvest activities for high levels of visual quality, wildlife habitat, and riparian zone protection; preclusion of timber management from roadless areas; and provision of a high level of recreation management. The potential for local jobs dependent on Forest outputs will increase 5 percent from the 1980 level, because the timber output is slightly higher.

l. Utility Transportation Corridors

Corridor segment R29 along Highway 93 will be in land designations which provide for roading and development. Segment R27 through the Sapphire Mountains will be blocked by the Sapphire wilderness recommendation. Segment R28 has been effectively blocked by the Central Idaho Wilderness Act management requirements for the Nez Perce Trail road corridor.

9. Alternative H--Market Emphasis on Roaded Lands and Significant Wilderness Recommendation

This alternative will maintain or increase market outputs from currently roaded lands, and emphasize nonmarket issues on roadless areas. Nearly all roadless acreage will remain unroaded, with most recommended for wilderness.

a. Roadless Area

Of the 405,000 roadless acres, 73 percent are recommended for wilderness; 16 percent will be managed for roadless semiprimitive recreation; and 11 percent will be roaded and developed. Areas managed for roadless recreation include parts of the North Big Hole, Selway-Bitterroot, Sleeping Child, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain areas.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum would be 66 percent primitive, 4 percent semiprimitive motorized, and 30 percent roaded.

A low level of maintenance is provided for campgrounds and trails in the developed portions of the Forest. No expansion or new development is planned. A moderate level of trail maintenance is provided in the roadless portion, including measures to minimize boggy sections, tread erosion, and safety problems. No new construction is planned.

c. **Wilderness**

Approximately 298,000 acres are recommended for wilderness, including Swift Creek, Needle Creek, and portions of North Big Hole, Selway-Bitterroot, Sleeping Child, Sapphire, Stony Mountain, Blue Joint, and Allan Mountain areas. These lands have reasonable topographic boundaries, moderate or higher wilderness attributes, and public support for wilderness.

d. **Visual Quality**

A high level of visual quality is maintained adjacent to residential areas, and a moderate level in the foreground viewed from existing and potential major travel corridors. Management activities in these areas may be evident, but are subordinate to characteristic landscape patterns. Elsewhere, timber harvest and roads will be evident.

Visual quality objectives outside existing wilderness are: preservation on 35 percent of the area, the land recommended for wilderness; partial retention on 10 percent of the area, the land near residential areas and travel corridors; and modification or maximum modification on 47 percent of the area. The remaining 8 percent is unroaded area not suitable for timber production, but available for mineral exploration and development. These lands will be managed for semi-primitive recreation opportunities and retention visual quality, unless accessed for minerals.

e. **Elk and Old Growth**

All unroaded security areas remain roadless. Intensive timber management on currently roaded areas, where most winter range is located, results in relatively high forage production. Cover on winter range will be reduced to marginal levels, and roads will be closed to maintain some security for elk in these areas. The roadless areas and road closures will maintain hunting opportunities. Old growth will decrease slightly but remain at a high level.

f. **Fish and Water Quality**

Catchable trout populations are projected to decrease 15 percent by the end of decade 1, due to sedimentation from roads. Provisions for adequate woody material to replace debris dams prevent further loss. Fish habitat improvement could reduce losses by about 40 percent.

g. **Range**

Forage production remains relatively stable for several decades. It then increases gradually to slightly above current use. Forage production parallels expected use in the early decades.

h. **Timber**

The objective is to maintain a high level of timber production from currently roaded and developed lands. Approximately 62 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 28 MMBF/year is 7 percent less than the 1976-85 sold level. Projected outputs increase to the sustained yield capacity of 40 MMBF/year in

decade 10. Timber production is significantly below RPA targets. Clearcut and shelterwood harvest are 73 and 27 percent respectively, of the acreage harvested in early decades. Lodgepole pine accounts for 24 percent of the first decade allowable sale quantity, compared to 26 percent of the standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 31 percent less timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 58 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 28 percent of these lands, special mitigation or conditions would be required on 37 percent, and 35 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 1,700 miles of road are needed to complete the system. Annual road construction for decade 1 is 19 miles, with 6 miles of capital investment roads.

k. Socioeconomic

Alternative H is inexpensive in terms of direct costs, due to small timber and road construction programs. However, returns are low because of nonmarket resource objectives on the roadless portion of the Forest. Annual expenditures in the first decade are $7.9 million, or 20 percent above the present level. Annual returns are $2.0 million, or 25 percent above the present level. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $5.9 million.

Over 150 years, discounted costs are $197 million and benefits are $300 million, so the present net value of the Forest is $103 million. The primary reasons it isn't higher are: the harvest of 28 MMBF/year the first decade; dispersal of harvest activities to meet low levels of visual quality, wildlife habitat, and riparian zone protection; preclusion of timber management from all roadless areas; and provision of a high level of recreation management on the roadless/wilderness area. The potential for local jobs dependent on Forest outputs will decrease 4 percent from the 1980 level, because the timber output is lower.

1. Utility Transportation Corridors

Same as Alternative G.

10. Alternative J--Nonmarket Emphasis

This alternative emphasizes nonmarket uses, especially wilderness, visual quality, wildlife, fish habitat, and water quality. Timber, livestock grazing, and mineral opportunities are consistent with these objectives.

a. Roadless Area

About 99 percent of the 405,000 acres of roadless land is recommended for wilderness. Areas along the boundaries which have roads and timber harvest, or which improve the boundary are excluded.

b. Recreation and Trails

Forest-wide, the recreation opportunity spectrum is 72 percent primitive and 28 percent roaded.

A moderate level of maintenance is provided for campgrounds and trails. Expansion of recreation facilities at Lake Como and Larry Creek, and a visitor center at Lost Trail are planned. Reconstruction of about 25 percent of existing trails is scheduled over 12 years to minimize boggy sections, tread erosion, and safety problems.

c. Wilderness

Approximately 402,000 acres are recommended for wilderness, with the objective of maximizing wilderness.

d. Visual Quality

A very high level of visual quality is maintained adjacent to residential areas, streams, and the foreground and middleground viewed from all travel corridors. Management activities here are not evident to the casual observer. Elsewhere, timber harvest and roads may be subordinate to or dominate the landscape, but are dispersed over time to mitigate the impact.

Visual quality objectives outside existing wilderness are: preservation on 46 percent of the area, the land recommended for wilderness; retention and partial retention on 33 percent of the area, the land near residential and travel areas and streams; and modification on 21 percent of the area.

e. Elk and Old Growth

All unroaded security areas are maintained. Forage production on winter range is low, but old growth is maintained at a high level. Roadless areas, road closures, and cover will maintain or increase hunting opportunities.

f. Fish and Water Quality

Catchable trout populations are projected to remain at current levels due to reduced road development, corresponding reductions in sediment, and provisions for adequate woody material to replace debris dams. Fish habitat improvement could increase populations above the current level.

g. Range

Forage production drops to 11,000 AUM's or slightly less than current use, and generally remains at that level. Forage supply is below expected future demand.

h. Timber

The objective is to maintain timber production, consistent with the emphasis on nonmarket values. Approximately 54 percent of tentatively suitable timberland is managed for scheduled timber outputs. The first decade allowable sale quantity of 18 MMBF/year is 40 percent below the 1976 to 1985 sold level. Projected outputs gradually increase to the sustained yield capacity of 30 MMBF/year in decade 12. Timber production is much below RPA targets. Clearcut and shelterwood harvest are 48 and 52 percent respectively, of the area harvested in early decades. Lodgepole pine accounts for 10 percent of the first decade allowable sale quantity, compared to 26 percent of standing inventory.

Assuming all the timber volume offered is sold, the alternative provides about 55 percent less timber volume than the stated need of mills in the vicinity of the Forest. A detailed analysis of timber supply is presented in the Comparison of Alternatives section of this Chapter.

i. Minerals and Energy Resources

Over time, the road system constructed primarily for timber purposes will provide access near 59 percent of the lands having high to very high hardrock potential, outside existing wilderness. Standard plans of operation would apply to 25 percent of these lands, special mitigation or conditions would be required on 34 percent, and 41 percent are recommended for wilderness.

Existing oil and gas leases have been processed under the guidelines of the Environmental Assessment on Oil and Gas Leasing on Nonwilderness Land, which is incorporated by reference in this EIS. New leases and subsequent lease reissuance will undergo additional analysis required by NEPA, tiering to this EIS through referencing the information presented herein. Special stipulations are used whenever the leased area has surface resource values that need special protection to meet the alternative management objectives.

j. Road System

Approximately 1,000 miles of road are needed to complete the system. Total annual road construction in decade 1 is 12 miles, with 4 miles of capital investment road.

k. Socioeconomic

Alternative J is inexpensive in terms of direct costs, due to small timber and road construction programs. However, returns are low because nonmarket resource objectives cause low timber harvest levels. Annual expenditures in the first decade are $7.4 million, or 12 percent above the present level. Annual returns are $1.3 million, or 19 percent below the present level. When assigned values for recreation and livestock grazing are included, the total annual benefits in the first decade are $5.2 million.

Over 150 years, discounted costs are $185 million and benefits are $247 million, so the present net value of the Forest is $62 million. The primary reasons it isn't higher are: the harvest of 18 MMBF annually in the first decade; dispersal of harvest activities for high levels of visual quality and wildlife habitat; preclusion of timber management from all roadless and riparian zones; and provision of a moderate level of recreation management. The potential for local jobs dependent on Forest outputs will decrease 16 percent from the 1980 level, because the timber output is lower.

l. Utility Transportation Corridors

Same as Alternative G.

D. Comparison of Alternatives

The discussion in this section focuses on how major resource outputs and economic effects vary among alternatives. Environmental effects from Chapter IV are included when needed for understanding of the alternatives being considered and their differences. The purpose of this section is to aid decision-makers in determining which alternative maximizes net public benefits. Table II-21 summarizes how issues are addressed in each alternative. Total output for each alternative and selected benchmarks are shown in Table II-26, and outputs that vary significantly among alternatives are discussed.

In many cases tabular or graphic displays are presented by decade. Decade 1 is the plan period. Other decades (projections) are shown when needed to disclose long-term implications of continuing the alternative.

Changes between the Draft and Final EIS include:

Alternatives - A new preferred alternative, Alternative E2 has been added.

Timber - A timber supply and demand analysis for the Forest's zone of influence has been added.

- Timber volumes have been adjusted to Regional Guide utilization standards.

- Economic sensitivity testing of timber values, appreciation rates and first decade volumes.

Roadless Inventory - The Selway-Bitterroot roadless area was enlarged to include advertised timber sale areas that were not sold.

1. Recreation

a. Dispersed Recreation

All alternatives will provide opportunities for dispersed recreation outside wilderness in excess of expected use (Figures II-2 and II-3). However, Alternatives A, B, H and J provide little or no opportunity for semiprimitive recreation outside of wilderness areas. Recreation use of existing wilderness areas is projected to exceed capacity within 50 years in all alternatives (Figure II-4). Current and anticipated use varies mainly by population so there is little difference in total use among alternatives. Only minor shifts in use occur between semiprimitive and wilderness use (Table II-26).

Discussion of the Recreation Opportunity Spectrum (ROS) and categories is found in Chapter III. Figure II-10 compares ROS settings among alternatives: e.g., primitive (wilderness), semiprimitive (roadless) and roaded natural (roaded). Table II-26 shows current and projected use estimates for these three categories, and elk hunting potential, for each alternative.

b. Developed Recreation

The developed sites have an existing capacity of 223,100 recreation visitor days per year. All alternatives meet total projected use without additional capacity until about 2025, but some sites would be overused due to use patterns. Day use facilities at the Lake Como site, which include picnic and swimming areas and a boat ramp, occasionally exceed capacity now, particularly on hot summer weekends. Most other sites are operating at far less than capacity. Alternatives E, E1, and E2 (Preferred Alternative) include improvement of the day use site at Lake Como in the first decade, and expansion of the campground in the second decade. Alternatives G and J provide for additional site capacity at Lake Como and Larry Creek.

2. Roadless Area

a. Inventory Adjustment

The combined RARE II and unit plan roadless inventory totaled 597,600 acres in 1979. Since 1979, wilderness designation, nonwilderness activities and other adjustments have occurred in all areas resulting in reduction and additions to the roadless inventory (Table II-2). See Appendix C for details.

Table II-2
Roadless Area Inventory Adjustments

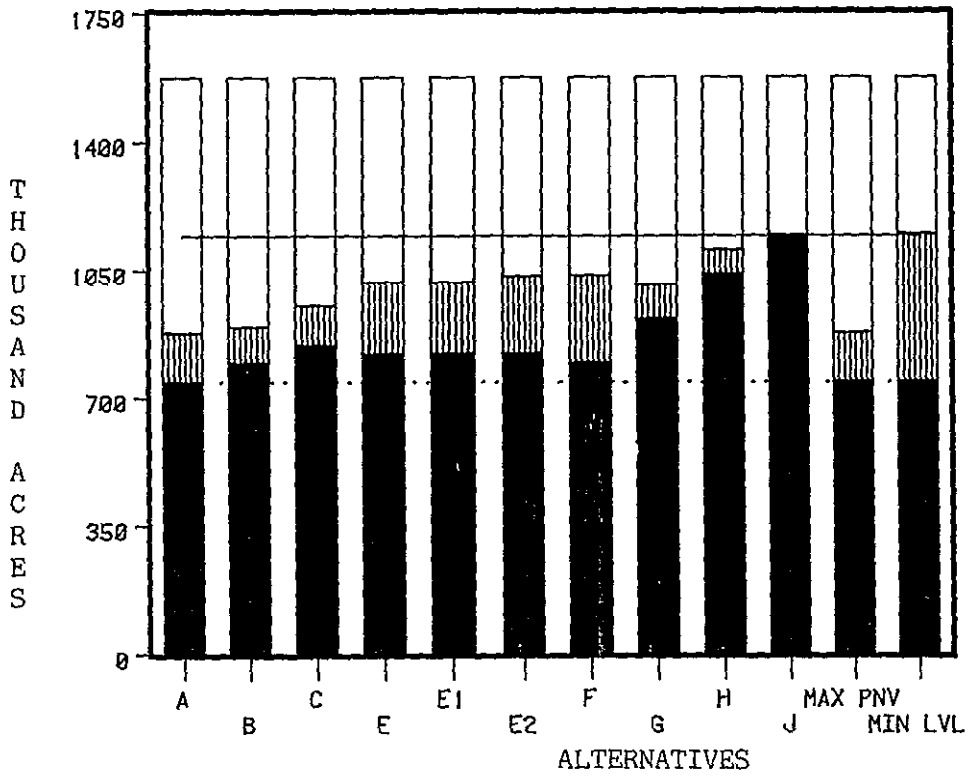
Roadless Area	Forest	Area Number	Net Acres	Acreage Adjustment Category 1	2	3	4	5	Revised Acres
Allan Mountain	Bitterroot	01946	111,200	0	-9,549	0	+635	0	102,286
	Salmon	13946	46,670	0	-691	0	+5,002	0	50,981
Blue Joint	Bitterroot	01941	126,500	-65,100	0	0	+3,970	0	65,370
	Salmon	13941	19,905	-19,415	0	0	0	0	490
Lolo Creek	Bitterroot	01805	0	0	0	+587	0	0	587
	Lolo	01805	14,900	0	-240	0	0	0	14,660
Needle Creek	Bitterroot	01066	1,100	0	0	0	-15	0	1085
North Big Hole	Bitterroot	01001	3,800	0	-480	0	+371	0	3691
	Beaverhead	01001	37,810	0	-9,328	+23,719	+687	0	53,088
Sapphire	Bitterroot	01421	42,300	0	0	0	+1,816	0	44,116
	Deerlodge	01421	56,515	0	0	+17,221	-1,872	0	72,414
Selway-Bitter-root	Bitterrroot	01067	221,700	-105,600	-4,238	+120	+3,169	0	115,151
	Nez Perce	01067	0	0	0	+600	0	0	600
Sleeping Child	Bitterroot	X1074	23,600	0	-2,400	0	+223	0	21,423
Stony Mountain	Bitterroot	01808	49,800	0	-8,188	+800	+1,308	0	43,720
	Deerlodge & Lolo	01808	57,520	0	0	0	+2,026	0	59,546
Swift Creek	Bitterroot	01065	700	0	0	0	+44	0	744
Tolan Creek	Bitterroot	X1070	9400	0	-6,187	+3,875	0	0	7088
Black Bear	Bitterroot	X1075	7,500	0	-3,400	0	0	-4,100	0
Total	Bitterroot		597,600	-170,700	-34,442	+5,382	+11,521	-4,100	405,261
	Adjacent Forest		233,320	-19,415	-10,259	+42,091	+6,043	0	251,779

* Category 1 Added to Wilderness (P.L. 96-312)
Category 2. Developed or under contract
Category 3. Land added to inventory
Category 4. Refined acreage calculation
Category 5 Remaining area does not meet roadless criteria

b. Wilderness Recommendations

All alternatives have 743,082 acres of existing wilderness and 429,540 acres of existing roaded area. Thus there are 405,261 roadless acres available for roaded, semiprimitive, or wilderness management (Figure II-10).

Figure II-10
Wilderness, Roadless and Roaded Management



The area between the two horizontal lines is currently roadless.

All alternatives except A include recommendations for additions to existing wilderness (Table II-3). Alternative J recommends nearly all 405,261 acres for wilderness. Slight boundary adjustments are planned in J to assure they will be locatable and manageable, and eliminate roads and harvested areas in Montana Wilderness Study Act areas. Alternatives B and F include recommendations for adding the RARE II areas recommended for wilderness to the Selway-Bitterroot and Anaconda-Pintler Wildernesses.

Alternatives C, E, E1, E2, and G recommend from 76,805 to 171,720 acres for wilderness. Alternative H recommends a significant portion of the roadless area for wilderness and emphasizes timber outputs on currently roaded land to help meet current outputs.

Wilderness recommendations for the roadless areas, including the portions on adjacent National Forests, are shown in Table II-3.

Table II-3
Wilderness Recommendations for Roadless Areas
(thousand acres and percent total)

Roadless Area	Forest	Alternatives									
		A	B	C	E	E1	E2	F	G	H	J
Allan	Bitterroot	0	0	0	0	0	0	0	0	71.4	101.3
Mountain	Salmon	0	0	8.4	8.4	0	0	0	36.6	8.4	51.0
	% of area	0	5	5	0	0	0	0	24	52	99
Blue	Bitteroot	0	0	16.8	28.5	28.5	28.5	0	44.2	59.1	64.7
Joint	Salmon	0	0	0	0	0	0	0	.5	.5	.5
	% of area	0	0	25	43	43	43	0	68	90	99
Lolo	Lolo	0	0	0	0	0	4.0	0	14.7	14.7	14.7
Creek	Bitterrroot	0	0	0	0	0	0	0	0	0	0.6
	% of area	0	0	0	0	0	26	0	97	97	100
Needle	Bitterroot	0	1.1	1.1	0	0	0	1.1	1.1	1.1	1.1
Creek	% of area	0	100	100	0	0	0	100	100	100	100
North	Beaverhead	0	0	6.6	6.6	6.6	6.6	6.6	30.9	49.2	53.1
Big Hole	Bitterroot	0	0	0	0	0	0	0	3.6	0	3.1
	% of area	0	0	12	12	12	12	12	61	87	99
Sapphire	Bitterroot	0	0	2.5	0	0	0	0	20.4	36.0	43.7
	Deerlodge	0	0	7.9	0	0	0	0	34.0	56.5	72.4
	% of area	0	0	9	0	0	0	0	47	79	100
Selway-	Bitterroot	0	48.3	76.5	48.3	48.3	48.3	48.3	78.4	90.8	115.1
Bitterroot	Nez Perce	0	.6	.6	0	0	.6	0	.6	.6	.6
	% of area	0	44	70	44	44	44	44	72	83	100
Sleeping	Bitterroot	0	0	0	0	0	0	0	0	0	21.4
Child	% of area	0	0	0	0	0	0	0	0	0	100
Stony	Bitterroot	0	0	0	0	0	0	0	23.3	37.2	43.3
Mountain	Deerlodge	0	0	0	0	0	0	0	24.6	24.6	24.6
	Lolo	0	0	0	0	0	0	0	34.9	34.9	34.9
	% of area	0	0	0	0	0	0	0	80	94	100
Swift	Bitterroot	0	0.7	0.7	0	0	0	0.7	0.7	0.7	0.7
Creek	% of area	0	100	100	0	0	0	100	100	100	100
Tolan	Bitterroot	0	0	0	0	0	0	0	0	0	7.1
Creek	% of area	0	0	0	0	0	0	0	0	0	100
Total of	Bitterroot	0	50.1	97.6	76.8	76.8	76.8	50.1	171.7	296.3	402.1
all areas	Beaverhead	0	0	6.6	6.6	6.6	6.6	6.6	30.9	49.2	53.1
	Deerlodge	0	0	7.9	0	0	0	0	58.6	81.1	97.0
	Lolo	0	0	0	0	0	4.0	0	49.6	49.6	49.6
	Nez Perce	0	0.6	0.6	0	0	.6	0	0.6	0.6	0.6
	Salmon	0	8.4	8.4	0	0	0	0	37.1	8.9	51.5
Total		0	59.1	121.1	83.4	83.4	88.0	56.7	348.5	485.7	653.9
% of area		0	9	19	13	13	13	9	53	75	100

c. Roadless Area Management

Table II-4 shows roadless area management for each alternative by roaded, unroaded, semiprimitive recreation and wilderness categories of emphasis. Management prescriptions providing for roads have been grouped into one management emphasis, since roading forecloses future options for wilderness. Unroaded management emphasis precludes consideration for wilderness in the short-term, and semiprimitive recreation will maintain the wilderness option unless accessed for mineral development or to protect semiprimitive values.

Table II-4
Management Emphasis by Alternative for Roadless Area
(thousand acres)

	Alternatives									
	A	B	C	E	E1	E2	F	G	H	J
Nonwilderness	656 9	597.9	535.9	573.6	573 6	569 1	600 4	308 6	171.5	3 0
Roaded Emphasis	438.7	412.12	338.3	183.5	177 2	149 8	178 8	162 0	94 5	3 0
Bitterroot Forest	272.4	255 4	197 2	121 0	121.0	99 1	76 1	106 0	36 0	3 0
Contiguous Roadless Area										
Beaverhead Forest	36.4	36 4	24.4	20 6	20 6	20 1	28 0	19 1	3.0	0
Deerlodge Forest	47 8	47.8	44 1	22.8	16.5	11.5	9 0	22 5	12.9	0
Lolo Forest	30 0	30.0	30.0	10.4	10.4	10.4	26 4	0	0	0
Nez Perce Forest	0 6	0	0	0	0	0	0	0	0	0
Salmon Forest	51 5	42.6	42 6	8 7	8 7	8 7	39 3	14 4	42 6	0
Unroaded Emphasis	6.6	6.6	6 6	16.7	18 1	35 4	56 6	35.7	0 5	0
Bitterroot Forest	0	0	0	9 8	9 8	15.4	37 5	31 0	0	0
Contiguous Roadless Area										
Beaverhead Forest	0	0	0	0	0	9 4	0	0	0	0
Deerlodge Forest	6 6	6.6	6.6	6.9	8 3	10 6	6.9	4 7	0 5	0
Lolo Forest	0	0	0	0	0	0	0	0	0	0
Nez Perce Forest	0	0	0	0	0	0	0	0	0	0
Salmon Forest	0	0	0	0	0	0	12 2	0	0	10
Semiprimitive Recreation Emphasis	211.6	179 1	191 0	373 4	378 3	383 9	365 0	110 9	76 5	0
Bitterroot Forest	132.8	99.8	110.4	197 7	197.7	213 9	241 6	96.5	73.1	0
Contiguous Roadless Area										
Beaverhead Forest	16.7	16.7	22.1	25.9	25.9	17.1	18.5	3.1	0.9	0
Deerlodge Forest	42 5	42.5	38.4	67 3	72 2	74.9	81 1	11 3	2 5	0
Lolo Forest	19 6	19.6	19.6	39.1	39 1	35 2	23 2	0	0	0
Nez Perce Forest	0	0	0	0.6	0 6	0	0 6	0	0	0
Salmon Forest	0	0 5	0 5	42.8	42.8	42 8	0	0	0	0
Wilderness	0	59 1	121 1	83.4	83.4	88.0	56.7	348 5	485 7	654.0
Bitterroot Forest	0	50.1	97 6	76.8	76 8	76 8	50.1	171.7	296 3	402.2
Contiguous Roadless Area										
Beaverhead Forest	0	0	6.6	6 6	6 6	6 6	6 6	30 9	49.2	53 1
Deerlodge Forest	0	0	7 9	0	0	0	0	58 6	81.1	97 0
Lolo Forest	0	0	0	0	0	4 0	0	49 6	49 6	49 6
Nez Perce Forest	0	0 6	0 6	0	0	.6	0	0 6	0.6	0 6
Salmon Forest	0	8 4	8 4	0	0	0	0	37 1	8 9	51 5
Summary of Management Emphasis										
Developed *										
Bitterroot Forest										
Decade 1	105 0	84.7	35 7	67 7	76 0	17 7	44.5	43 0	14 4	0 1
Decade 5	320.8	302.6	197 2	130.7	130 7	105 3	113 5	136 9	35 9	0 6
Contiguous Areas										
Decade 1	20 8	20 8	20 5	3.1	2 1	13.6	12 7	16 4	16 5	0
Decade 5	102.6	94.1	90.6	27 2	27 2	45 2	86 8	20 2	50 0	0
Roadless/Undeveloped *										
Bitterroot Forest										
Decade 1	300 2	270 4	271 9	260.6	260 6	310 8	310 6	110 5	93 6	0.4
Decade 5	84 4	52.5	110 4	197.7	197.7	223 2	241.6	96 5	73 1	0
Contiguous Area										
Decade 1	177.9	168 9	161 3	195.6	195 6	227 1	186 0	36 4	71 1	0
Decade 5	96 1	95.6	91 2	137.3	137 3	195 4	111.9	32.6	23.2	0
Total Roadless Area										
Bitterroot Forest	405.3	405 3	405.3	405 3	405 3	405.3	405.3	405 3	405 3	405 3
Beaverhead Forest	53.1	53.1	53.1	53.1	53.1	53 1	53.1	53.1	53 1	53.1
Deerlodge Forest	97.0	97.0	97 0	97.0	97 0	97.0	97.0	97.0	97.0	97 0
Lolo Forest	49 6	49.6	49 6	49.6	49 6	49 6	49 6	49.6	49 6	49 6
Nez Perce Forest	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Salmon Forest	51.5	51.5	51 5	51 5	51.5	51 5	51 5	51 5	51.5	51 5
Total	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657 0	657 0

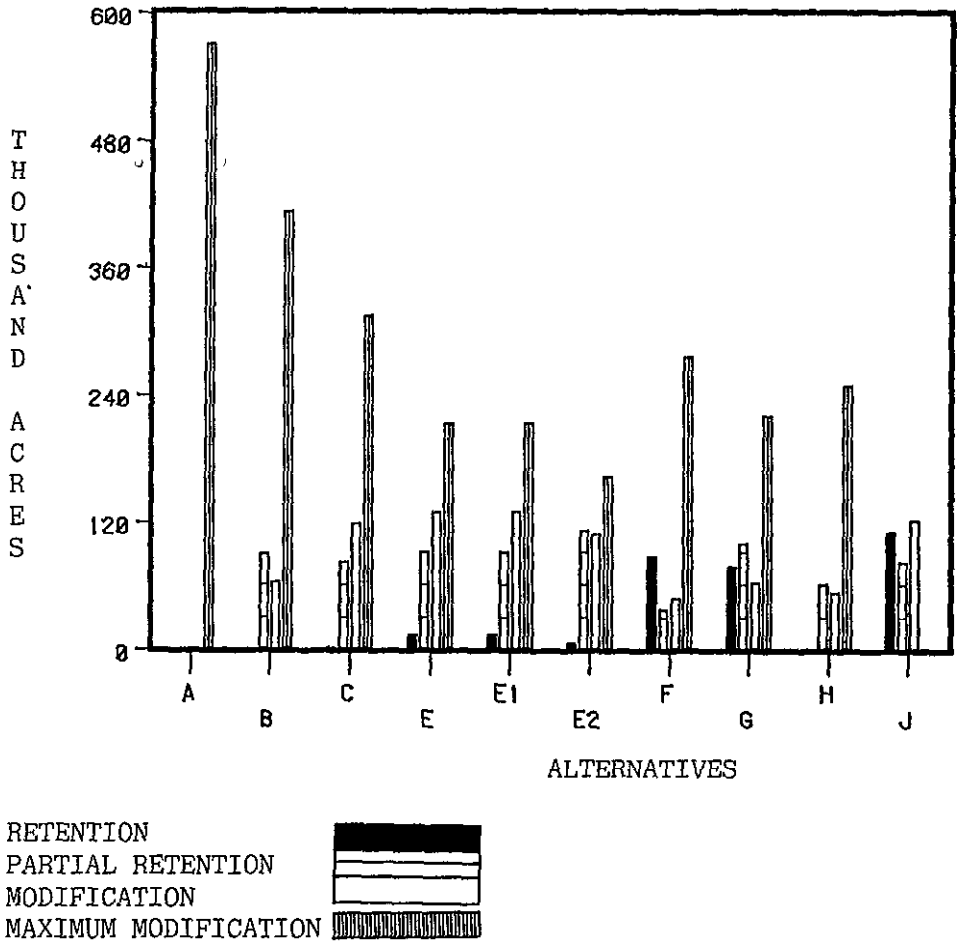
* Does not include wilderness designations.

3. Visual Quality

Visual quality objectives are standards to which proposed changes in the character of the landscape can be compared, to ascertain acceptability of change. In the preservation objective the natural landscape will not be altered by management activities. In the retention objective activities should not be evident to the casual forest visitor, and in partial retention activities may be evident but must remain subordinate to the natural landscape. In modification and maximum modification, changes can dominate the natural landscape but should look natural from a distance. A discussion of constraints applied to achieve visual quality objectives is in Appendix B, Section III.

Visual quality objectives were inventoried and mapped for the Forest according to the procedure described in National Forest Landscape Management (USDA, 1977). Alternative G was designed to meet the inventoried objectives. Benchmark K (Max PNV) was not constrained to meet any visual quality objective. Alternative A meets the maximum modification objective, the least restrictive. All other alternatives use various combinations of visual quality objectives (Figure II-11).

Figure II-11
Visual Quality Objectives on Suitable Timberland



Standards and guidelines in the management prescriptions were developed to assure that management practices meet visual quality objectives. These guidelines are quantifiable mitigation measures designed to constrain management activities. (Planning Record: Forest Plan 177). See Table II-5. Site specific management practices will be designed to meet site specific visual objectives for each project.

Table II-5
Quantification of Visual Quality Objectives

Criteria	Objective: Maximum Modification	Modification	Partial Retention	Retention	Preservation
Opening size (acres)					
Other areas	≤40	≤40	5-15	±7	NA 1/
Riparian zones	± 5	± 5	≤ 2	≤2	NA
Land area that may appear cutover (percent)					
Land type 2/					
-40	45	40	22	15	0
MN+40	40	29	18	13	0
S40M60	29	20	14	11	0
SS+60	25	17	10	8	0
Recovery (years)	<30 3/	30	30	30	NA
Harvest age (years)	±100	±120	±180	±240	NA
Road density (miles/section)					
Land type					
-40 6.6	6.6	5.5	4.4	0	
MN+40	6.6	6.6	3.3	2.2	0
S40M60	3.8	3.8	2.2	1.1	0
SS+60	0	0	0	0	0

Source: Planning Record: Forest Plan Note 177.

1/ NA: Not applicable.
2/ -40: All soils on slopes under 40 percent.
MN+40: Moderately- to non-sensitive soils on 40 to 60 percent slopes.
S40M60: Moderately- to non-sensitive soils on slopes over 60 percent and sensitive soils on 40 to 60 percent slopes.
SS+60: Sensitive soils on slopes over 60 percent.
3/ The minimum recovery period for maximum modification is when regenerated stands are certified as stocked.

4. Research Natural Areas

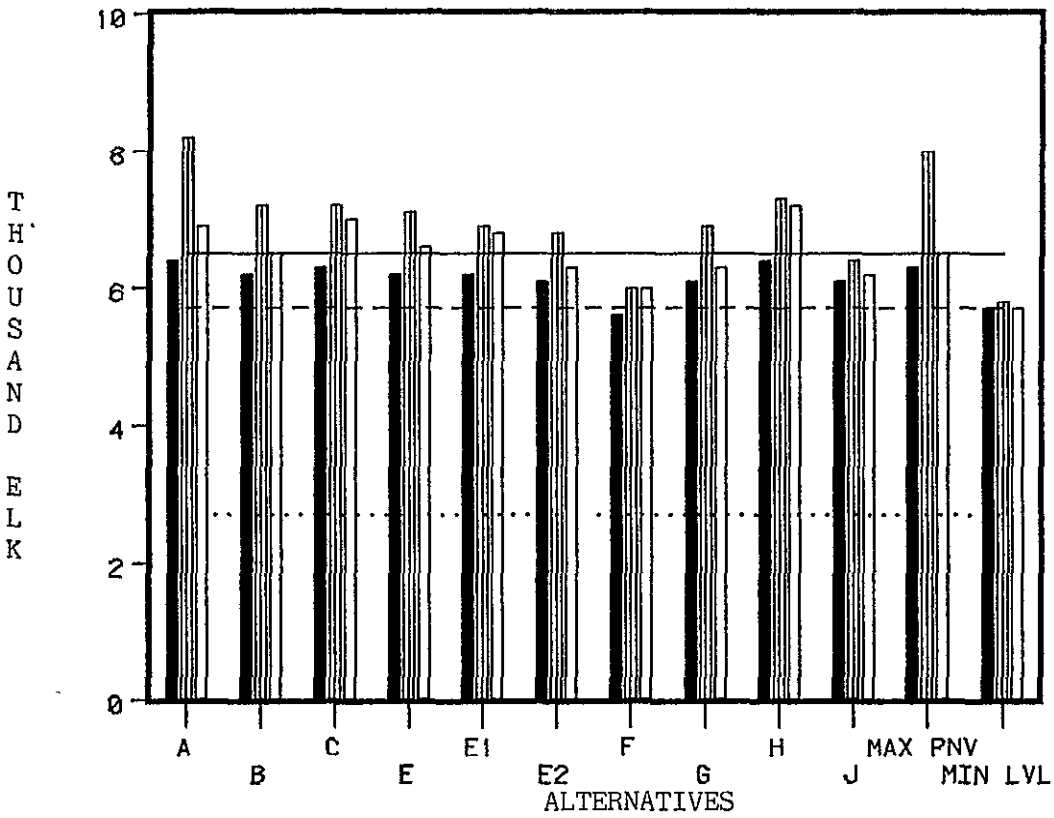
The area of research natural area management is low in high timber output alternatives (Table II-26). No areas were set aside in Alternative F, because current direction has specified none. Alternatives C, E, E1, E2, G, and J have the largest research natural area acreages.

5. Wildlife

All alternatives and benchmarks were designed to ensure the maintenance of at least minimum viable populations of wildlife and fish.

Elk is the wildlife species of greatest public interest on the Forest and is the indicator species for commonly hunted big-game animals. It is assumed that mule deer habitat is similar to elk habitat, and population trends will be similar between the species. Cover needs for big game are ensured by soil, water and visual quality constraints, so the limiting factor for elk is winter forage. Winter forage, converted to potential number of elk on winter range, varies by amount of timber harvest and allocation of forage to livestock. There is enough winter forage to at least maintain the current winter elk population under all alternatives (Figure II-12). Table II-26 compares current and projected elk hunting potential.

Figure II-12
Elk Habitat Potential



Biological needs of big game for cover are provided in all alternatives. However, security cover is needed during hunting season to ensure a stable trend in hunting season lengths and bag limits. In Alternatives A and B and Benchmark K, the only security cover will be in areas not suitable for timber production and where roads are closed. For these alternatives, restricted hunting seasons and/or bag limits, established by the Montana Fish and Game Commission, may become increasingly necessary to maintain population levels. Alternatives C, E, E1, E2, F, G, H, J, and Benchmark M (MIN LVL) all have significant acreage set aside as roadless elk security areas or for roadless recreation (Table II-26). Road closures and roadless security areas provide the means to control hunter access and reduce elk vulnerability. See Chapter II, section D.12 for further discussion of road closures.

In 100 years, old-growth dependent species will have less habitat in all alternatives and benchmarks except Benchmark M (MIN LVL) (Figure II-13). The expected result is a reduction in these populations. Old-growth stands in wilderness or other areas where timber will not be harvested is dependent upon the potential of sites to produce trees, and conversion to other age classes by wildfire, insects or disease. In areas scheduled for timber harvest, old growth in riparian zones is especially desirable and used by a wider variety of wildlife than is nonriparian land.

Alternative A has a constraint to maintain 5 percent old growth on suitable timberland, the minimum required for maintenance of viable populations of all wildlife species. Alternatives E, E1 and E2 maintain 50 percent of the fisheries riparian zone in old growth. Alternative E2 also provides for 25 percent old growth in nonfisheries riparian areas, to provide a source for replacement of natural debris dams. Alternative J removes all riparian area from the suitable timber base, and in the remaining alternatives, lesser levels of old growth in riparian areas are maintained due to long timber rotations in partial retention and retention visual prescriptions.

All alternatives will maintain at least 5 percent old growth, well distributed across the suitable timber base. Alternatives A and B emphasize market values with shorter timber rotations and consequently, lower levels of old growth. Alternatives G and J emphasize nonmarket values having long timber rotations, and consequently high levels of old growth. Market and nonmarket considerations are more balanced in the remaining alternatives with old growth falling between the two extremes (Figure II-13).

Figure II-13
Old Growth on Suitable Timberland in 100 Years

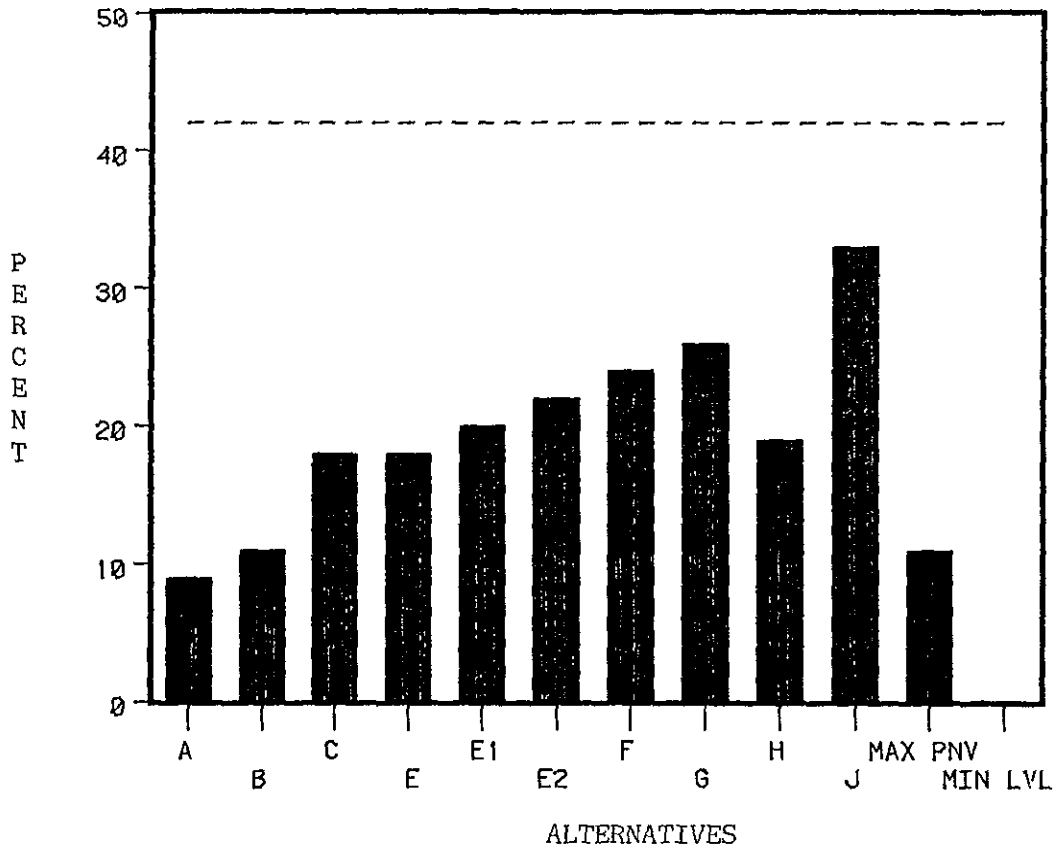


Table II-6 shows the total riparian acreage within the suitable timber base, and the amount scheduled for restricted riparian treatment, such as long rotations, maintenance of old growth, use of selection harvest systems, etc.

Table II-6
Management of Suitable Timberland in Riparian Zones

Alternative/ Benchmark	Acres Available for Harvest	Restricted Acres	Percent of Area Restricted
A	63,400	0	0
B	61,340	10,200	17
C	55,900	10,000	18
E	49,400	16,400	33
E1	49,400	16,400	33
E2	41,400	41,400	100
F	49,400	13,500	27
G	50,800	19,250	38
H	41,500	7,800	19
J	0	NA	NA
K (MAX PNV)	64,600	0	0
M (MIN LVL)	0	NA	NA

NA: Not Applicable

The maintenance of a diverse vegetative community results in a diverse community of wildlife species. With a portion of the Forest maintained in old growth, other vegetative age classes are maintained through timber harvest. After stands are harvested and regenerated, they grow through stages of vegetative development to become mature forests. As the forest changes structure, wildlife species inhabiting the forest change. When the total Forest is considered, there will be an ever-changing mosaic of vegetation.

All alternatives and benchmarks provide diverse habitats, with the high timber output alternatives having more early seral stage area and less old growth than the lower timber output alternatives. Pileated woodpecker and pine marten populations will be monitored as indicators of old growth. Cutthroat trout populations will be monitored as indicators of the status of riparian ecosystems.

6. Threatened and Endangered Species

Because grizzly bears historically occupied the Forest, the Bitterroot Range Evaluation Area (as defined by the Interagency Grizzly Bear Committee) will be evaluated for its vegetative potential to support grizzly bears. The Evaluation Area includes the Selway-Bitterroot and Frank Church-River of No Return Wildernesses and the Lost Horse Creek drainage on the Bitterroot. The evaluation will be completed by 1995 using the "Criteria for Mapping Grizzly Bear Habitat Constituent Elements" (USDA, 1983). Since most of the area is wilderness, adverse habitat modifications would only occur in Alternatives A and B, where timber harvest and road construction are scheduled on the suitable tim

berland in the Lost Horse area. If a grizzly population does become established, the likelihood of bears wandering onto developed areas is higher in the high timber output alternatives, because less land will remain undeveloped. Potential habitat will not be destroyed, but chances for undesirable human/bear confrontations will be increased.

Potential gray wolf habitat is essentially the same as grizzly habitat, and will not be adversely affected in any alternative. Strict law enforcement, travel plan administration, and maintenance of ungulate populations will ensure that wolves are provided for in all alternatives.

The most important element of peregrine falcon habitat is the nest site, which most often occurs on high cliffs. No alternative contains management practices which would alter potential nest sites.

The most likely habitat for bald eagles is on two 40-acre parcels along the Bitterroot River which will not be altered under any alternative.

We have consulted with the USDI, Fish and Wildlife Service, about our proposed management of threatened and endangered species as required by the Endangered Species Act. The Forest will cooperate with any interagency effort to restore a threatened or endangered species under any alternative.

7. Fish

The catchable trout population is dependent on stream channel conditions, which are affected by sediment delivered to the fishery and the availability of debris to form pools (Figures II-14 and 15). Figure II-14 shows catchable trout populations by alternative in nonwilderness streams which may be affected by management activities. Figure II-15 shows the total stream and lake catchable trout population. The current population level shown in these figures represents the maximum level possible with existing habitat. The riparian prescription was designed to maintain or improve riparian habitats and the geomorphic characteristics of stream channels.

Wilderness streams and lakes will not be significantly affected by management activities. Nonwilderness stream fish populations will be affected by timber harvest (Figure II-21), site preparation, road construction (Table II-18), and the availability of large woody debris. Catchable trout populations outside wilderness drop from 14 to 24 percent in decade 1 in all alternatives except E2 and J, because increased sediment from timber harvest and roading cause enough changes in stream channel conditions to affect fish populations (Table II-26).

Alternative E1 has a high level of timber harvest and roading in decade 1, with a corresponding 24 percent reduction in fish population. Alternative J does not provide for timber harvest in any riparian zone, and therefore the fish population is not reduced. Alternative E2 also maintains existing population levels through riparian prescriptions for both fishery and nonfishery streams, mitigation of accelerated erosion on the existing road system, and slow pace of roading and timber harvest.

Direct stream habitat improvement measures, mostly felling trees to create pools, could be applied to 340 acres of stream to increase the nonwilderness catchable trout population by 9,000 in all alternatives.

Figure II-14
Nonwilderness Stream Trout Population

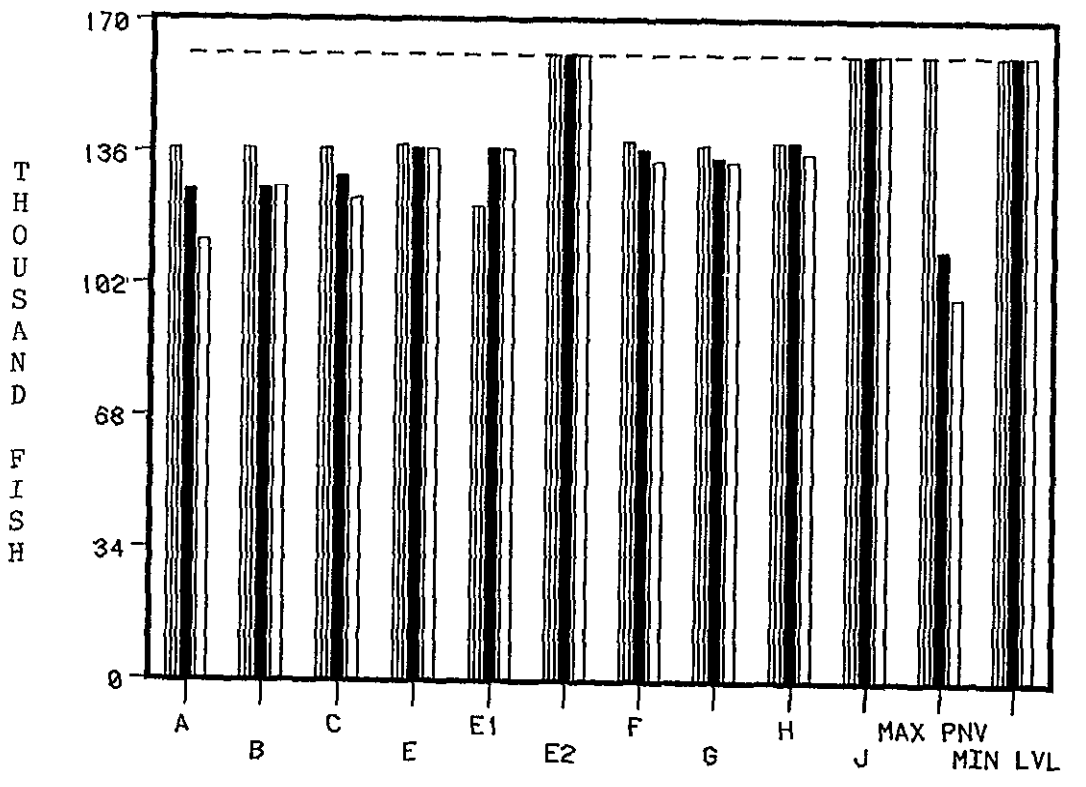
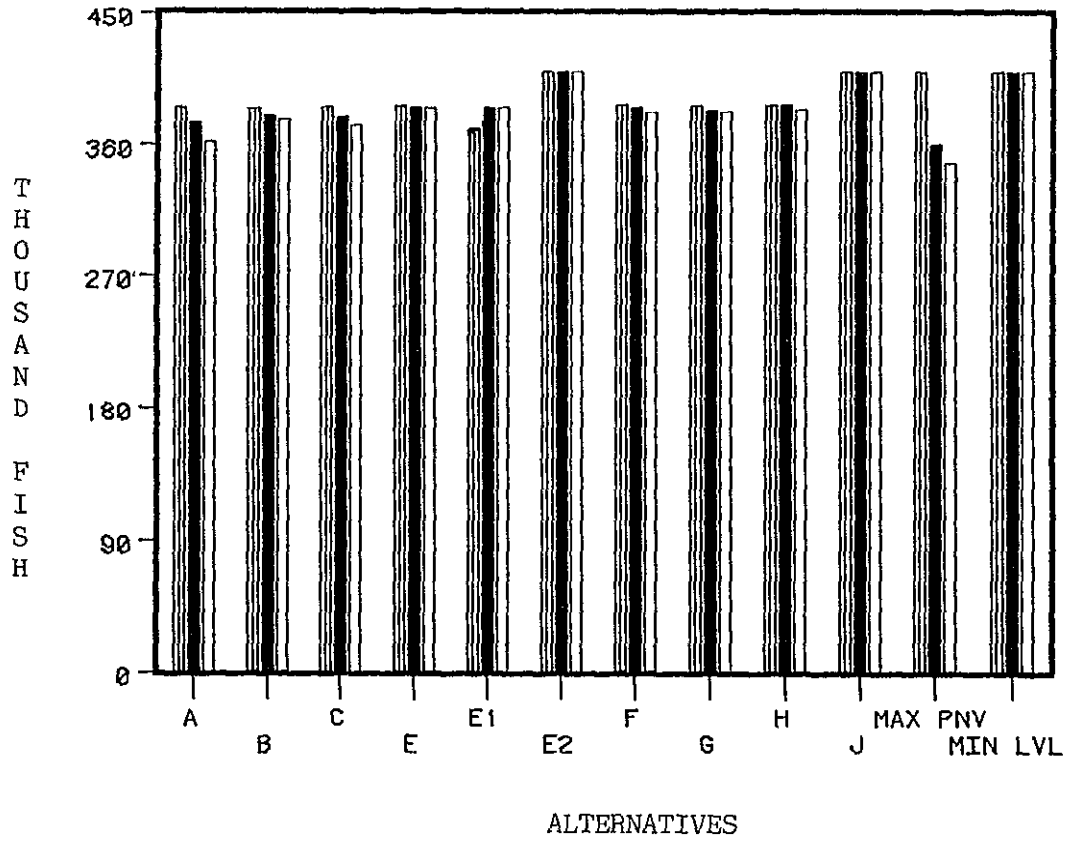


Figure II-15
Total Catchable Trout Population



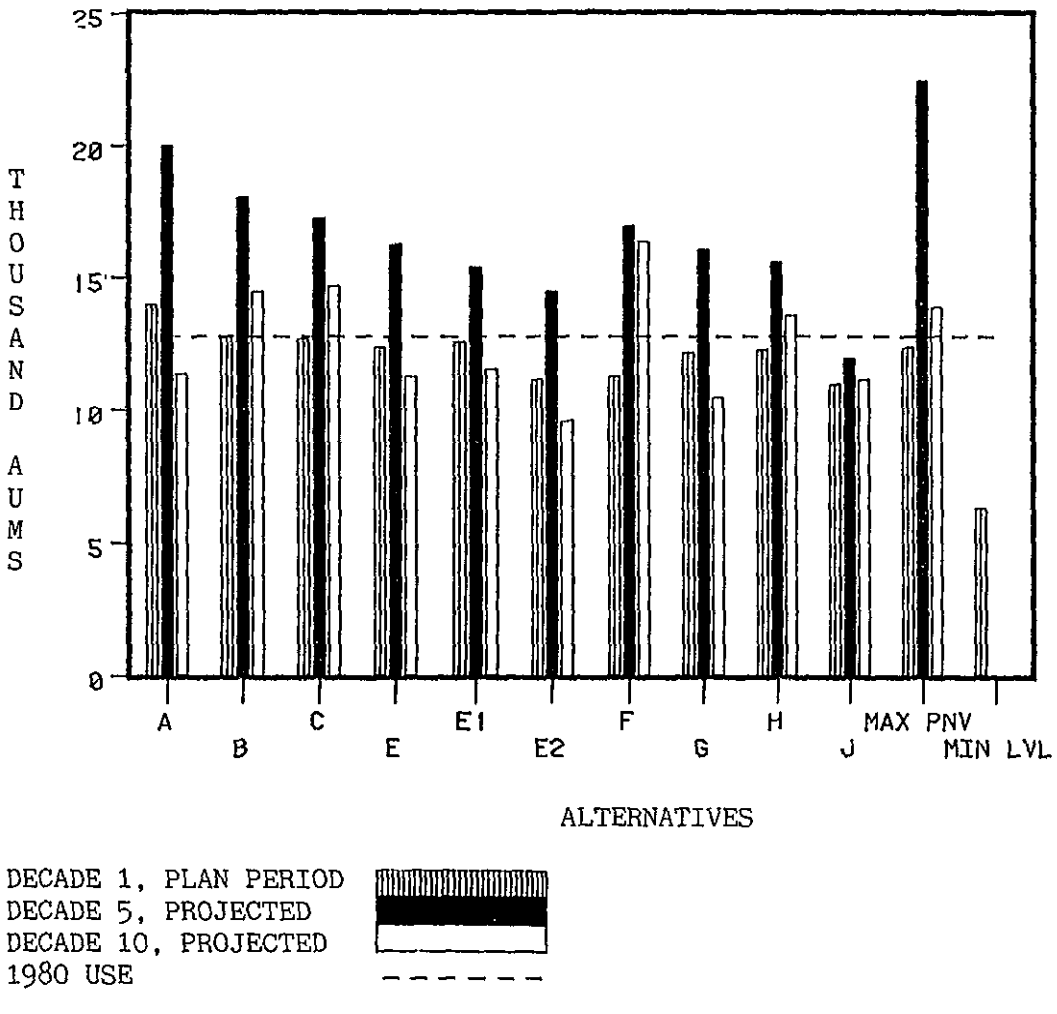
8. Range

Timber harvest within cattle allotments creates forage available to livestock (Figure II-16). Available forage varies by amount of timber harvest and emphasis on providing winter range forage for elk. There are about 140,000 acres of suitable rangeland available in all alternatives.

Although the forage produced for livestock exceeds 20,000 animal unit months in some periods in several alternatives, anticipated use is less than 10,000 animal unit months.

Potential increases in livestock use resulting from even-aged timber harvest along fisheries streams in Alternatives A, B, C, and H could significantly impact stream channel conditions and fish population. Alternatives E, E1, E2, F, G and J are designed to maintain tree cover along most fisheries streams.

Figure II-16
Potential Livestock Forage



9. *Timber*

a. *Timber Sale Level*

Cubic and board foot volumes scheduled for sale in selected decades are compared in Figures II-17 and II-18. Volume for all decades is shown in Tables II-7 and II-8. The conversion ratio of cubic to board feet varies with the size of trees sold. The allowable sale quantity includes salvageable material.

Figure II-17
Average Annual Allowable Sale Quantity
(cubic feet)

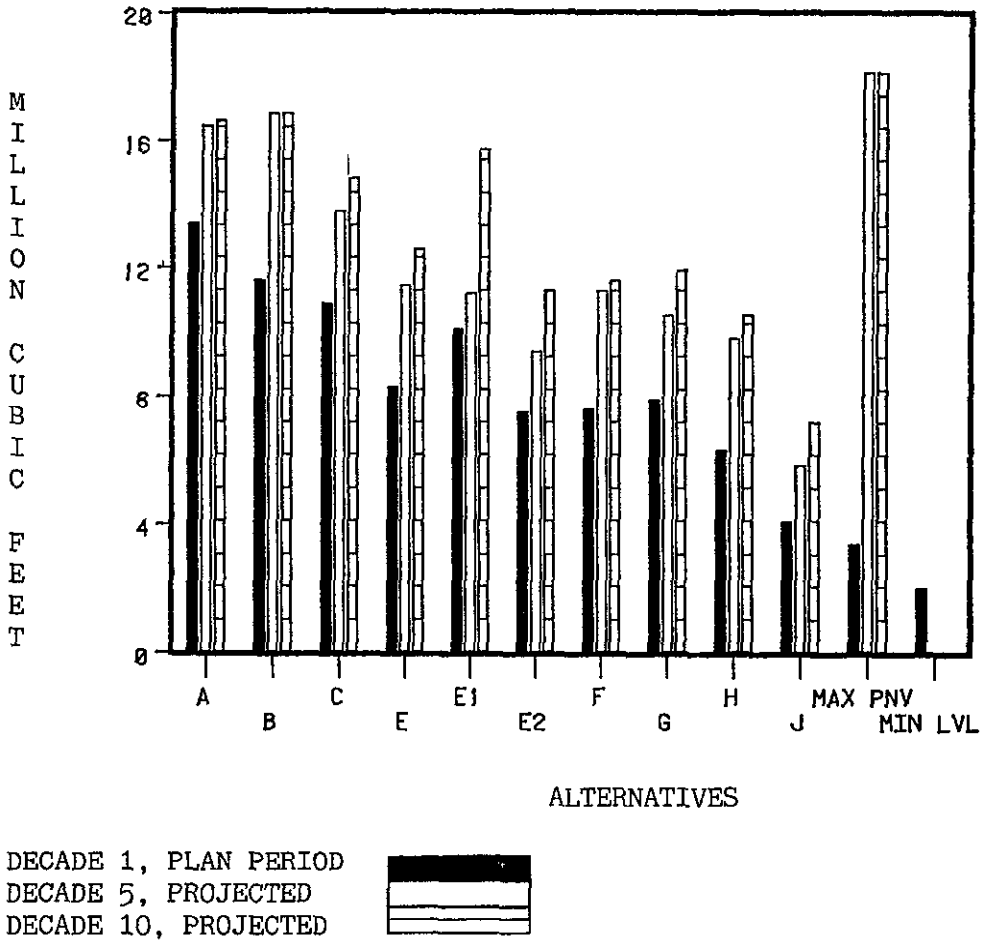


Figure II-18
Average Annual Allowable Sale Quantity
(board feet)

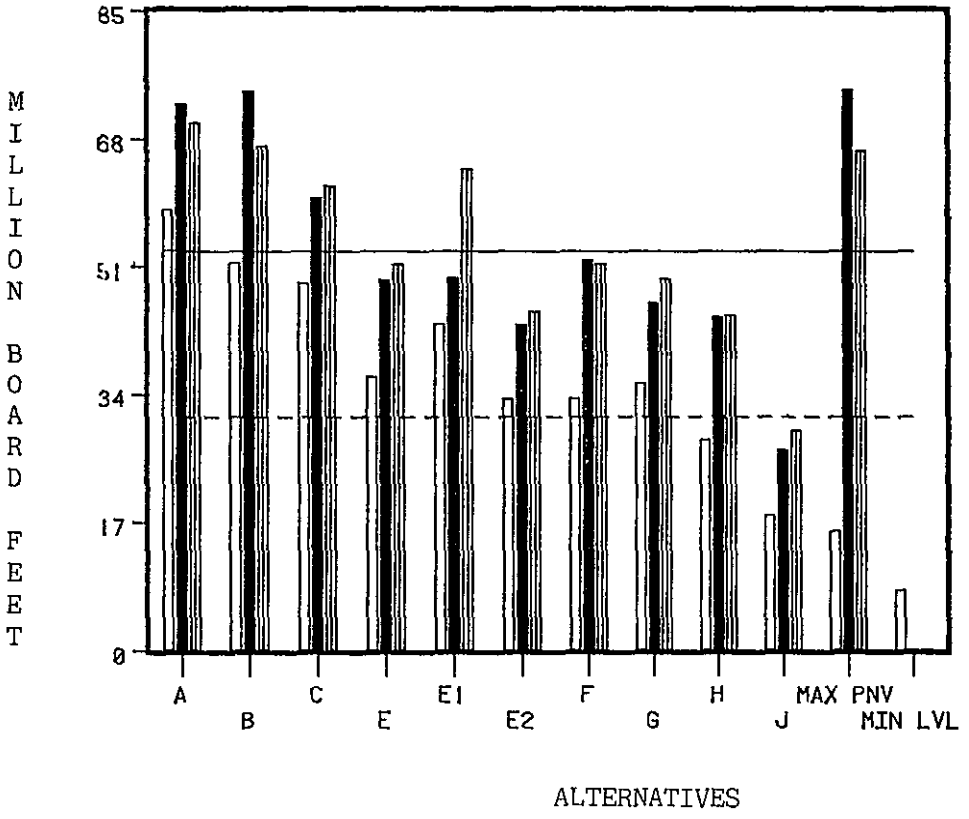


Table II-7
Board Foot Allowable Sale Quantity and Long Term Sustained Yield
(Includes green sawtimber and salvage material non-interchangeable components)

	ALTERNATIVES (MMBF)										BENCHMARKS -- (MMBF) --	
	A	B	C	E	E1	E2	F	G	H	J	K	M
Plan Period												
Decade 1	58 7	51.5	48.9	36 5	43 5	33 4	33.5	35 5	28 0	18.0	15.9	8 0
Projected Period												
Decade 2	59.5	50 5	47.3	36.5	33.2	33 0	33 3	34.6	27.8	17 5	62.9	0 0
Decade 3	57.5	50 0	47.5	36.3	33.7	32.7	33.3	34.5	27.9	17.7	79.3	0 0
Decade 4	74 2	75.9	61.9	51 0	40.6	42.3	51.0	47.2	44.1	26.0	81 0	0 0
Decade 5	72.4	74.8	60.4	49 0	49 4	42.7	51.4	45 3	43.8	26.8	74 4	0.0
Decade 6	76 6	77 2	63.4	52 4	64.5	42.8	52 0	49.2	44.7	27.0	85.1	0.0
Decade 7	67 5	73.1	49 8	40.8	38.3	35 1	44.4	38.5	35.1	19.1	78 1	0 0
Decade 8	70.6	73 0	57.9	48.6	43.0	38.6	46.7	45.3	40.1	24.8	73.5	0.0
Decade 9	65 3	64.1	57.2	44.7	51.5	34.3	44 5	41.1	39.0	29.0	69.6	0 0
Decades 10-15	53 0- 70.1	42.6- 67.4	41.5- 62.0	37.6- 51.2	13.3- 80.3	37.5- 44 5	30.2- 51.3	32.1- 49.0	31 9- 43.9	25.0- 30.5	49.6- 72.2	0.0
Long Term Sustained Yield	59.2	59 5	51.5	46.4	45.9	42.1	39 6	44.5	39.9	29 7	60.2	0.0

Table II-8
Cubic Foot Allowable Sale Quantity and Long Term Sustained Yield
(Includes green sawtimber and salvage material non-interchangeable components)

	ALTERNATIVES (MMCF)										BENCHMARKS -- (MMCF) --	
	A	B	C	E	E1	E2	F	G	H	J	K	M
Plan Period												
Decade 1	13.4	11.6	10.9	8.3	10.1	7.5	7.6	7.9	6.3	4 1	3.4	2.0
Projected												
Decade 2	13.4	11.6	10.9	8.3	7 5	7.5	7 6	7.9	6.3	4.1	13.5	0 0
Decade 3	13.4	11.6	10.9	8.3	7.7	7.5	7.6	7 9	6.3	4.1	18.2	0 0
Decade 4	16 5	16.9	13.7	11 4	9.0	9.4	11.3	10 6	9 8	5.8	18 2	0.0
Decade 5	16 5	16.9	13.7	11.4	11.2	9 4	11 3	10.6	9.8	5.8	18.2	0.0
Decade 6	16.5	16.9	13 7	11.4	14.0	9 4	11.3	10.6	9.8	5.8	18.2	0.0
Decade 7	16.5	16.9	13.7	11 4	10.5	9 4	11.3	10 6	9.8	5.8	18.2	0.0
Decade 8	16 5	16 9	13.7	11 4	10.0	9.4	11.3	10.6	9.8	5.8	18.2	0.0
Decade 9	16.5	16.9	14.6	11.4	12.5	9.4	11.3	10.6	10.0	7.2	18.2	0 0
Decade 10-15	16 7	16.9	14.8	12.6	6.2- 19 6	11.3	11.7	12.0	10.6	7.2	18.2	0.0
Long Term Sustained Yield	16 7	16.9	14 8	12.6	12.4	11 3	11.7	12 1	10.6	7.5	18.2	0.0

b. Supply and Demand

This section has been added since the draft with subsections (1), (2), (3) and (4) addressing industry concerns about the cumulative affect of Forest Plans on timber supply, and subsection (5) other concerns about the economic wisdom of high timber production levels.

(1) Potential timber supply for each alternative was compared to the average volume offered within the bid area during the past 10 years (Table II-9). Since purchasers of Bitterroot Forest timber also buy timber from adjoining National Forests, both sources are included in the table. Alternatives from adjoining Forests that are comparable to Bitterroot Forest alternatives were identified and the timber volumes combined to provide an indication of the supply potential in the traditional bid area (EIS Chapter III). The Preferred Alternative is E2 and the current direction or no action alternative is F.

Table II-9
Average Annual Timber Volume Offered - Allowable Sale Quantity, Decade 1

		ALTERNATIVES									
	Unit	A	B	C	E	E1	E2	F	G	H	J
Bitterroot NF	MMBF/Yr	59	51	49	36	44	33	33	35	28	18
Change from the past 10-year Average of 34 MMBF 1/	%	+74	+50	+44	+6	+29	-3	-3	+3	-18	-49
Beaverhead, Lolo & Salmon NF's	MMBF/Yr	224	212	210	159	183	155	171	158	140	141
TOTAL FROM BID AREA FORESTS	MMBF/Yr	283	263	259	195	227	188	204	193	168	159
Change from the past 10-year Average of 204 MMBF 1/	%	+39	+29	+27	-4	+11	-8	0	-5	-18	-22

1/ Table III-8

Alternatives with a relatively high commodity emphasis (A, B, C and E1) all show significant increases in the volume of timber that would be offered, both from the Bitterroot and adjoining Forests. Alternatives with a relatively strong environmental emphasis (H and J) show reductions in the volume offered and the remaining alternatives are within plus or minus 10 percent of past offerings.

(2) Another comparison that is helpful in understanding the supply situation is the volume sold as a percentage of volume offered. In periods of poor or even good markets, purchasers may not buy all the timber offered for sale if it is not considered profitable to harvest.

Two situations were used to make projections of timber that would be sold. The first assumes that the total volume offered would be sold. This is the most optimistic situation and produces a high estimate. The second assumes that the percentage of volume sold to volume offered would remain the same as in the past and produces a low estimate. Table II-10a shows the projected volume that would be purchased from the Bitterroot Forest under each of the two situations.

Table II-10a
Average Annual Timber Volume Purchased from Bitterroot Forest - Allowable Sale Quantity, Decade 1

		ALTERNATIVES									
	Unit	A	B	C	E	E1	E2	F	G	H	J
VOLUME SOLD (Assuming all Offered Volume is Purchased)	MMBF/Yr	59	51	49	36	44	33	33	35	28	18
Change Compared to Historical Volume Purchased (30.1 MMBF/Yr) 1/	%	+96	+69	+63	+20	+46	+10	+10	+16	-7	-40
Change Compared to Bitterroot Share of Reported Log Requirements (40.3 MMBF/Yr) 1/ 2/	%	+46	+27	+22	-11	+9	-18	-18	-13	-31	-55
VOLUME SOLD (Assuming Historical Proportion of Volume Offered is Purchased = 88%)	MMBF/Yr	52	45	43	32	39	29	29	31	25	16
Change Compared to Historical Volume Purchased (30.1 MMBF/Yr) 1/	%	+73	+50	+43	+6	+30	-4	-4	+3	-17	-47
Change Compared to Bitterroot Share of Reported Log Requirements (40.3 MMBF/Yr) 1/ 2/	%	+29	+12	+7	-21	-3	-28	-28	-23	-38	-60

1/ Chapter III, Table III-8

2/ Mill owners for the Darby mill group report that log requirements are 45 to 50 MMBF per year or 34 percent above historical purchases of 37.3 MMBF (Table III-8). Assuming the same percentage increase for Missoula mills brings total log requirement to 58.5 MMBF

Table III-8 shows that the Bitterroot Forest has traditionally supplied about 64 percent of the total volume purchased by the Darby mill group. It is assumed that this mill group will continue to purchase the remaining 36 percent of volume needs from other sources as they have in the past, primarily from National Forests adjoining the Bitterroot. It is also assumed that Missoula mills will continue to purchase their traditional percentage share from the Bitterroot National Forest.

Under the assumption that all offered volume will be purchased, all alternatives except H and J meet or exceed historic purchases, but only alternatives with a relatively high commodity emphasis, A, B, C and E1, meet or exceed reported log requirements. This pattern is repeated under the assumption that only the historical proportion of volume offered will be purchased; however, a higher commodity emphasis is required to meet either level.

(3) Table II-10b is similar to Table II-10a but considers all National Forests in the bid area. In this case, the first situation assumes that the total volume offered would be sold and that bid area mills retain their traditional share of purchases. The second assumes that the percentage of volume sold to volume offered would remain the same as in the past and bid area mills retain their traditional share of purchases.

Table II-10b
Average Annual Volume Purchased from all Forests in the Traditional Bid Area

		ALTERNATIVES									
	Unit	A	B	C	E	E1	E2	F	G	H	J
VOLUME SOLD (Assuming all Offered Volume is Purchased) 1/	MMBF/Yr	76	68	65	48	59	45	46	47	38	28
Change Compared to Historical Volume Purchased (40.6 MMBF/Yr) 2/	%	+87	+67	+60	+18	+45	+11	+13	+16	-6	-31
Change Compared to Reported Log Requirements (54.5 MMBF/Yr) 2/	%	+39	+25	+19	-12	+8	-17	-16	-14	-30	-49
VOLUME SOLD (Assuming Historical Proportion of Volume Offered is Purchased = 74%) 1/	MMBF/Yr	56	50	48	36	44	33	34	35	28	21
Change Compared to Historical Volume Purchased (40.6 MMBF/Yr) 2/	%	+38	+23	+18	-11	+8	-19	-16	-14	-31	-48
Change Compared to Reported Log Requirements (54.5 MMBF/Yr) 2/	%	+3	-8	-12	-34	-19	-39	-38	-36	-49	-61

1/ Bid area mills have traditionally purchased 27 percent of the total purchases from four Forests within the bid area (Table III-8). Volumes for alternatives vary around this figure depending on the proportional share of projected purchases furnished by each Forest.

2/ Table III-8

Table II-10b indicates the same general trend as Table II-10a.

(4) In response to timber industry concerns, the Forest Service completed a study of various timber supply scenarios for the state of Montana (1987) based on ownership categories. Included in these supply scenarios were the harvest levels of the draft preferred alternatives of National Forests within the State of Montana. The major findings of this study for Southwest Montana indicated that the timber supply is adequate for the next 10 years (1988-1997). This is based on the planned harvest levels of the Preferred Alternatives from the DEIS from each National Forest in the Southwest Montana region (Beaverhead, Bitterroot, Deerlodge, Flathead, Helena, and Lolo National Forests) and the continuation of the historic harvest level of the other timber ownerships. Depending on corporate objectives and policies, the harvest levels from private industrial lands may begin to decline during this period, but planned harvest levels from National Forests and harvest levels of other ownerships can offset this decline.

The State of Montana study was then used to estimate future equilibrium supply and demand quantities for the market area served by the Bitterroot National Forest. The study used expected timber prices and price/cost trends developed for the 1985 RPA Update. These timber prices and trends were also used by the Bitterroot Forest in the sensitivity analysis summarized elsewhere in this section and detailed in Appendix B.

A range of potential demand for the Bitterroot National Forest timber was developed from this statewide study by comparing the expected quantity supplied and demanded with a range of possible future harvests from other ownerships. This range of potential demands was then compared directly with planned harvest levels of the Preferred Alternative for the Bitterroot Forest. The State-wide analysis was subdivided into marketing regions and the Bitterroot National Forest is in the Southwest sub-state region. The potential demand for the Southwest area, and a range of possible supplies from other owners is shown below in Table II-11a.

Table II-11a
Range of Potential Demand and Range of Supplies
(MMBF/Year)

	Planned	Projected			
	1990	2000	2010	2020	2030
Potential Demand	441	448	451	495	571
Range of Potential Supply from Other Owners	297-327	307-330	222-282	225-280	144-295

From the above information, an implied range of potential demand for National Forest timber in the Southwest Region of Montana is shown in Table II-11b.

Table II-11b
Range of Potential Demand
(MMBF/Year)

	Planned	Projected			
	1990	2000	2010	2020	2030
Range of Potential National Forest Demand	114-144	118-141	169-229	215-270	276-427

It is significant to note that as regional and national markets imply an increase in the quantity demanded for Southwestern Montana, other timber ownerships will have a decreasing ability to provide timber, largely due to depleted inventory in industrial ownerships. This would mean that the potential demand on National Forest timber can be expected to increase.

There is no mathematical model at the present which can be used to disaggregate the range of potential demand for Southwest Montana to a specific National Forest. Therefore, it is assumed that future demand ranges for each National Forest will be proportional to its market share in the sub-state region. This is based on the total planned harvest levels of the National Forests within this market area. The range of potential demand for the Bitterroot National Forest timber using this disaggregation method is shown in Table II-11c:

Table II-12
Range of Potential Demand and Forest Plan Harvest Level
(MMBF/Year)

	Planned	Projected			
	1990	2000	2010	2020	2030
Range of Potential Demand for Bitterroot National Forest	28-36	30-35	34-46	58-73	72-111
Bitterroot National Forest Plan Harvest Level	33	33	33	42	43

By comparing planned harvest levels from the Bitterroot National Forest with the Range of Potential Demand for this National Forest, it can be seen that the planned harvest is approximately within the Range of Potential Demand. Potential demand for additional timber will be relatively small for the first three decades. After the year 2020 Potential Demand significantly exceeds planned harvest levels and there will be significant opportunity to market additional timber as well as upward pressure on stumpage prices.

However, the State-wide timber supply study shows that for the 10-15 year planning period addressed in detail in the Preferred Alternative, there is not expected to be a shortage of timber volume in the area served by the Bitterroot Forest. This result is consistent with the analysis performed by the Forest, discussed above, which considered historical sources and volumes of timber manufactured by local mills.

It is important that the information on potential supply and demand be considered only as a reference point. A range of potential demand levels for individual National Forests is dependent on the supply assumptions for other ownerships and adjacent National Forests. Based on these assumptions, the proper interpretation of the demand projections is that they provide a reasonable range, not an absolute floor or ceiling for any specific National Forest. The difference between the upper and lower range of these projections indicates the additional timber that could reasonably be marketed. This does not preclude the consideration of specific alternatives with an allowable sale quantity (ASQ) in excess of the upper and lower end of the potential demand range at projected price levels.

c. Utilization Standards Analysis

This section has been added since the DEIS, to address industry concerns about the implementation of Regional Guide utilization standards.

Utilization standards for alternatives are those prescribed for use in the Regional Guide. The standards and the effects on economics, first decade timber volume, and suitable timberland, of converting from current to Regional Guide utilization standards, are shown in Table II-13.

Table II-13
Comparison and Effects of Current and Regional Guide Utilization Standards.
(Decade 1)

Standard	Minimum DBH		Minimum Top DIB	Minimum Piece Length
	Lodgepole Pine	Other Species	All Species	All Species
Current	7"	8"	5.6"	8'
Regional Guide	6"	7"	4.6"	8'

Max PNV Benchmark	Green Sawtimber Volume		Difference	% Change
	Current Standards	Regional Guide Standards		
MMCF-(annual)	2.33	3.41	+1.08	+46
MMBF-(annual)	10.78	15.86	+5.08	+47
PNV (MM$)	206	206	+0.0	0
M Acres suit.	584.3	585.8	+1.5	+0.3
Alternative E2				
MMCF-(annual)	7.0	7.0	0	0
MMBF-(annual)	29.1	31.2	+2.1	+7
PNV (MM$)	65	67	+2	+3

The Max PNV benchmark comparison shows a 50 percent increase in first decade timber volume outputs changing from current to Regional Guide utilization standards. However, over 150 years, the increase is only about 5 MMBF per year and the cumulative increase is only about 5 percent. The PNV did not change significantly, because the increase in volume realized by utilizing Regional Guide standards is offset by the higher costs of handling smaller diameter trees. The table indicates that the land economically suitable under current utilization standards remains suitable under Regional Guide standards.

Alternative E2 comparison shows no change in volume, because there is a constraint to produce 7 MMCF per year in the first decade, no matter which utilization standard is used. However, there is an increase in present net value from current to Regional Guide standards because more area is required to produce 7 MMCF under current standards and their average economic value is lower. The current utilization standard volume harvested from the area harvested under Regional Guide standards would be 6.6 MMCF or 27.3 MMBF per year, a 6 percent reduction. The present net value using current utilization standards should be nearly the same as it was for the Regional Guide standards, since the reduction in value due to reduced volume is offset by decreased costs of handling larger size logs.

The distribution of volume, average diameter, and species composition by habitat type for decades 1 and 5 are shown in Table II-14.

Table II-14
Average Annual Volume Distribution by Habitat Type, Diameter and Species

Standard	Decade	Habitat Type Group 1/	ASQ Volume MMBF	DBH 2/	Species Composition 3/ (percent by volume) DF	PP	LP	AF	S/L	Total
Regional Guide	1	HT123	20.0	13.2	55	16	20	6	3	100
	Planned	HT4	6.0	13.8	43	1	35	15	6	100
	Period	HT567	7.4	14.8	36	2	32	15	15	100
		Average			48	10	26	10	6	100
Contract	1973-82				48	35	11	3	3	100
Regional Guide	5	HT123	26.3	15.6	49	26	12	11	2	100
	Projected	HT4	7.0	14.4	37	2	44	13	4	100
	Period	HT567	9.4	13.7	46	4	19	13	12	100

1/ HT123 = mostly DF/snowberry, DF/pinegrass, DF/ninebark & DF/huckleberry habitat type.
HT4 = AF/beargrass habitat type.
HT567 = AF/menziesia habitat type and riparian areas.
2/ 50% of volume greater than and 50% less than the diameter shown.
3/ DF = Douglas-fir, PP = ponderosa pine, LP = lodgepole pine, AF = subalpine fir, S/L = spruce/western larch.

Table II-14 shows that volume distribution by habitat type does not change significantly in 50 years. Average diameter increases by 2.4 inches in habitat type group HT123, increases by only .6 inches in group HT4, and decreases by 1.1 inches in group HT567. Species composition will be fairly stable over time; however, there will be significant changes within habitat type groups. The volume distribution changes significantly from the period 1973-82 to the Planned Period, especially the ponderosa pine and lodgepole distribution.

d. **Timber Suitability**

All land managed by the Forest was tested for suitability for production of timber, by applying the criteria discussed in Appendix B, Section II. Tentatively suitable timberland was assigned to prescriptions that meet the management objectives of a given alternative.

Alternative A has the highest timber output and the largest land base suitable for timber production (Figure II-19); but it also has the greatest impact on nonmarket values including visual quality (Figure II-11), old growth (Figure II-13), roadless and wilderness (Figure II-10), big-game cover, big-game security, riparian zones (Table II-6), and fisheries (Figures II-14 and 15). The visual quality objectives, old growth, and cover are all at the minimum acceptable level. Roadless area for semiprimitive recreation is confined to land unsuitable for timber management. There are no recommended wilderness additions.

Alternatives B, C, and H are also timber oriented with a moderate response to visual quality, old growth and elk cover. Roadless area, wilderness and elk security vary in these three alternatives: from a near maximum in H, which develops no roadless area; to B, which develops nearly all roadless area suitable for timber production.

As emphasis shifts towards nonmarket values in Alternatives E, E1, E2, F, and G, timber outputs and the land base suitable for timber production are reduced. Visual quality approaches or is at level recommended by application of the Visual Management System (USDA, 1977) in most areas. Old growth and big-game cover/forage relationships are optimal. Riparian zone old-growth characteristics are maintained. Moderate amounts of roadless area are maintained as wilderness and semiprimitive recreation areas.

Alternative J has the smallest timber output and land base suitable for timber. All roadless and riparian areas are removed from the suitable timber base, and high levels of visual quality, old growth and cover are maintained.

Figure II-19
Suitable Timberland

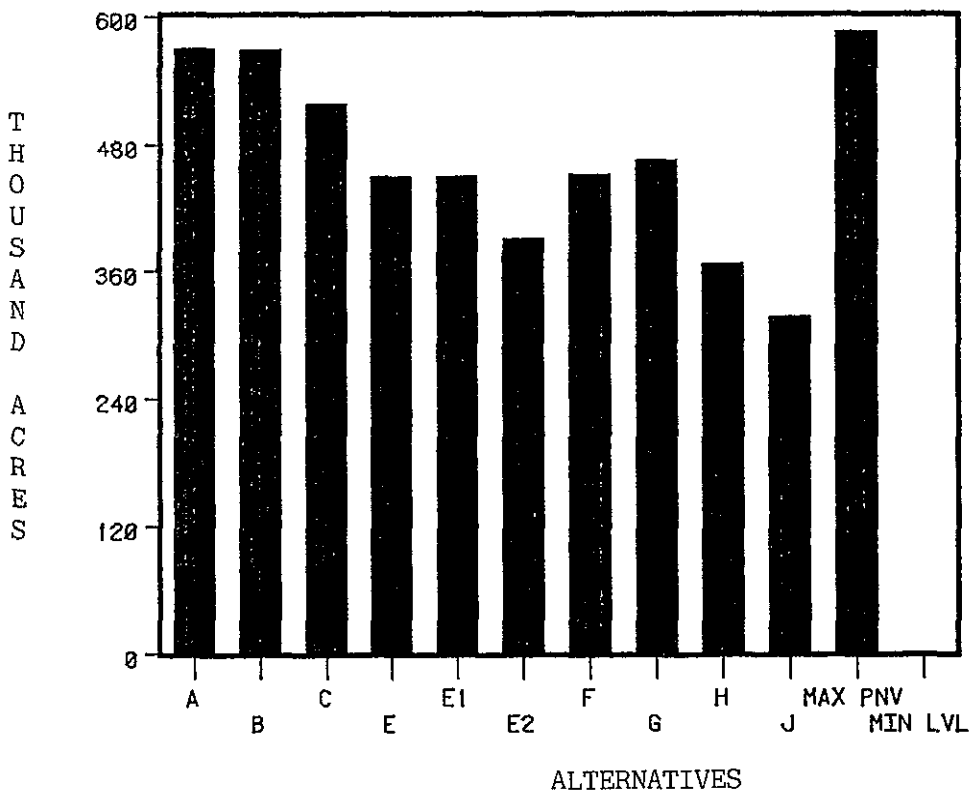


Table II-15
Timberland Classification Summary

Classification	Alternatives and Benchmarks M Acres											
	A	B	C	E	E1	E2	F	G	H	J	BMK	BMM
1. Non-Forest land (includes water)	<---------- 354.7 ---------->											
2. Forest land	<---------- 1,223.2 ---------->											
3. Forest land withdrawn from timber production	<---------- 457.4 ---------->											
4. Forest land not capable of producing crops of industrial wood 1/	<---------- none ---------->											
5. Forest land physically unsuitable: -irrever -sible damage likely to occur	<---------- 1/ ---------->											
-not restockable within 5 years	<---------- 34.5 ---------->											
6. Forest land-inadequate information 2/	<---------- 144.9 ---------->											
7 Tentatively suitable Forest land. (Item 2 minus items 3, 4, 5, and 6)	<---------- 586.3 ---------->											
8. Forest land not appropriate for timber production:												
a minimum management requirements	0	0	0	0	0	5.9	0	0	0	0	0	0
b. multiple use objectives	0	17.2	69.2	136.6	136 6	162.0	132.8	120.0	215 3	269.9	0	588 7
c. cost efficiency	18.9	2.7	1.9	2.8	2.8	28.6	4.7	5.0	6.9	2.8	2.8	0
9 Unsuitable Forest land (Items 3, 4, 5, 6 & 8)	653.4	654.4	705 6	773.9	773 9	833.3	772.0	759.5	856 7	907.2	637.3	1,223 2
10. Total suitable Forest land (Item 2 minus 9)	569 8	568.8	517 6	449.2	449.2	389.9	451.2	463.8	366.4	316.0	585.8	0
11. Total National Forest land.	<---------- 1,577.9 ---------->											

1/ See Appendix B, II A.4.
2/ Lands for which current information is inadequate to project responses to timber management. Usually applies to low site lands.

e. Silvicultural Systems

In high timber output alternatives, clearcutting is applied to all the area where it is the optimal silvicultural system. In other alternatives, shelterwood and selection systems are applied to some areas because of other resource values, but clearcutting is the most used system because it is the optimal silvicultural system in most of the habitat types and the most biologically sound system in the forest cover types on the Forest. Figures II-20 and II-21 represent the optimal way of meeting alternative objectives and constraints as projected by the Forest Planning Model (FORPLAN) but do not represent area targets by method. Final determination of harvest method will be made by a certified silviculturist following site-specific analysis.

Figure II-20
Decade 1 (Plan Period) Silvicultural Systems (board feet)

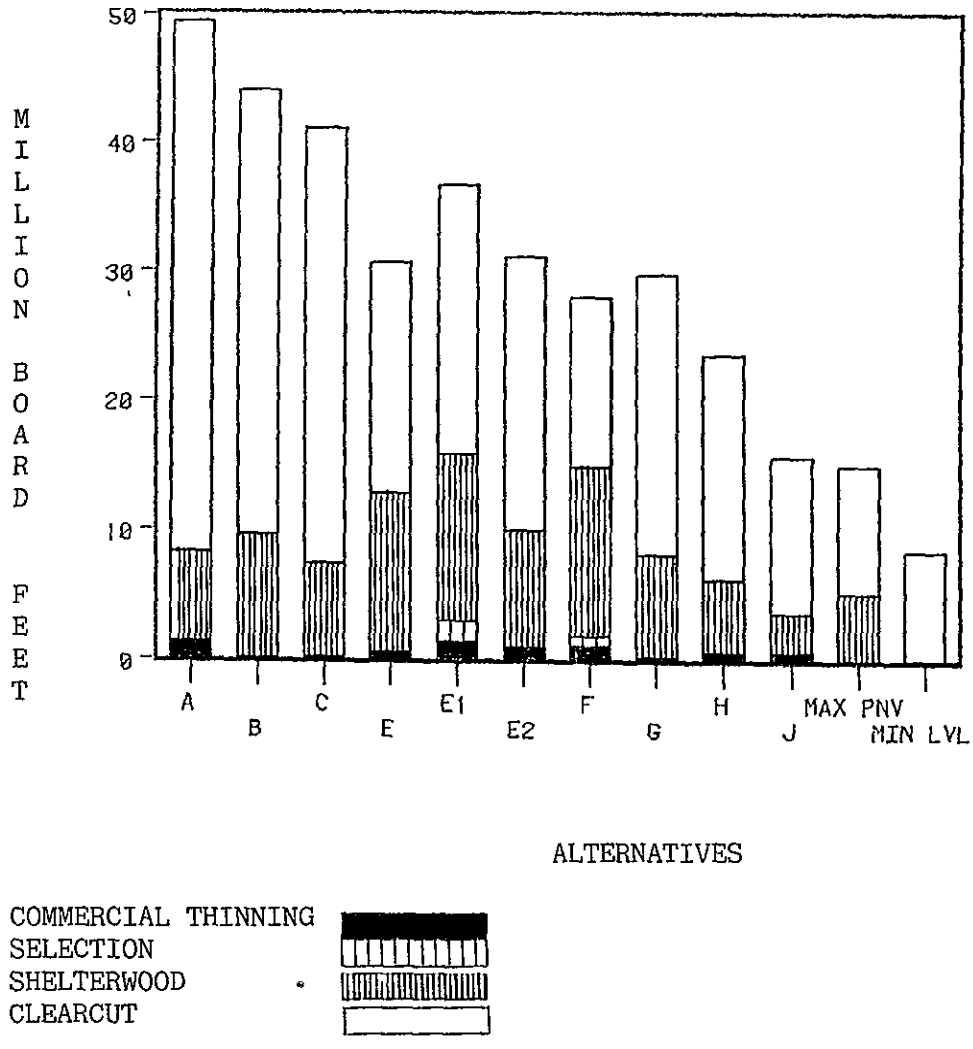
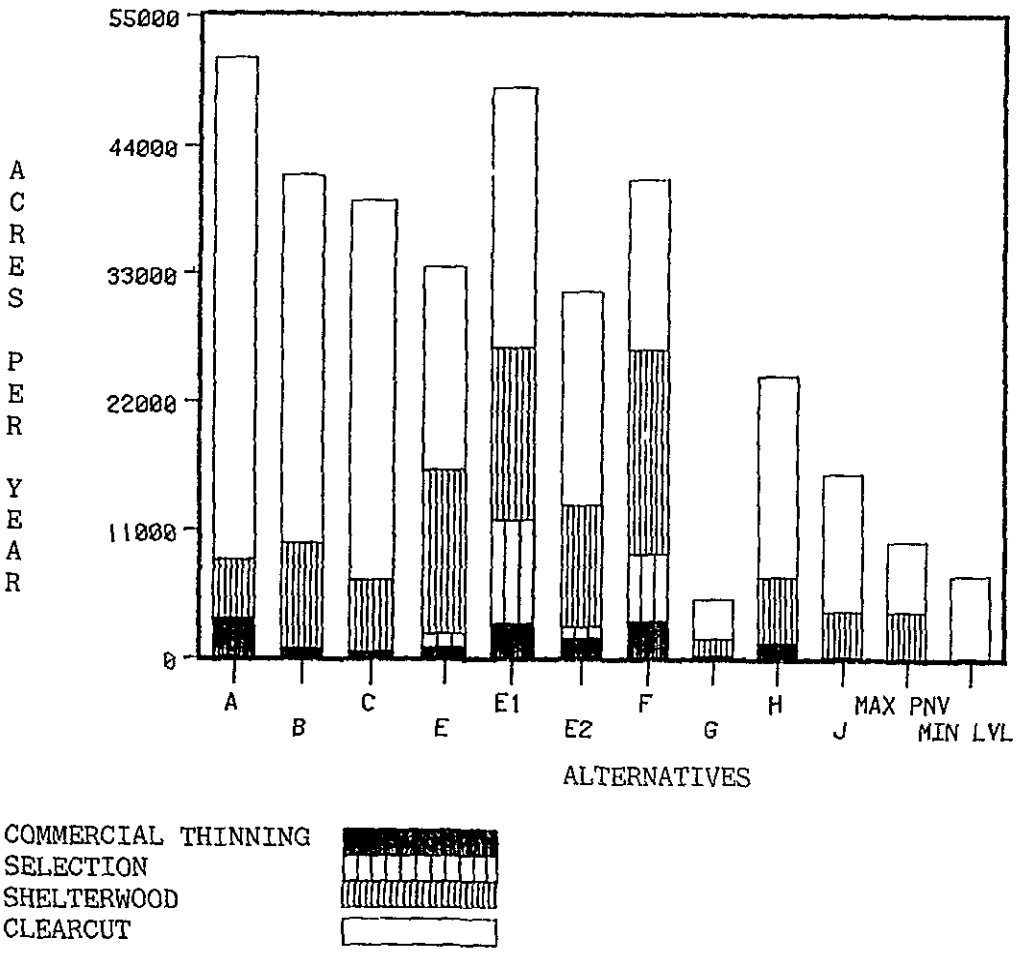


Figure II-21
Decade 1 (Plan Period) Silvicultural Systems (acres)



10. Watershed

Sediment can be generated both by increased water yields and by ground disturbances. The principal activity resulting in increased water yields from the Forest is the loss of vegetative cover from timber harvest. Other activities that contribute to increased water yield are the clearing associated with road construction, domestic livestock grazing, mineral exploration, and slash disposal and site preparation following timber harvest. These ground-disturbing activities, especially in riparian zones, increase the risk of sediment yield. The actual risk of increased sediment yield varies by the amount of soil disturbance, the type of treatment, soil material, and various other physical and biological factors. As roads stabilize and disturbed sites revegetate, sediment production from any given source decreases (Cline 1980, Megahan 1972, 1974).

Table II-16 displays the amount of major activities as indicators of water yield increase and sediment production potential. Using road construction and timber harvest levels as the principal indicators, the alternatives are ranked by their relative risk of affecting water-related beneficial uses. The alternative ranked number 1 has the least risk of affecting such uses. Road construction risk of affecting water uses was weighted more heavily than timber harvest and the rankings were averaged for the first, third and fifth decades. See Planning Records for the specific procedure used to rank the alternatives.

Table II-16
Alternative Rank by Risk of Producing Sediment and Criteria for Ranking

Rank	Alternative/ Benchmark	Decade 1 Plan Period Road Const. Mi/Yr	Decade 1 Plan Period Timber Harvest Ac/Yr	Decade 3 Projected Road Const. Mi/Yr	Decade 3 Projected Timber Harvest Ac/Yr	Decade 5 Projected Road Const. Mi/Yr	Decade 5 Projected Timber Harvest Ac/Yr
1	MIN LVL	3	716	0	0	0	0
2	J	12	1,582	13	2,021	4	3,239
3	H	19	2,426	19	2,511	15	5,260
4	E2	25	3,146	22	3,816	13	5,345
5	G	24	2,956	22	3,602	18	6,778
6	E	23	3,360	22	4,410	20	6,883
7	F	23	4,111	22	3,993	18	7,020
8	E1	31	4,900	22	4,900	18	6,983
9	C	34	3,926	30	4,710	26	6,881
10	B	36	4,141	35	4,752	22	7,766
11	MAX PNV	11	1,006	53	7,030	37	8,243
12	A	41	5,146	39	4,971	35	6,937

Figure II-22 displays the annual water yield. There is very little water yield increase in decade 1 for Benchmark K (MAX PNV) because little timber is harvested. In decade 5, water yield increase in Benchmark K is the highest because more timber is harvested than in any alternative or other benchmark. Maximum water yield increase in any decade for any alternative is 33,000 acre-feet per year, about a 1 percent increase. Water yield will increase less than 0.5 percent in any decade in Alternative E2 (Preferred Alternative).

Figure II-22
Annual Water Yield

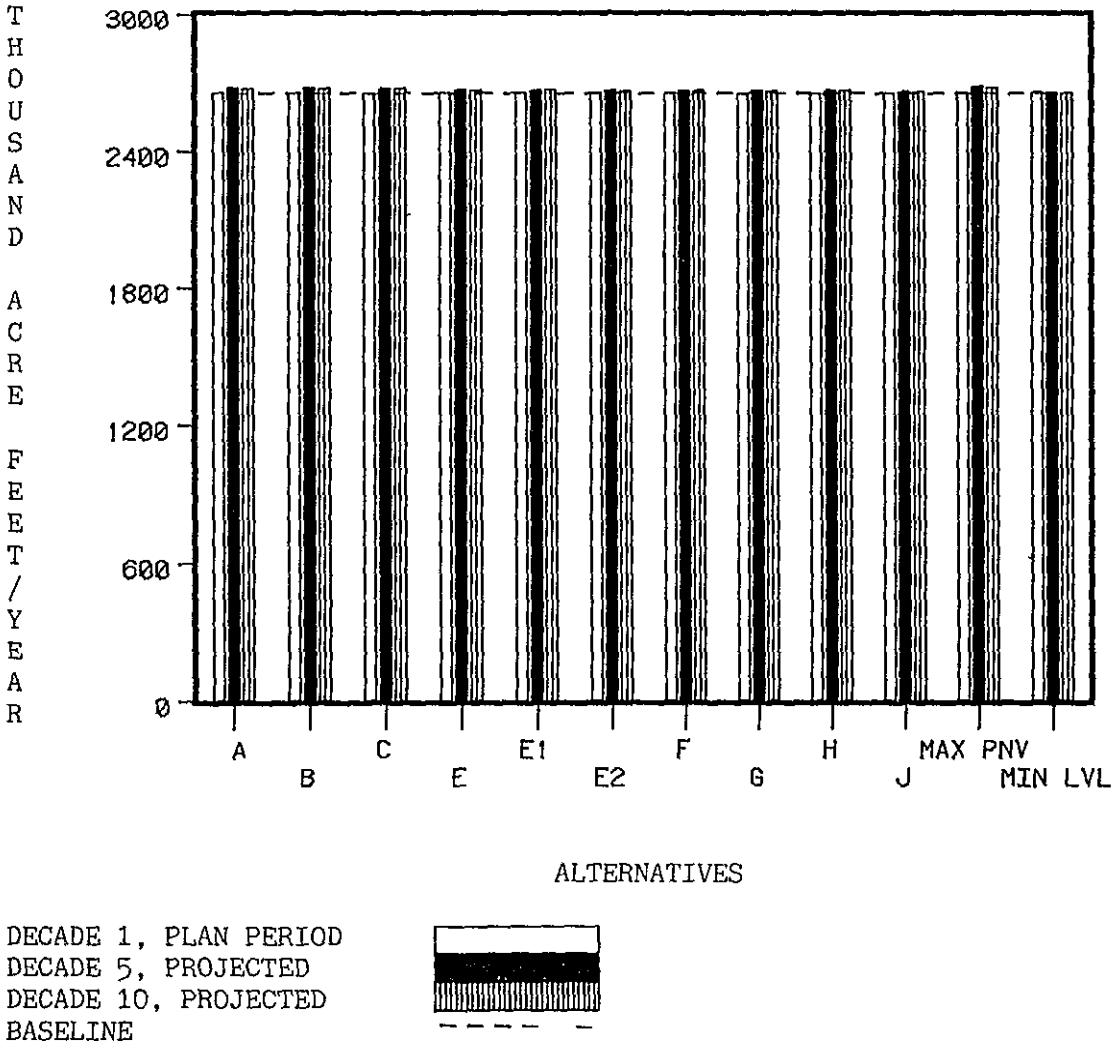
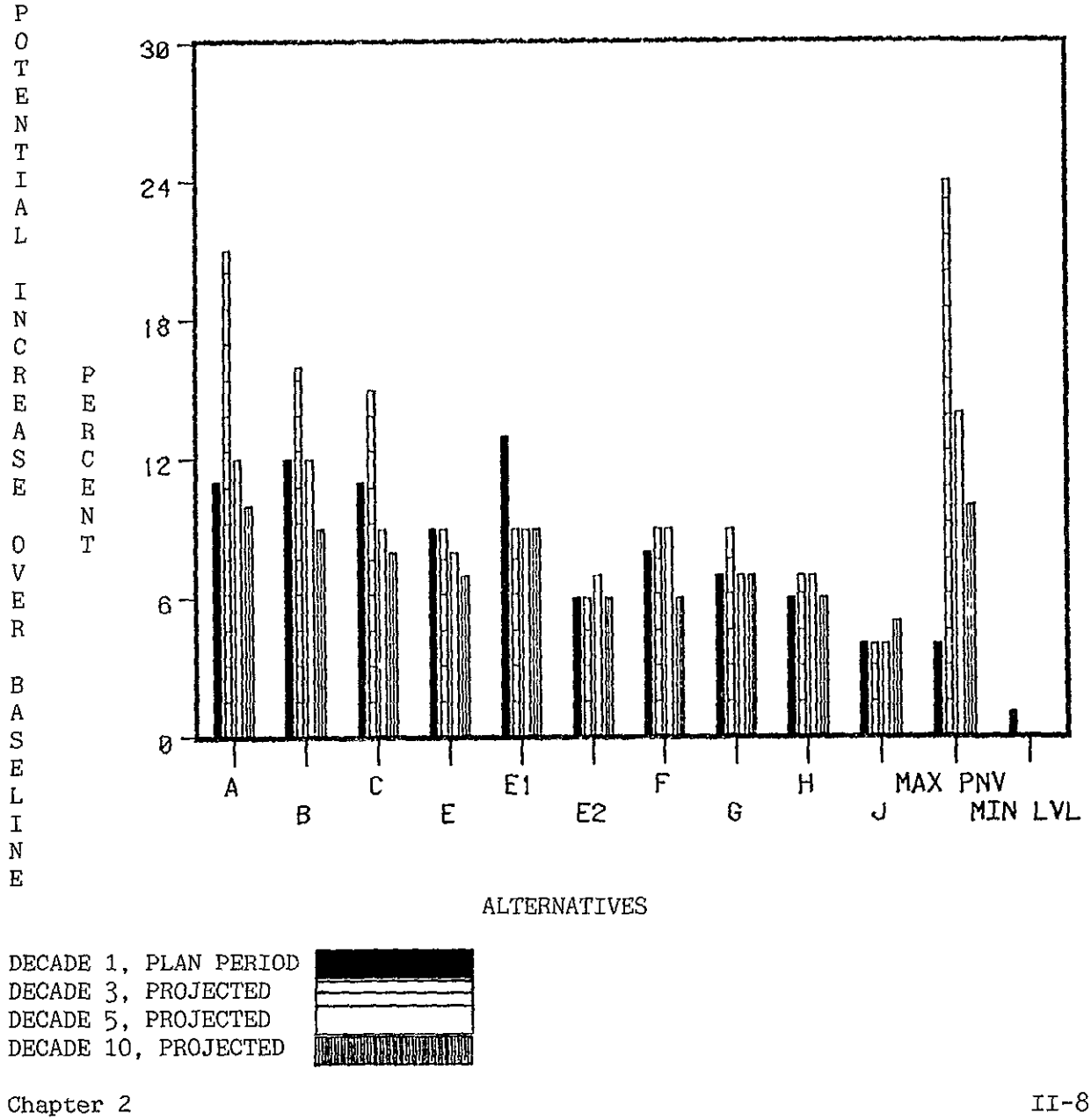


Figure II-23 displays the potential increased sediment production by alternative and decade, based on the use of the Regions 1 and 4 sediment model (USDA, 1981) as a means to compare alternatives. The risk ranking of alternatives shown in Table II-16 correlates with the potential sediment production displayed in Figure II-23.

Road construction is the major producer of sediment on the Forest. Road construction, timber harvest, slash disposal, and site preparation are the criteria used to rank alternatives. Due to the higher sediment production levels, it will be more costly to meet water quality goals for Alternatives A, B and C, and there is a greater risk that water quality might be impacted in spite of application of Soil and Water Conservation Practices.

Alternatives A, B and C show potential increases in sediment in 50 years of 15 to 21 percent above the present level. Alternatives E, E1, F, G and H show 7 to 14 percent potential increase. Alternatives E2 and J have the lowest sediment increase potential, 5 to 7 percent, since they have the least miles of road construction and timber harvest, and thus the least risk to water quality degradation. (Table II-16 and Figure II-23).

Figure II-23
Potential Increased Sediment Production



The amount of disturbance caused by mineral exploration and development on the Forest at this time is minimal. Impacts due to domestic livestock grazing are localized, and contribute insignificant amounts of sediment Forest-wide.

Soil and Water Conservation Practices (Draft FSH 2509.22) will be used in all alternatives to assure that management activities will meet and/or exceed State of Montana Water Quality Standards.

The effects of sediment production on water-related beneficial uses will be monitored during project development. Projects that will not meet State Water Quality Standards will be redesigned or dropped.

11. Minerals

Ratings of mineral and energy potential (low, moderate, high, very high) are based upon the favorability of the geologic environment. Land has also been placed into one of the following four categories according to its degree of availability and accessibility.

Category A	Withdrawn or proposed for withdrawal from mineral entry.
Category B	Statutes or executive orders require specific protection or mitigation measures for riparian zones.
Category C	Special conditions on winter game range, roadless and visual lands require special lease stipulations or plans of operation.
Category D	Standard lease stipulations and conditons for plans of operation apply.

Land area in these categories changes by alternative (Table II-17). The Forest road system will enhance mineral access when it is completed in about 50 years. The area of the Forest that will be roaded varies by alternative (Figure II-24). Almost one-half of the Forest is now wilderness where no further mineral entry is allowed.

Figure II-24
Area Roaded by Decade 15 (Projected)
(thousand acres)

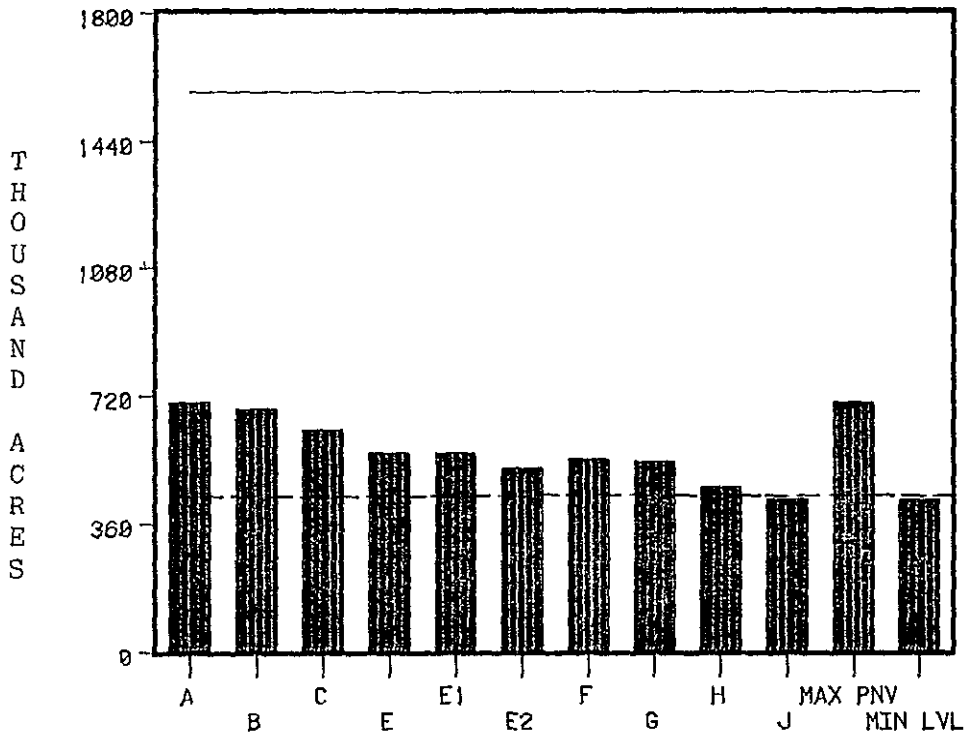


Table II-17
Area of Nonenergy and Energy Resource Potential
(thousand acres)

Alternative	Category	Potential for Nonenergy: Low	Moderate	High	Very High	% * H-VH	Potential for Energy: Low	Moderate	High	Very High	% * H-VH
A	A	600	150	2	0	1	738	5	0	0	0
	B	26	35	15	0.9	9	31	45	0	0	0
	C	140	154	29	17	27	200	126	0	0	0
	D	113	191	85	22	63	241	193	0	0	0
B	A	628	172	2	0.8	2	789	5	0	0	0
	B	24	36	13	4	10	42	36	0	0	0
	C	141	133	32	15	27	196	126	0	0	0
	D	86	189	79	23	60	194	193	0	0	0
C	A	628	190	6	0.4	4	789	22	0	0	0
	B	25	35	12	4	10	42	35	0	0	0
	C	151	150	42	18	36	215	148	0	0	0
	D	74	157	66	19	50	175	155	0	0	0
E	A	628	193	9	0 3	5	791	32	0	0	0
	B	25	34	12	4	9	42	34	0	0	0
	C	165	184	75	3	46	134	177	0	0	0
	D	61	120	55	11	39	254	117	0	0	0
E1	A	628	193	9	0.3	5	791	32	0	0	0
	B	25	34	12	4	9	42	34	0	0	0
	C	165	184	75	3	46	134	177	0	0	0
	D	61	120	55	11	39	254	117	0	0	0
E2	A	628	193	9	1	6	791	32	0	0	0
	B	25	34	12	4	9	42	34	0	0	0
	C	179	219	90	5	56	138	189	0	0	0
	D	47	85	40	8	28	250	105	0	0	0
F	A	628	172	3	0.4	2	788	5	0	0	0
	B	24	35	15	1	9	41	38	0	0	0
	C	174	195	72	20	54	234	216	0	0	0
	D	51	127	43	18	36	134	124	0	0	0
G	A	657	249	19	3	13	863	53	0	0	0
	B	22	36	12	5	10	33	33	0	0	0
	C	136	146	53	20	43	199	219	0	0	0
	D	64	108	48	12	35	98	82	0	0	0
H	A	683	306	48	14	36	919	121	0	0	0
	B	19	22	7	4	6	29	25	0	0	0
	C	129	106	42	11	31	144	141	0	0	0
	D	48	93	36	12	28	124	77	0	0	0
J	A	721	351	58	16	42	1070	48	0	0	0
	B	16	17	7	3	6	24	22	0	0	0
	C	110	100	37	12	28	168	136	0	0	0
	D	37	55	26	18	25	54	60	0	0	0
MIN LVL	A	600	150	2	0	1	738	5	0	0	0
	B	26	35	15	1	9	31	45	0	0	0
	C	206	251	78	27	62	317	243	0	0	0
	D	48	93	36	12	28	124	77	0	0	0
MAX PNV	A	600	150	2	0	1	738	5	0	0	0
	B	26	35	15	1	9	31	45	0	0	0
	C	140	153	29	17	27	200	126	0	0	0
	D	113	191	85	22	63	241	193	0	0	0

* Percent distribution of high plus very high potential by category for each alternative and benchmark.

The minerals industry has shown particular interest in the 170,000 acres having high to very high potential for nonenergy mineral resources. No energy potential on the Forest is in the high or very high categories. Standard surface protection requirements (Category D) apply to about 30 percent of the land with high to very high potential in Alternatives E2, H and J and about 60 percent in A and B. Existing and proposed withdrawals (Category A) apply to practically no land having high to very high potential in Alternatives A, B and F, to about 40 percent in Alternative J. Existing wilderness has practically no land of high to very high potential.

12. **Road System**

There are now 2,057 miles of road on the Forest. The high timber output alternatives (A, B and C) project 2,300 or more additional miles to access all the area managed for timber production (Table II-18). Projections for other alternatives, except J, nearly double the existing road system. Roads constructed in Alternative J are on lands currently considered roaded, so there will be very little reduction in roadless area.

Projections show that about 60 percent of the new roads will be built by decade 5. All high timber output alternatives require a substantial increase in road-building activity in the first decade, compared to the average for 1970-80.

Table II-18
First Decade (Plan Period), Fifth Decade Cumulative (Projected), and Total Road Construction
(miles)

Road Construction	Alternative/Benchmark										MAX PNV	MIN LVL
	A	B	C	E	E1	E2	F	G	H	J		
Plan Period Decade 1	410	360	340	230	310	250	230	240	190	120	110	30
Projected Decade 5 Cumulative	1920	1570	1500	900	1170	1020	1050	1070	890	740	1770	30
Total	2640	2300	2325	1970	2055	1812	1785	1965	1658	972	3130	30

13. **Fire Management**

Wilderness areas on the Forest have been or are being evaluated for application of fire management prescriptions. Prescriptions prepared for the Anaconda-Pintler, Frank Church-River of No Return and Idaho portion of the Selway-Bitterroot Wildernesses range from immediate control in areas where public safety or other resource values are important, to monitoring where desirable to restore fire to the ecosystem. Alternatives vary in the application of fire management prescriptions by the amount of land recommended for wilderness.

14. Landownership

Landownership adjustment goals vary to meet the objectives of management areas (see Appendix B, Section IX). Alternatives A and B designate most intermingled and adjacent land, including that involved with corporate checkerboard ownership, to the timber/range management area. These lands can be exchanged provided the supply of wood products is not affected; however, the objectives of these alternatives would not be enhanced by exchange. However, the objectives of all of the alternatives can be enhanced through land exchange with corporate checkerboard ownership in the Rye Creek area. Winter range, sensitive visual, semiprimitive and/or wilderness management areas can be improved in Alternatives C, E, E1, E2, G, H, and J. Up to 4,000 acres in Alternative J could be exchanged to improve management area objectives.

15. Energy Consumption

Nearly three-fourths of the energy consumed in each alternative is for developed and dispersed recreation, timber hauling, and road construction (Table II-19). In general, the higher the timber output, the greater the energy consumption, because recreation uses vary only slightly among alternatives, and other uses vary directly with timber harvest volume. See Table II-26 for total energy consumption in decades 1, 3, and 5.

Table II-19
Decade 1 Annual Average Energy Consumption
(billion BTU's)

	Alternatives/Benchmark											
Activity	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Recreation	85	85	85	85	85	85	85	85	85	85	85	85
Timber felling, yarding, loading	54	34	30	25	30	17	26	26	17	11	9	4
Timber hauling	44	39	37	27	33	24	25	27	21	13	13	7
Timber management	6	5	5	4	6	4	4	4	3	2	1	1
Road construction	46	56	54	44	67	25	39	34	33	20	17	3

16. Utility Transportation Corridors

Management prescriptions are categorized as utility corridor exclusion, avoidance, or window areas (Table II-20). Existing and recommended wilderness areas are exclusion areas.

Avoidance areas are areas where establishment and use of corridors conflict with land management objectives, including prescriptions which emphasize semiprimitive recreation, research, riparian, sensitive visual, and recreation management; and some minimum management areas.

Window areas include multiple use prescriptions which emphasize timber, range, and wildlife winter range management, and some minimum management areas.

Table II-20
Utility Corridor Exclusion, Avoidance and Window Areas
(percent)

	Alternatives/Benchmarks											
Status	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Exclusion	47	50	53	52	52	52	50	58	66	73	47	47
Avoidance	8	13	13	20	20	26	25	19	9	15	8	25
Window	45	37	34	28	28	22	25	23	25	12	45	28

Corridor studies have identified three utility transportation corridor segments on the Forest. The Sapphire Mountain corridor, segment R27 (Table IV-10), is available in Alternatives A, B, and C; conflicts with roadless, semiprimitive recreation designation in Alternatives E, E1, E2, and F; and is excluded from use in Alternatives G, H, and J because the Sapphire divide is recommended for wilderness.

The Nez Perce Trail road corridor, segment R28, was excluded from use in all alternatives by classification of the Frank Church-River of No Return Wilderness and expansion of the Selway-Bitterroot Wilderness. Segment R29, the Highway 93 corridor, is available in all alternatives.

17. Issues Considered in Alternatives

Each alternative was designed to address, in varying degrees, one or more of the six major issues. Table II-21 identifies the six issues, the indicators of response to each issue, and the actual response by alternative. For example, Alternative A addresses the timber production issue with an allowable sale quantity of 59 MMBF but does not address visual or wildlife issues, and provides for minimum soil and water protection and roadless management.

Table II-21
Response of Alternatives to Major Issues

ISSUE	INDICATOR	UNIT 1/	Alternatives A	B	C	E	E1	E2	F	G	H	J	BENCH-MARK MAX PNV
Timber	--Portion of 586,300 acres of tentatively suitable timberland managed for timber production	%	97	97	89	77	77	66	77	79	63	54	100
	--Long term sustained yield.	MMBF	59	59	52	46	46	42	40	44	40	30	60
	--Annual Allowable Sale Quantity (Decade 1)	MMBF	59	51	49	36	44	33	33	35	28	18	16
	Aerial yarding portion.	%	37	20	16	17	22	12	27	23	17	17	7
	Lodgepole pine	%	40	19	9	28	35	26	24	13	24	10	0
	Steep slopes, sensitive soils	M Ac	29	16	13	15	23	9	19	11	7	5	3
	Timber sale program excluding MWSA areas.	MMBF	52	42	43	32	39	31	33	30	26	18	16
	Change from 10-year average sell of 30 1 MMBF	%	+96	+69	+63	+20	+46	+10	+10	+16	-7	-40	-47
	Change from Bitterroot share of log requirement expressed by Darby mill owners (40 3 MMBF).	%	+46	+27	+22	-11	+9	-18	-18	-13	-31	-55	-60
	--Potential for below-cost sales in Decade 1. 2/	Rank	VH	H	M	H	VH	M	H	M	L	L	VL
Visual	--Visual quality objective as a percentage of suitable timber base.												
	-Retention, activities evident	%				3	3	1	20	17		35	
	-Partial retention, activities subordinate.	%		16	16	20	20	29	8	22	17	26	
	-Modification, activities dominate	%		11	23	29	29	44	11	14	15	39	
	-Maximum modification, activities dominate	%	100	73	61	48	48	26	61	48	68	0	100
Wildlife	--Winter range assigned to winter range prescription	%	*0*	*25*	*46*	*51*	*51*	*51*	*19*	*25*	*22*	*24*	*0*
	--Old growth on suitable timberland end of Decade 1	%	38	38	38	35	36	37	37	38	36	32	38
Fish	--Portion of riparian area assigned to riparian prescription	%	0	17	18	36	36	100	28	38	21	NA	0
	--Current non-wilderness stream population compared end of Decade 1	%	85	92	85	86	76	100	86	86	86	100	100
Water	--Increase in sediment above current level, Decade 1	%	11	12	11	9	13	5	8	8	6	4	4
Roadless	--Portion recommended for wilderness	%	0	12	24	19	19	19	12	42	73	99	0
	--Portion to remain roadless	%	33	25	27	49	49	58	60	24	18	0	0
	--Estimated development in Decade 1	%	26	21	9	17	19	4	11	11	4	0	0
	--Estimated development in later decades	%	41	42	40	15	13	26	10	23	5	1	100
Blue Joint MWSA	--Portion of 65 4 M acres recommended for wilderness	%	0	0	26	44	44	44	0	68	90	99	0
	--Portion designated to remain roadless	%	25	25	20	30	30	30	100	4	8	0	25
Sapphire MWSA	--Portion of 44 1 M acres recommended for wilderness	%	0	0	6	0	0	0	0	46	82	99	0
	--Portion designated to remain roadless.	%	24	24	35	61	61	62	100	11	16	0	24
Roads	--Average annual road construction *Decade 1*	Miles	41	36	34	23	31	25	23	24	19	12	11
Economics	--Present net value.	MM $	148	143	125	96	85	99	103	91	103	62	206
	--Cash flow (annual, Decade 1). Annual receipts minus costs. 3/	MM $	-4 8	-3 9	-3.7	-4 5	-5 8	-3.2	-4 5	-4 3	-4.0	-4 2	-2 1
	Timber receipts minus timber related costs 4/	M $	-1 8	-0 8	-0 4	-1 2	-2 4	+0 5	-1 9	-0 5	-0.7	-0 6	+0 5
	Wildlife, recreation, range, minerals receipts minus *costs* 4/	MM $	-0 4	-0 4	-0 6	-0 7	-0.7	-0 7	-0 3	-1 1	-0 7	-1 1	-0 1
	--Income from Forest related activities	MM $	26	24	23	20	23	19	19	20	18	15	14
Budget	--Change from FY 86 budget	%	+39	+39	+38	+30	+50	+14	+20	+29	+20	+12	-11
Returns	--To States, Decade 1	M $	600	900	900	500	600	600	400	600	500	300	500
Employment	--Change from current Forest related employment	%	+33	+25	+21	+8	+20	-1	+2	+6	-4	-16	-22

1/ MMBF = millions of board feet M $ = thousands of dollars
ASQ = allowable sale quantity MM $ = millions of dollars
M Ac = thousands of acres

2/ Below-cost sales are those where timber receipts do not recover timber-related costs For more detail see EIS Chapter II, Section 18

3/ Excludes Job Corps but includes road maintenance, fire protection, etc

4/ Excludes road maintenance, fire protection, etc

A comparison of each alternative to Alternative F, current program, is shown in Figures II-25 through II-33. The horizontal line represents the current program; the bars represent first decade resource, activity, and economic percent changes for each alternative. For example, Figure II-25 shows that Alternative A substantially increases livestock, timber, PNV, and receipts, but there is a corresponding increase in cost and decrease in visual quality.

Figure II-25
Comparison of Alternative A to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

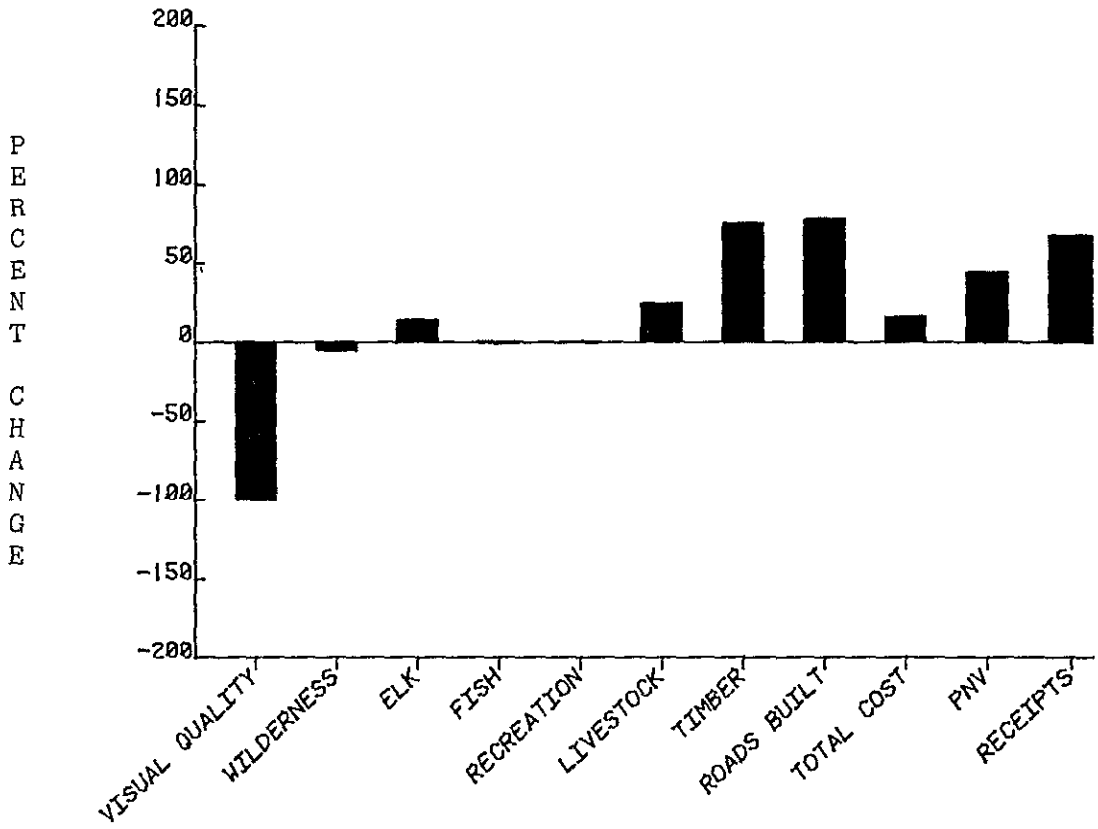


Figure II-26
Comparison of Alternative B to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

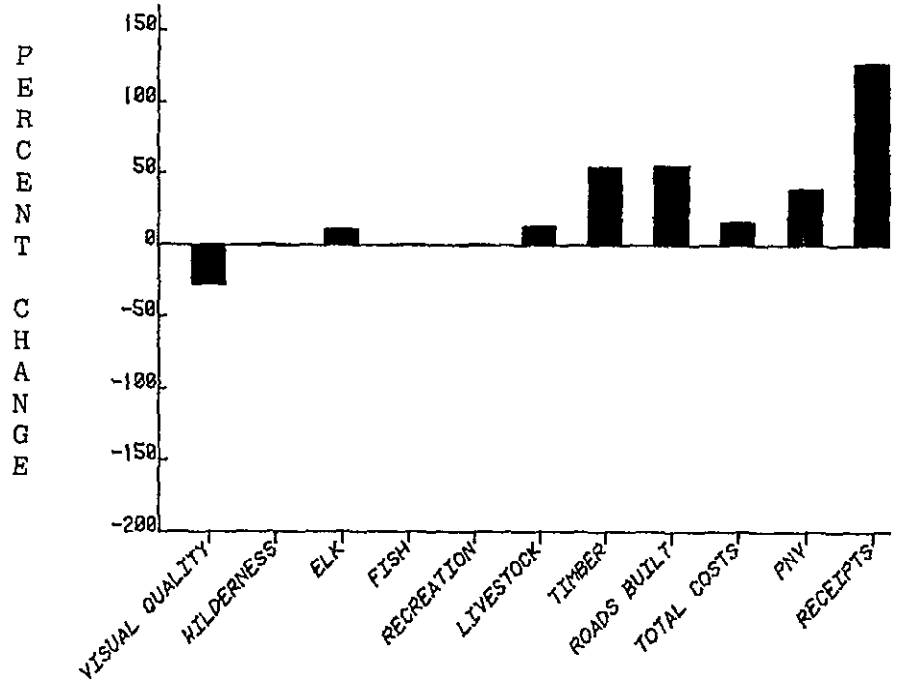


Figure II-27
Comparison of Alternative C to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

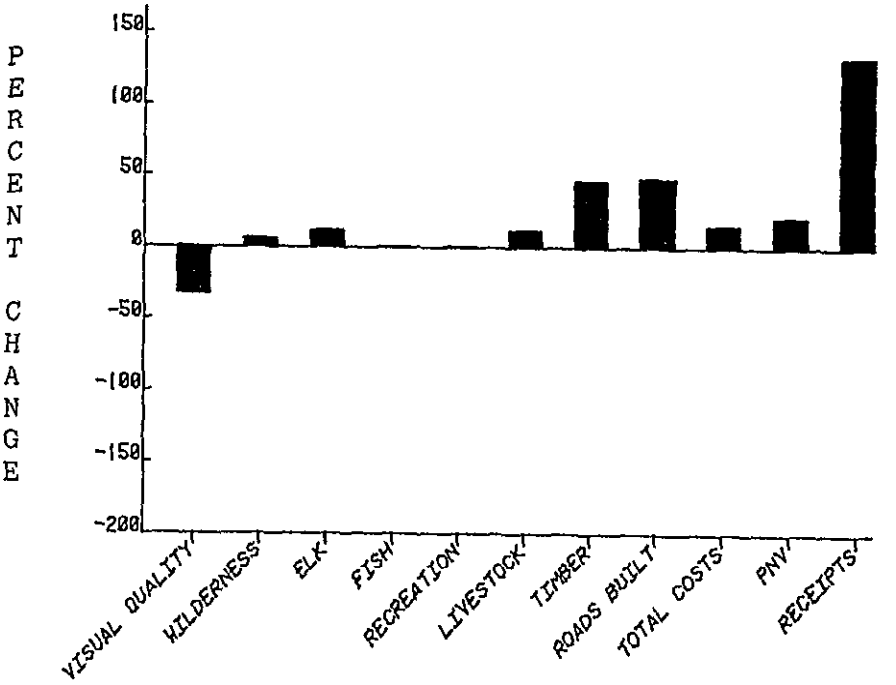


Figure II-28
Comparison of Alternative E to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

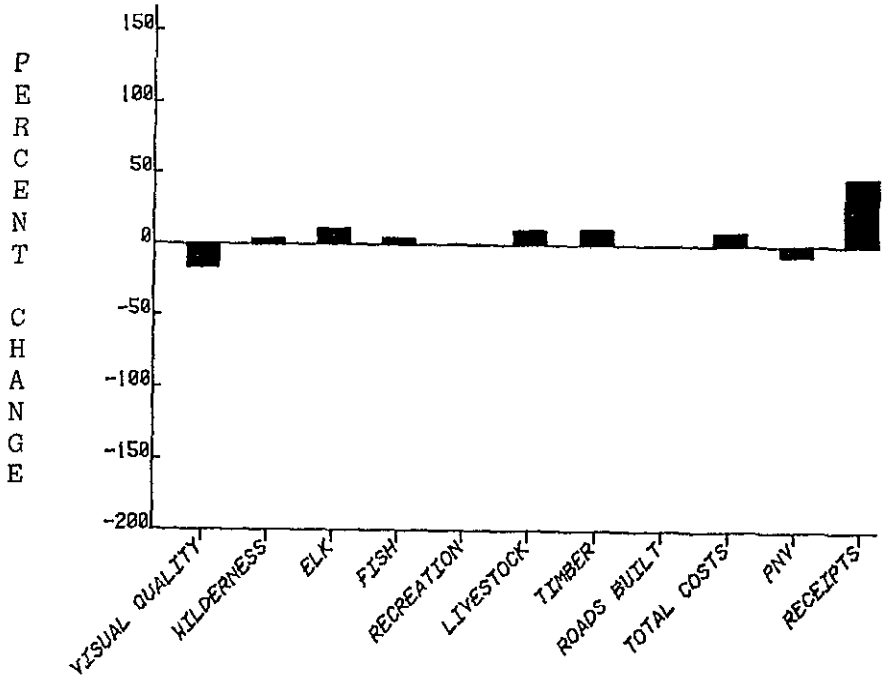


Figure II-29
Comparison of Alternative E1 to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

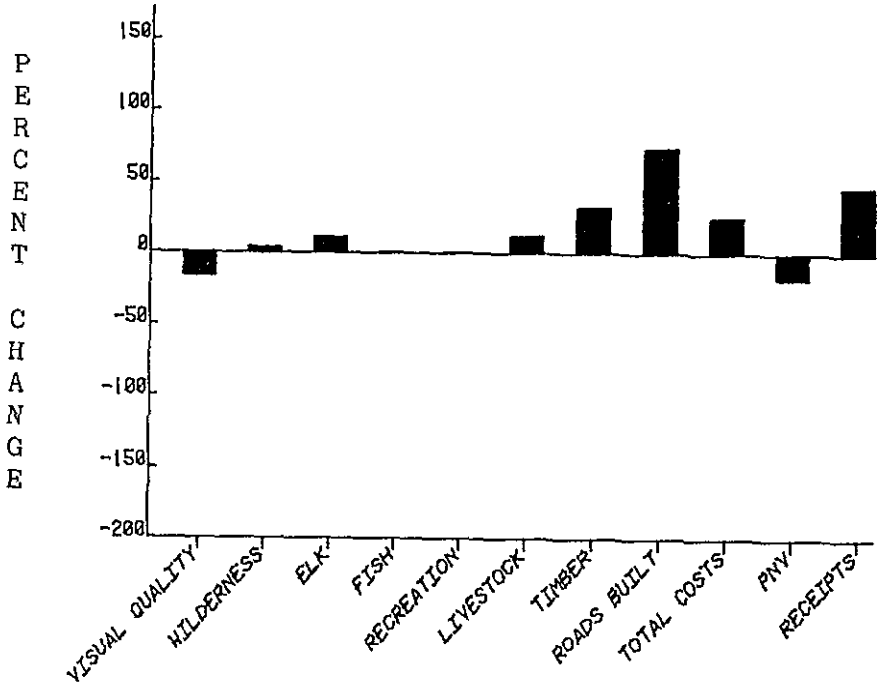


Figure II-30
Comparison of Alternative E2 to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

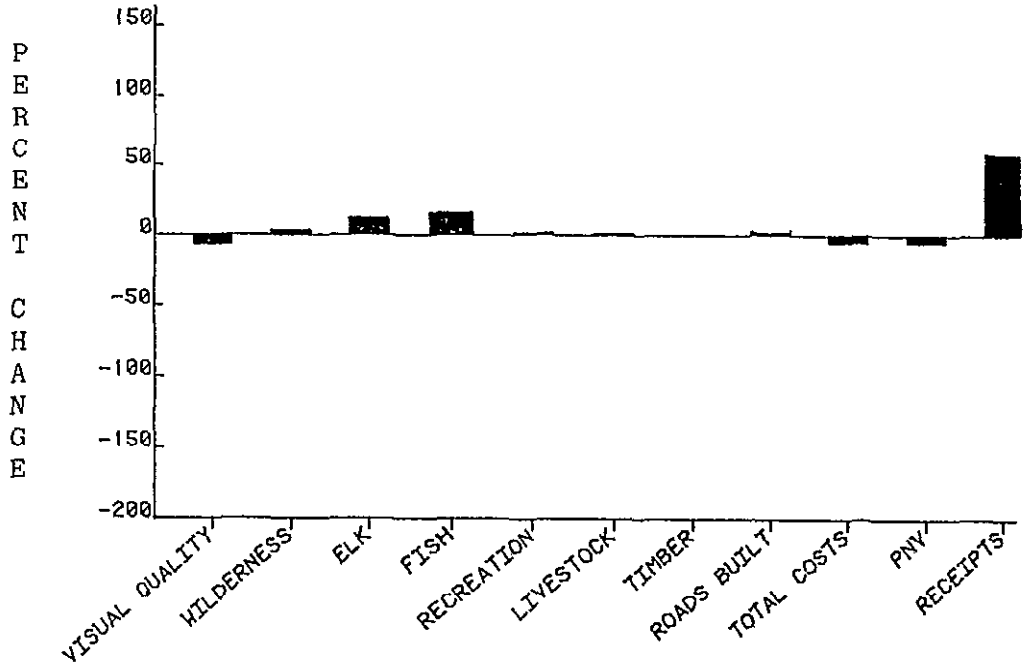


Figure II-31
Comparison of Alternative G to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

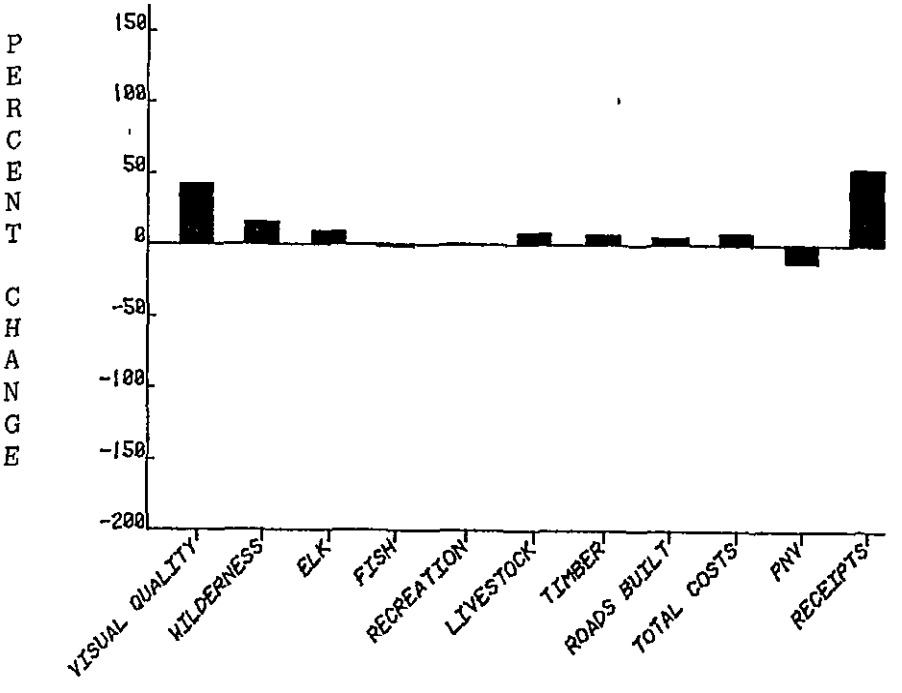


Figure II-32
Comparison of Alternative H to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)

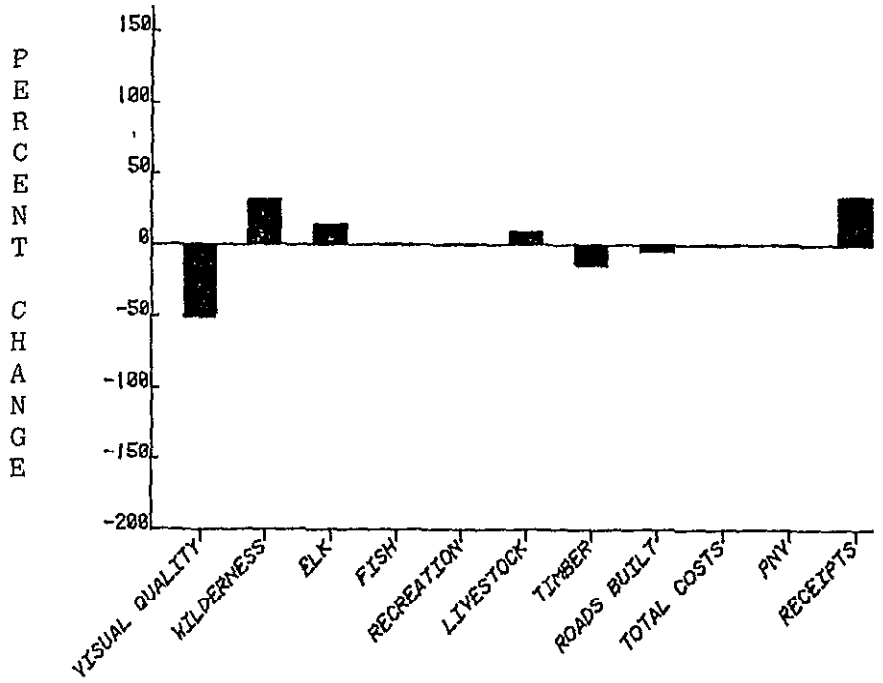
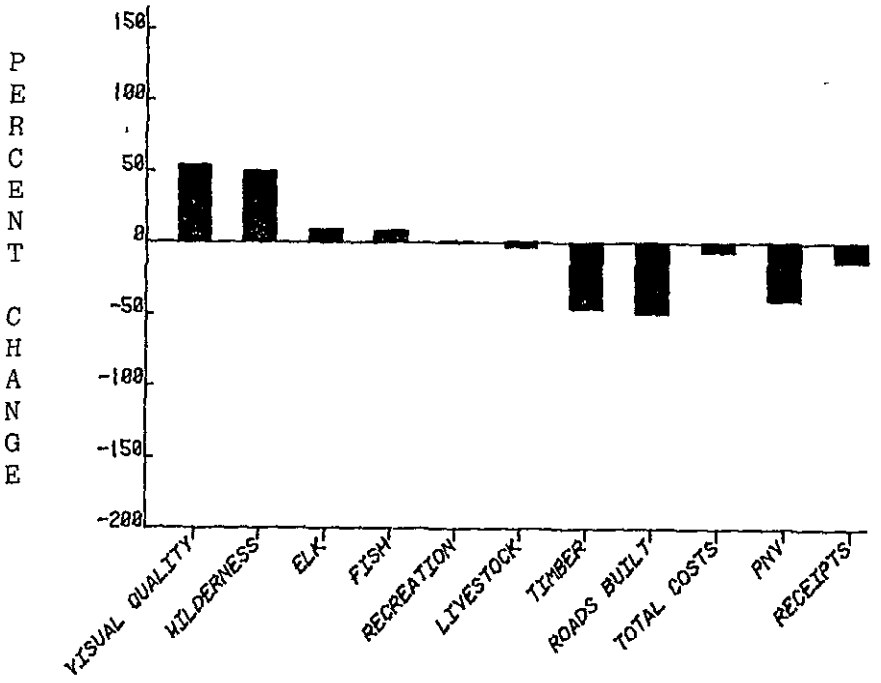


Figure II-33
Comparison Of Alternative J to Alternative F (Current Direction)
Change in Decade 1 Outputs
(percent)



18. Below-Cost Timber Sales

The discounted timber benefits for the planning horizon are greater than the discounted timber costs (Table II-23a) which means that overall financial returns of the timber program are positive. However, the positive values do not mean that below cost sales have been avoided. Timber sales, whether below cost or not, were assessed in terms of how they fit into a comprehensive program of management for the Forest. The mix of outputs and associated costs and benefits produced by the different alternatives are the result of selecting prescriptions which most efficiently meet the objectives of the alternative. Cost efficiency was considered in (1) the development of the prescriptions (see Appendix B, Sections III and IV), and (2) the FORPLAN model which had a range of those prescriptions to choose from when determining an optimal solution for each alternative with the objective of maximizing PNV. The long-term timber harvest level in all alternatives is less than the timber harvest level in the maximum PNV benchmark which is the most economically efficient mix of management prescriptions and resource outputs for the Forest if management constraints are minimal.

In spite of alternative and prescription cost efficiency objectives, indications are that below cost sales will occur (Table II-23b). When examining decade 1 alone, the overall net receipts (including other resource programs besides timber) are negative for all alternatives and the Max PNV benchmark. By decade 3, the net receipts are projected as positive for the maximum PNV benchmark but negative for all alternatives. By decade 5, the net receipts for all alternatives are projected as positive. Sales with high investment costs in the immediate future are followed by sales in the future that have lower costs and higher returns so the entire set of management activities provide a positive return. As pointed out by a research study on below cost sales, efficient management and below cost sales are not incompatible (Schuster and Jones 1985).

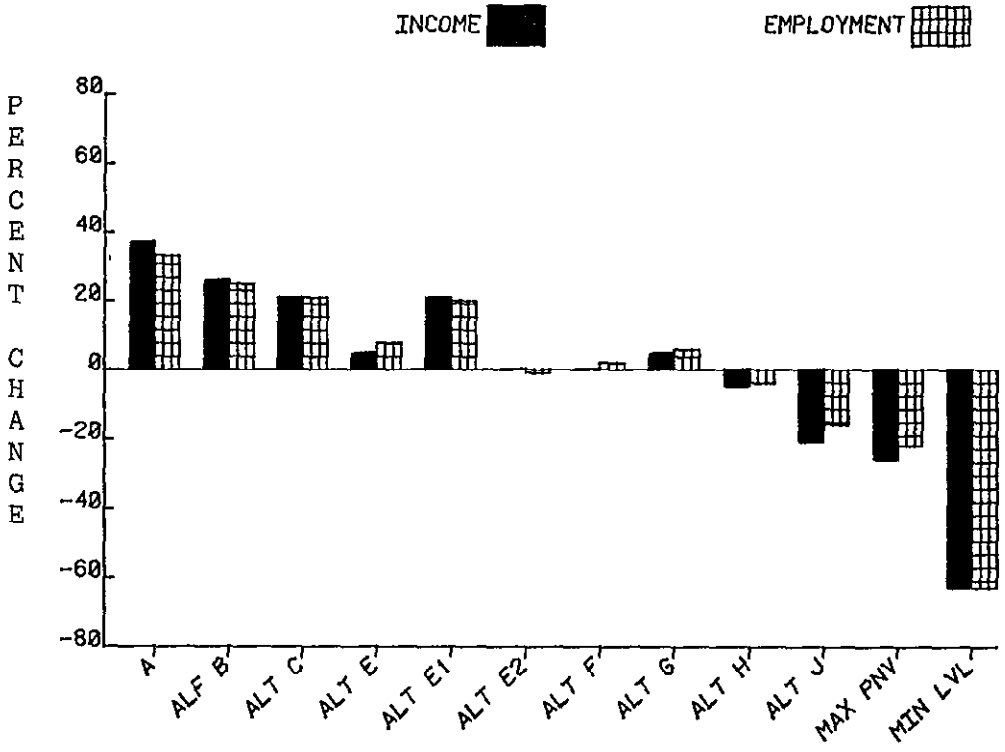
In implementing any alternative, however, further project level analysis will be required prior to implementing that activity. Regional Office direction requires a project level analysis of each timber sale over one million board feet to assure it deals with environmental concerns with the most cost-effective measures possible. The feasibility analysis added to the final Forest Plan requires examination of strategic items to assure consideration of their economic impacts on sale value in the sale design process.

19. Economic And Social Impacts in the Regional Area

a. Economic Impacts in Ravalli and Missoula Counties

Changes in timber harvest, recreation use, livestock grazing, and Forest Service expenditures result in changes in personal income and employment in Ravalli and Missoula Counties. Within the two-county area, Forest activities in 1980 to 1982 accounted for 1,050 jobs and $19 million in personal income or about 4 percent of the economic activity. The relative contribution of employment and income by alternative is displayed in Figure II-34. Differences among alternatives are primarily due to different timber outputs and Forest expenditures. The employment and income values include direct, indirect, and induced effects (See Appendix B, section V.)

Figure II-34
Local Private Sector Employment and Income in Decade 1 - Change from 1980-82 Average



b. *Social Effects in Ravalli and Missoula Counties*

Employment and income are important to the quality of life, and amenity values like scenery, hunting, fishing, backpacking, and fuelwood gathering are important in the lifestyles of local and regional residents. The effects of Forest resource use on these latter activities are less quantifiable than employment or income estimates.

Lifestyles; attitudes, beliefs, and values; and social organization, are the social variables used to compare the effects of Forest outputs and activities among the alternatives with Alternative F, the current situation.

(1) Lifestyles

In market-oriented alternatives there would be expanded employment and higher income in wood products, ranching, and minerals, but reduced employment for guides, outfitters, and recreational businesses. In nonmarket alternatives employment expands for guides, outfitters, and recreational business but wages paid are lower. Other alternatives maintain varying levels and mixes of employment opportunities.

Roaded recreation opportunities expand in Alternatives A, B and C, but hunting opportunity would decrease, fish populations decrease, and roadless recreation opportunities decrease. Alternative J maintains hunting season length and present opportunities, and fish populations. Other alternatives provide for varying levels and mixes of recreational opportunities.

(2) Attitudes, Beliefs, and Values

The natural condition of the Forest is rapidly modified by timber harvest and road construction in Alternatives A and B. Naturalness is maintained in Alternative J. Other alternatives provide for varying levels of naturalness.

Plentiful supplies of wood, forage, and access for minerals creates a feeling of self-sufficiency for people dependent upon those resources for a livelihood. As supplies decrease in Alternative J so does the feeling of self-sufficiency for these groups.

Alternatives A and J create uncertainty about living a desired way because they represent a dramatic change from the current situation. Other alternatives are more balanced in providing market and nonmarket resources thereby increasing the feeling of certainty of both commodity- and amenity-oriented individuals in being able to live a desired way.

(3) Social Organization

A certain amount of conflict is inherent in implementing any alternative. Alternatives A, B, and J generate the greatest degree of polarization. This decreases as a balance is created in the resolution of commodity and amenity issues in other alternatives.

20. Net Public Benefit and Nonpriced Benefits Addressed in the Alternatives

The overall conceptual measure of value of each of the alternatives is net public benefit. Net public benefit is summarized here as a preface to discussing those benefits that cannot be expressed in economic terms.

Net public benefit is the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated Forest inputs and negative effects (costs) resulting from management of Forest lands. Priced benefits and all financial costs of management can be measured in dollar terms. Some nonmarket benefits, such as recreation visitor days, are assigned values based on the concept of the willingness of users to pay for the resource output. However, other benefits and some negative effects cannot be measured quantitatively or cannot be fully valued in financial terms (see Appendix B, Section IV). A goal of forest planning is to determine which alternative effectively responds to public issues while maximizing the net public benefit. The choice of the alternative that maximizes net public benefit is a subjective decision.

The principal benefits and costs relevant to making that judgement for the Bitterroot Forest are associated with the issues discussed in Appendix A and with legislation underlying the planning process. Section 21 details costs and benefits that can be measured in financial terms. Those benefits that cannot be quantified are discussed below. Section 22 then compares changes in economic benefits with differences in responses to issues. Because these are summary statements, a fully informed judgement of the alternatives also requires an understanding of the results displayed elsewhere in this document.

The major nonpriced benefits are described in Appendix B, Section IV. C. Nonpriced benefits are not directly addressed by the alternative PNV comparisons. Some nonpriced benefits vary significantly by alternative and can be measured by physical indicators such as acres. Nonpriced outputs often result in reduced priced outputs (lower PNV). Tables II-24 and II-26 show the tradeoffs between priced and nonpriced outputs. The indicators are used to estimate the relative achievement of nonpriced resource goals among alternatives. The indicators do not quantify the nonpriced benefits but they indicate differences in levels of nonpriced benefits among alternatives.

a. Major Nonpriced Benefits with Large Differences Among Alternatives

Although there are several nonpriced benefits resulting from Forest management, four were identified as major benefits on the Bitterroot Forest. These four correspond to issues discussed in Appendix A. The nonpriced benefits discussed in this section vary significantly by alternative.

(1) Visual Quality.

Visual quality refers to the range and distribution of the scenic aspects and perceived beauty and enjoyment of the forest environment. Differences among forest recreationists, nearby residents, and travelers in the enjoyment they would receive from the physical conditions of each alternative are real but difficult to measure. While the total numbers of recreationists preferring conditions having particular scenic qualities and the implied dollar-values of their activities have been estimated, the options available to them would vary by alternative. Additional nonpriced benefits result from visual management's influence on wildlife habitat and water quality.

The inventoried area of retention and partial retention visual quality objectives is maintained in Alternatives G and J. The preservation objective is applied to wilderness and other special areas in all alternatives.

(2) Protection of Water Quality/Fisheries Habitat

Those that benefit from increased water quality/fisheries habitat include irrigators, recreationists, and communities using municipal watersheds. Variations in catchable trout populations reflect the level of water quality maintained by alternative. The Forest fisheries habitat is maintained within State water quality standards. However, water quality and fisheries habitat in individual fisheries streams would vary greatly depending on the goals of the alternative. This variability depends on the type and intensity of road construction, grazing, or timber harvest, and the geologic and morphological characteristics of the drainage.

(3) Wilderness and Roadless Area Diversity and Quality.

In order for an area to qualify as a wilderness, it generally must be at least 5,000 acres. In order to provide a quality recreation experience, a roadless area must be the same, at least 5,000 acres. Roadless recreation can be provided in other smaller areas, but for the purposes of Forest planning, if the

area does not meet the 5,000 acre criteria, it is not included in the roadless recreation calculation. There are 405,000 acres of inventoried roadless on the Forest. Demands for wilderness recreation would be satisfied in all alternatives for at least the first two decades.

Recreation use is only one value of the wilderness or roadless resource. Citizens at the local and national level, conservation and wildlife groups have expressed the desire to have more wilderness than is needed to meet projected recreation use. Many people feel other values of wilderness include: maintaining options for future generations, maintaining native plant and animal species, and providing a research base for studying a natural undisturbed environment. Quantifying the value of a wilderness or roadless area strictly by its recreation visitor day use misses many of its important values. Wilderness benefits are specific to the Bitterroot Forest (not captured by other wilderness areas in the National System).

(4) Diversity and Quality of Recreation Opportunities

The assigned value per recreation visitor day does not reflect the value of providing a diversity of recreation opportunities and settings. Diversity of experiences includes primitive, semiprimitive, roaded, and developed settings. It also includes experiences in unique settings such as wilderness, wild and scenic rivers, botanical areas, scenic areas, and historic sites. Areas available for the semiprimitive nonmotorized experience are reduced as more areas are roaded. Similarly, areas which currently provide roadless elk hunting and/or trout fishing are eliminated as they are roaded.

Indicators of recreation quality and diversity are found in comparing the projected demand with the potential for each recreation type. Quality and diversity increase as the margin of potential increases over the demand.

b. Nonpriced Benefits That Differ Less Among Alternatives

(1) Plant and Animal Community Diversity

Diversity is reflected in management for visual quality, water quality, threatened and endangered species, the regulated forest, recreation and wildlife habitat management, preservation of natural areas, and wilderness and roadless areas. Therefore, it is largely a broad, generic term for a wide range of output consequences that are the source of both economic and nonpriced benefits. The goal of emphasizing plant and animal diversity is maintaining gene pools, scientific research opportunities and to ameliorate insect and disease infestations.

The indicator used to describe plant and animal community diversity is the area in each age class group. As stated in 36 CFR 219.27(g) the goal for plant and animal community diversity "...shall preserve and enhance the diversity... so that it is at least as great as that which would be expected in a natural forest...". However, the mix of age class group that would best represent the natural environment is impossible to define. If the goal is to have a regulated forest, the best distribution is approximately 10 percent nonstocked and 22 1/2 percent each of seedling/saplings, poles, immature, and mature sawtimber. As emphasis shifts towards other goals, the proportions of age classes change in

response to the goals. All alternatives provide mixes of age classes to meet minimum diversity requirements as a result of varying intensities of timber management activities and assignments to roadless or wilderness management.

21. Significant Differences in Economic Values Among Alternatives

This section explains tradeoffs that would occur among the quantified economic benefits and outputs.

a. Differences in Present Net Value

The primary measure of economic efficiency is present net value (PNV), the sum of market and nonmarket priced values less all management costs for the 150 year planning horizon discounted at 4 percent. The PNV of each alternative is displayed in Tables II-22, II-23a, and Figure II-35. The maximum PNV Benchmark represents the maximum net return available from managing the Forest. Although it meets minimum legal requirements of managing the Forest, the PNV Benchmark is not designed to address issues.

The alternatives are ranked by present net value in Table II-22. The second column in Table II-22 shows the differences in PNV among pairs of alternatives. These figures are estimates of the net economic values that would be forgone if a lower-ranked alternative rather than the preceeding one were selected. Because timber values are a major component of PNV, these potentially forgone values are largely due to limiting the timber program.

Table II-22
Present Net Value Benefits and Costs Discounted at 4 percent for Alternatives and Selected Benchmarks (Million Dollars)

Alternative/ Benchmark	Present Net Value		Discounted Benefits		Discounted Costs	
	Total	Change	Total	Change	Total	Change
MAX PNV	206		414		208	
		-58		-31		+27
A	148		383		235	
		-5		-7		-2
B	143		376		233	
		-18		-23		-5
C	125		353		228	
		-22		-53		-31
H	103		300		197	
		0		-6		-6
F	103		294		191	
		-4		-4		-2
E2	99		290		189	
		-3		+19		+24
E	96		309		213	
		-5		-4		+1
G	91		305		214	
		-6		+1		+7
E1	85		306		221	
		-23		-59		-36
J	62		247		185	
		-82		-186		-104
MIN LVL	-20		61		81	

As the timber program and PNV decrease, costs also generally decrease. As priced benefits decrease from the alternative that emphasizes market outputs (primarily timber) to the alternative that emphasizes nonmarket outputs, costs also decrease because most costs are associated with the timber program. The costs generally decrease because less timber is being harvested. Even when less timber is harvested, other resource goals may increase costs by: 1) moving harvests into areas with high access costs, and 2) increasing mitigation costs for nontimber resources.

Table II-23a shows discounted benefits and costs by resource group. This table shows that timber and recreation values make up the largest components of the PNV values on the Bitterroot Forest. Most of the change in PNV among alternatives is due to changes in the net value of the timber resource. PNV declines because some cost efficient timber sales are forgone; timber benefits decline substantially more than changes in priced recreation and hunting benefits. Economic values derived from other resources are generally not as large as timber on this Forest and their variations among alternatives are relatively minor.

Figure II-35
Comparison of Present Net Value

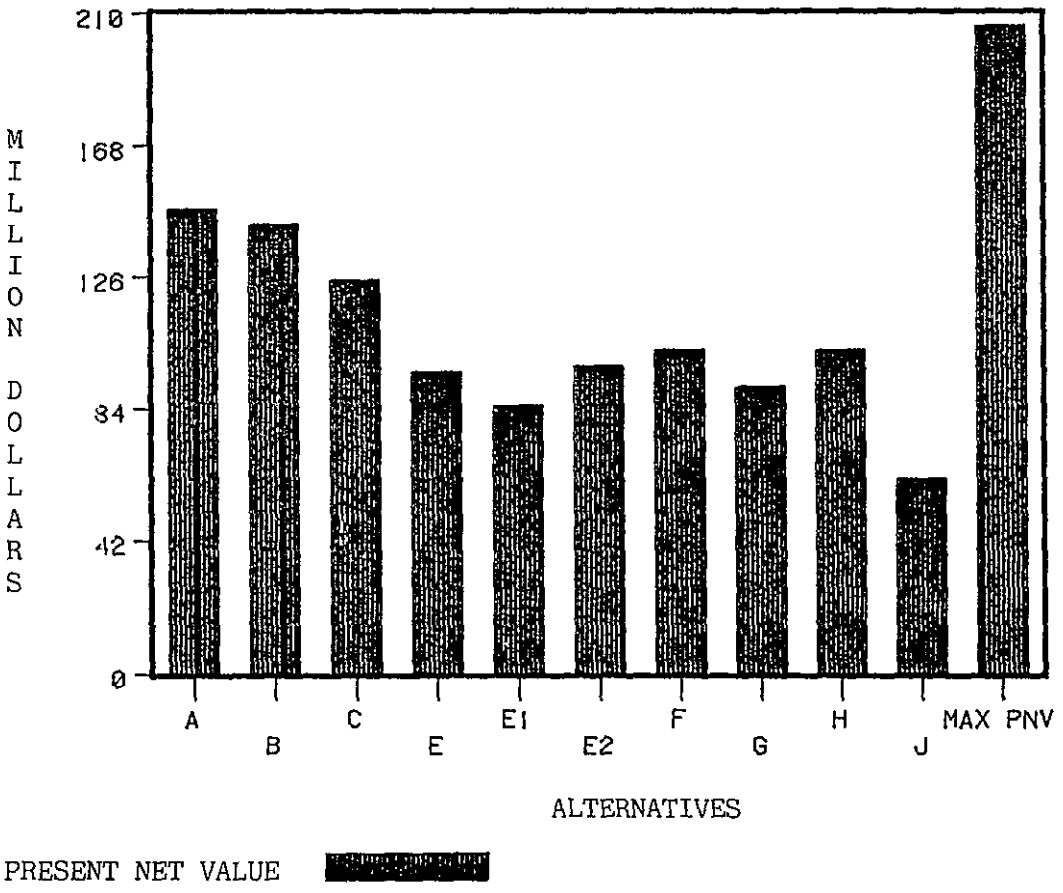


Table II-23a
Present Value Benefits and Costs for Resource Groups
(million dollars)

Alternative/ Benchmark	Present Net Value	----Discounted Benefits-----				----------Discounted Costs----------				
		Timber	Recre-ation	Range	Other	Timber	Roads	Rec/Wild-life	Range	Other
MAX PNV	206	233	172	6	2	50	38	4	3	113
A	148	202	173	6	2	58	46	12	3	116
B	143	196	172	5	2	55	47	12	3	116
C	125	173	173	5	2	50	42	18	2	116
H	103	118	175	5	2	35	24	21	3	114
F	103	119	167	5	2	43	29	11	2	106
E2	99	120	163	5	2	47	18	20	2	104
E	96	131	170	5	2	44	32	20	2	115
G	91	125	173	5	2	40	27	29	2	115
E1	85	128	170	5	2	46	37	20	2	116
J	62	65	176	4	2	26	14	29	2	113
MIN LVL	-20	6	52	1	2	0	1	1	0	79

NOTE: The direct comparison of benefits and costs by individual resource can be misleading because all costs include nonseparable multi-resource management costs.

b. Receipts and Noncash Benefits

Net cash flows to the U.S. Treasury are the dollar returns to the treasury less total budget costs. Table II-23b displays the net cash flow to the U.S. Treasury for the first and fifth decades for each alternative in order of declining PNV . Agency expenditures exceed receipts in all alternatives in the first decade. While the benefits displayed in Table II-23b estimate the full, potential dollar returns to the U.S. Treasury if full charges were made, the focus here is limited to the actual net receipts collected under current laws and policies. Cash receipts include returns from timber sales, livestock grazing fees, campground fees, mineral permits, and special use fees. Timber receipts make up 93 percent of the total receipts. The variation among alternatives is primarily due to the timber harvest level. In addition, timber receipts are affected by the per unit value of timber harvested. For example, Alternative A has lower timber benefits per MBF due to harvesting in less productive areas. Other benefits are grazing fees, campground fees, mineral leases and special use fees, that vary from $130,000 to $150,000 per year in all alternatives.

Returns are projected to increase in all alternatives because of real timber value price increases through the fifth decade and because timber harvest levels increase through time. Net receipts increase more rapidly than costs in each decade for all alternatives. The annual returns by resource for decades 1, 3, 5 and 10 are displayed in Table II-26.

Noncash benefits are the difference between what users are willing to pay for a resource and the fees collected. Other noncash benefits provided by resources such as old growth and riparian values are not captured by recreation valuation, and no methods of quantifiable valuation are available. Table II-23b displays the value of noncash benefits for the first and fifth decades.

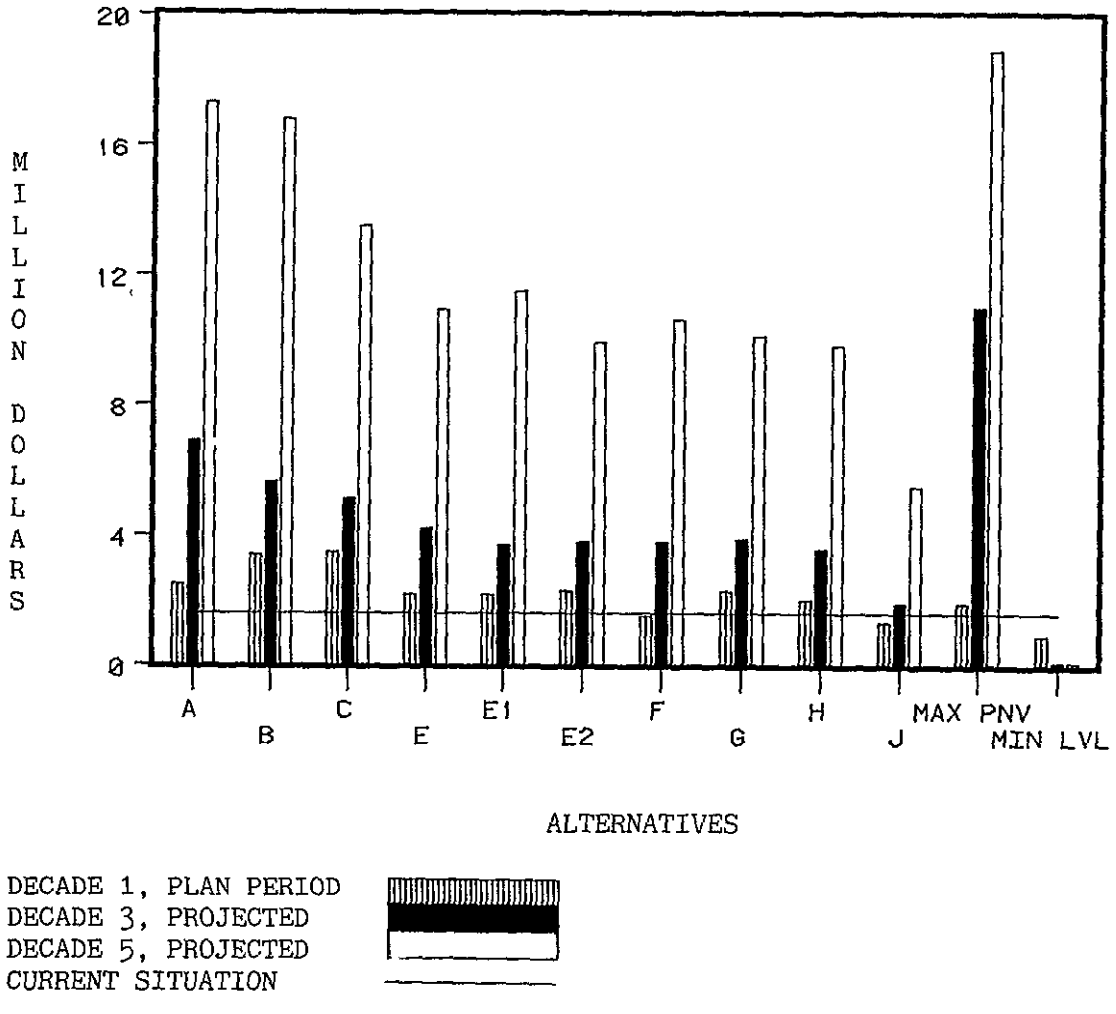
Table II-23b
Average Annual Returns to the Treasury and Noncash Benefits
(million dollars)

Alternative/ Benchmark	Decade 1				Decade 5			
	Net Receipts	2/ Costs	Receipts	Noncash Benefits	Net Receipts	2/ Costs	Receipts	Noncash Benefits
Max Pnv (Benchmark)	-4.0	5.9	1.9	3.7	10.0	8.9	18.9	12.9
A	-6.7	9.2	2.5	3.7	8.7	8.6	17.3	12.9
B	-5.8	9.2	3.4	3.7	8.0	8.8	16.8	12.9
C	-5.6	9.1	3.5	3.7	5.0	8.5	13.5	12.8
H	-5.9	7.0	2.0	3.8	2.0	7.8	9.8	13.0
F (Current)	-6.4	7.9	1.5	3.9	3.1	7.5	10.6	12.4
E2 (Preferred)	-5.1	7.5	2.4	3.6	2.3	7.7	10.0	11.8
E	-6.4	8.6	2.2	3.7	2.6	8.3	10.9	12.6
G	-6.2	8.5	2.3	3.7	1.6	8.5	10.1	12.8
E1	-7.7	9.9	2.2	3.7	3.3	8.2	11.5	12.6
J	-6.1	7.4	1.3	3.8	-1.6	7.1	5.5	13.1
Min Level (Benchmark)	-2.4	3.3	0.9	1.6	-3.1	3.2	0.1	3.3

1/ Values shown for Decade 1 are planned outputs and effects.
Values shown beyond Decade 1 are projections of the outputs and effects expected if the alternatives were selected to continue beyond the first decade.
2/ Costs include only Forest Service expenditures and exclude payments to counties.

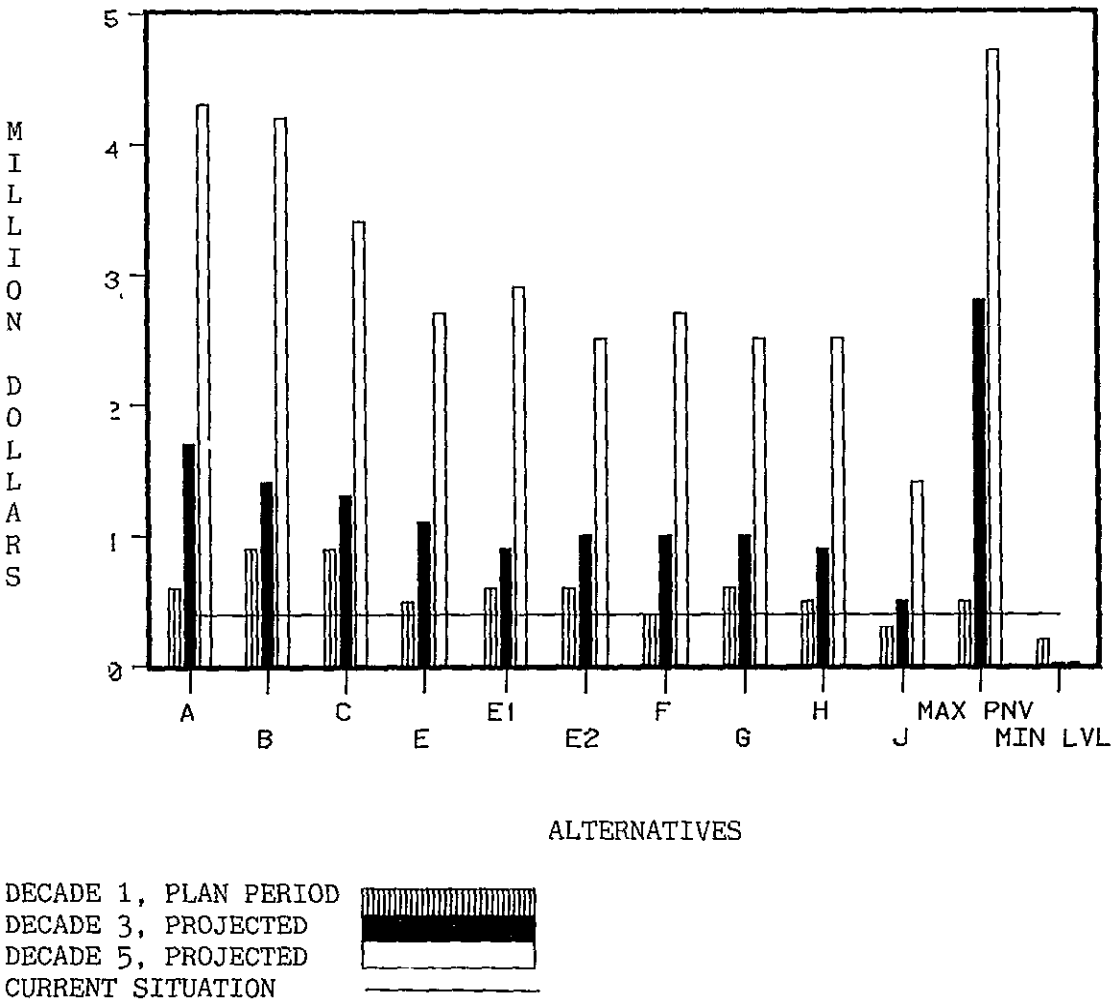
The portion of market benefits which are returns to the U.S. Treasury are displayed in Figure II-36 for decades 1, 3, and 5. Returns result primarily from the sale of timber. Campgrounds fees, mineral leases, and special uses fees are estimated at less than $200,000/year in all alternatives. Returns will increase in all alternatives due to expected increases in real stumpage prices and timber harvest levels through the fifth decade. The differences in returns among alternatives are due to differences in the value and amount of timber harvest. Returns in the first decade for all alternatives are higher than the 1980 to 1982 average of $1.6 million. The annual returns by resource for decades 1, 3, 5, 10,and 15 are displayed in Table II-26.

Figure II-36
Returns to U.S. Treasury



Twenty-five percent of the returns to the U.S. Treasury are distributed to state and local governments. The annual returns are displayed in Figure II-37 for decades 1, 3, and 5 and in Table II-26 for decades 1, 3, 5, 10, and 15. The distribution of returns is based on the area of Forest land in each county: 70 percent to Ravalli County, 29 percent to Idaho County, and 1 percent to Missoula County. Annual returns to state and local governments during the first decade for all alternatives are expected to be higher than the 1980 to 1982 average of $400,000.

Figure II-37
Returns to States



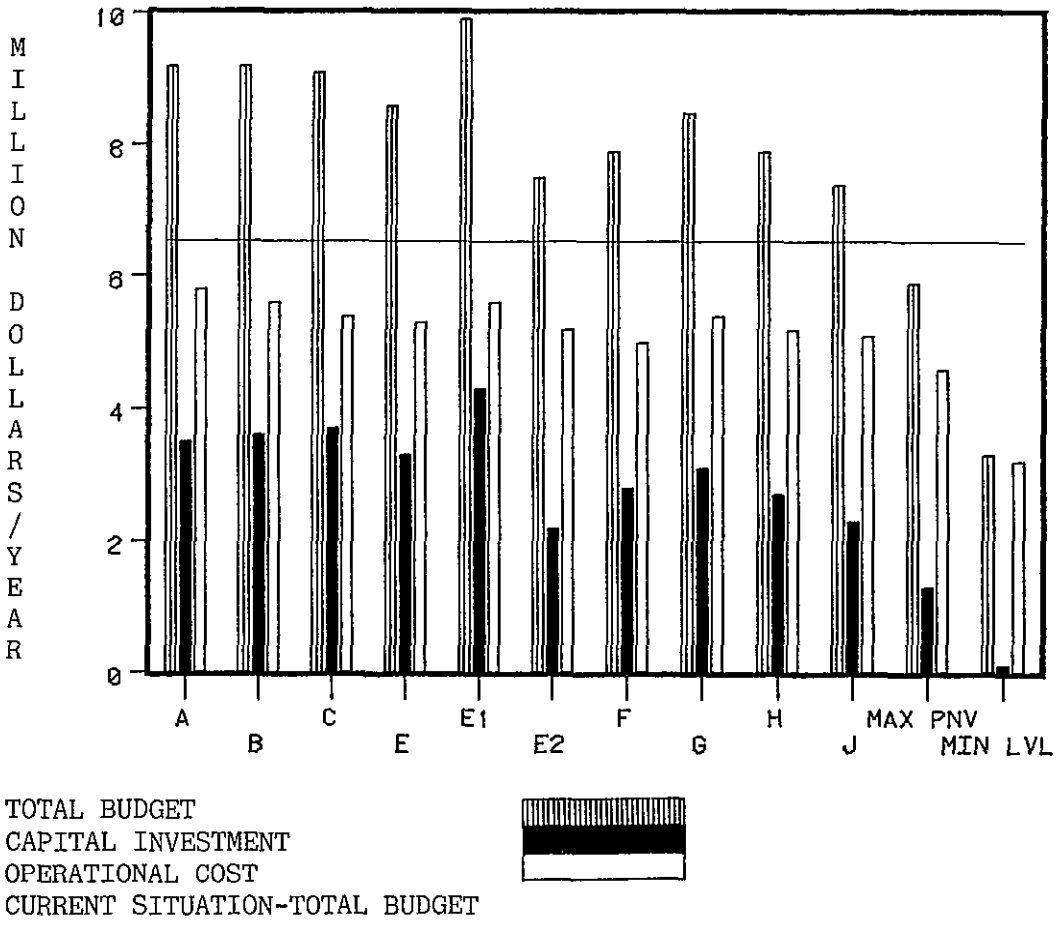
c. Budget

The average annual budget for decade 1 is shown by alternative in Figure II-38. Table II-26 contains annual budget estimates for decades 1, 3, 5, 10, and 15. For a further discussion of these categories see Appendix B, Section IV. All dollar figures are expressed in first quarter 1978 dollars, consistent with the 1980 RPA assessment.

The annual costs for decade 1 are displayed by alternative in Figure II-38 for two categories; capital investment and operational. Capital investment costs are primarily road construction and reforestation. Operational costs are all others. The annual costs for all alternatives are higher than the average 1980 to 1982 level of $7.2 million. The annual costs by major resource group for decades 1, 3, 5, 10, and 15 are displayed in Table II-26.

Average annual budget for the Bitterroot Forest varies from a low of $7.4 million in Alternative J to a high of $9.9 million in Alternative E1. General administration, fire control, law enforcement, and firewood administration costs are not significantly influenced by the objectives of alternatives and are relatively constant at about $4.1 to 4.5 million. The Preferred Alternative has a budget of $7.5 million per year in the first decade.

Figure II-38
Annual Forest Service Budget-Decade 1



d. Present Value Costs

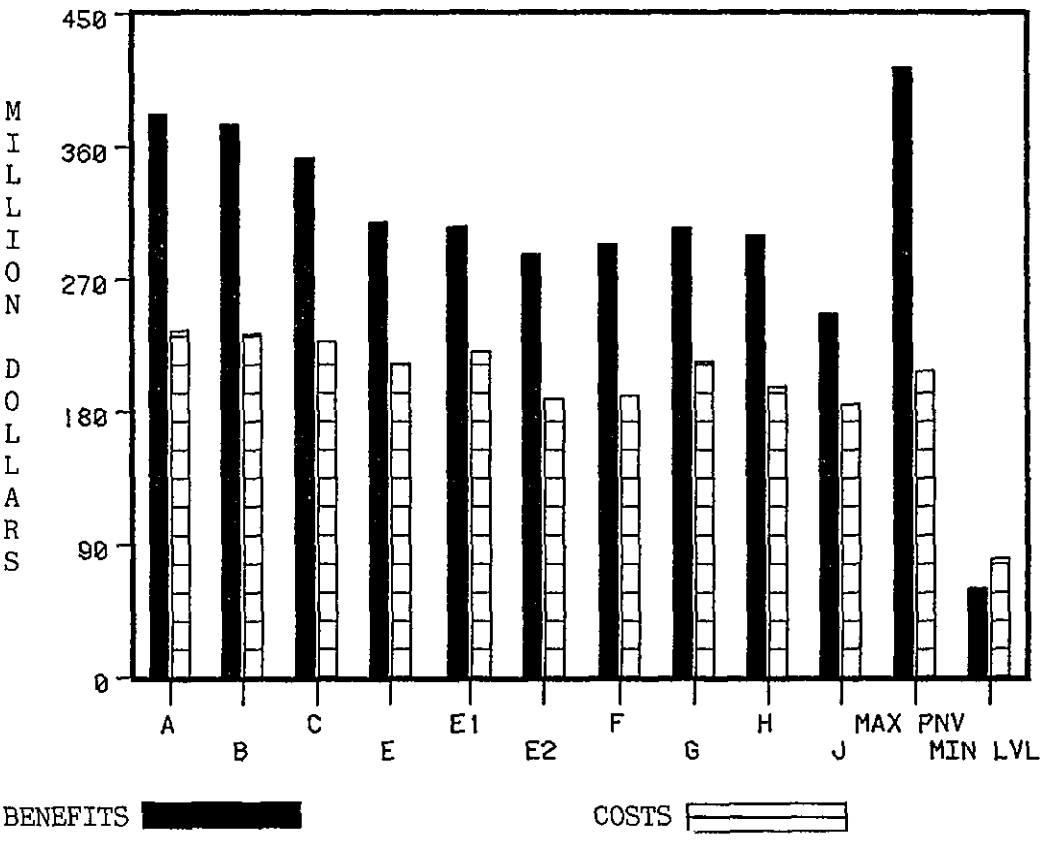
The present value cost is the sum of all expenditures for 150 years discounted to the present at 4 percent. The minimum discounted cost for Federal ownership of the Forest is $81 million as defined by the minimum level benchmark, Benchmark M. Almost 85 percent of the minimum cost is for operating the Trapper Creek Job Corps Center and fire control. The maximum present value cost is $235 million for Alternative A.

Approximately fifty percent of the costs in all alternatives are for activities which are not significantly influenced by alternative objectives. This amounts to a present value of $115 million and covers Job Corps, general administration, fire control, and road maintenance.

The remainder of costs are for activities which respond to objectives of the alternative. Alternatives with emphasis on market resources have higher road and timber management costs, and alternatives with emphasis on nonmarket resources have higher recreation costs. Annual costs decrease in all alternatives after decade 3 because most of the roads will have been built.

The present value of costs, by alternative, are displayed in Figure II-39 and Table II-22. The largest cost component is timber harvest, so those alternatives with relatively high harvest levels have high total discounted costs.

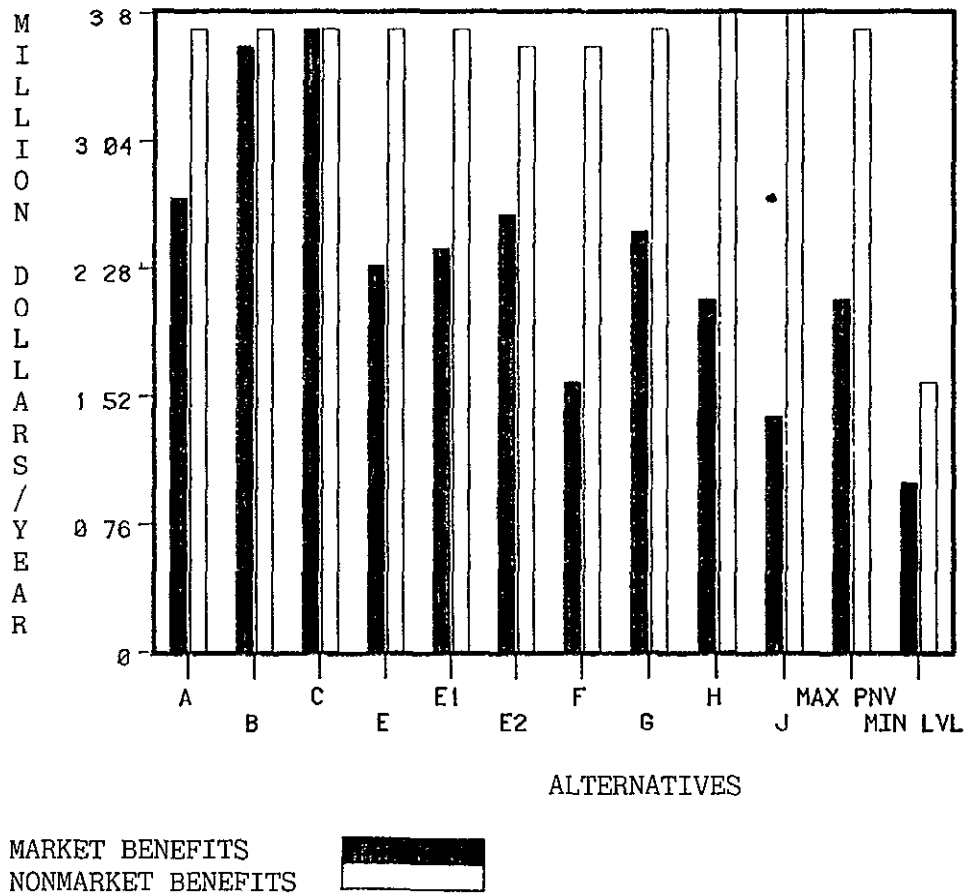
Figure II-39
Discounted Benefits and Costs



e. Annual Priced Benefits

The average annual priced benefits for decade 1 are displayed in Figure II-40 by alternative by market and nonmarket resource categories. Market benefits are the sum of the returns to the U.S. Treasury from timber sales, livestock grazing fees, campground fees, mineral leases, and special use fees, plus values assigned to livestock grazing and developed recreation use. Nonmarket benefits are the values assigned to dispersed and wilderness recreation use. The values assigned livestock grazing and recreation use recognize the potential dollar return to the taxpayer even though only part of the price is actually collected. The annual benefit by the two resource groups and by individual resources for decades 1, 3, 5, 10, and 15 are displayed in Table II-26. The benefits increase for all alternatives through the planning period as timber and recreation outputs and unit prices increase.

Figure II-40
Decade 1 Average Annual Benefits, Market and Nonmarket



f. Present Value Benefits

Present value benefits are the sum of priced benefit values for 150 years discounted to the present at 4 percent. Present value benefits are displayed in Figure II-39. Present value benefits by major resource category are displayed in Tables II-23a and II-26. The benefits incidental to management activities are $61 million as defined by Benchmark M (MIN LVL). The incidental benefits are: $52 million from recreation use, $7 million from timber sales and livestock grazing permits currently under contract, and $2 million from mineral leases.

Values assigned to market resources contribute over half the discounted benefit value in alternatives which emphasize market resource production. Values assigned to nonmarket resources contribute over half the discounted benefit value in alternatives which provide for a moderate or high level of nonmarket resources. The primary difference in the total present value of benefits of alternatives is timber values. The nonmarket values are essentially the same for all alternatives because dispersed and wilderness recreation use is basically the same.

22. Major Tradeoffs Among Alternatives

This section provides additional information to help identify the alternative or alternatives that come closest to maximizing net public benefit while meeting legal and environmental requirements and responding reasonably, equitably, and effectively to the issues, concerns, and opportunities. This additional information describes the tradeoffs that would occur among the net quantified benefits described in Section 21 and the nonpriced benefits described in Section 20. Except for the quantified economic benefits, the extent to which each alternative addresses issues, concerns, and opportunities is based on professional judgement.

a. National, Regional, and Local Demand Outlook

To provide a framework for assessing responses to issues, concerns, and opportunities, the long-term resource demands and needs of the nation, region, and local communities are reviewed briefly.

The RPA assessment projects total national demands to rise for all outputs of National Forests. There is a strong demand to protect and enhance the quality of the environment while meeting these demands. National Forest commodities generally flow into regional or national markets. The nation benefits when supplies are provided from the most efficient sources of production. The Forest is an efficient supply source for timber and recreation.

Most users of National Forest outdoor recreation, wildlife and wilderness are local people or people from the region of the National Forest. For example, 88 percent of the U.S. hunters in 1980 did not hunt outside their State and over 90 percent traveled less than 100 miles from their residences to hunt. Users of the Forest developed and dispersed recreation opportunities come predominantly from western Montana counties, other parts of the State, northern Idaho, and eastern Washington. Total recreation use of the Bitterroot is projected to grow from 545,000 RVD's in 1980 to 1,409,000 RVD's in 2030, with most of the increase in roaded dispersed recreation and wilderness use.

b. Issues, Concerns, and Opportunities

Relationships between priced and nonpriced outputs illustrate the interactions of attempting to resolve various issues. Competitive public issues, management concerns, and resource opportunities exist, and it is impossible to fully meet all wants and desires at the same time. By examining an array of priced and nonpriced outputs it becomes possible to see what is given up and what is achieved as a range of alternatives is explored. An understanding of the trade-offs between alternatives is required to help decision-makers decide which alternative maximizes net public benefit. The mixes of priced and nonpriced outputs resulting from each alternative are a direct result of the varied attempts to resolve the public issues discussed in Chapter I.

Appendix A fully discusses each of the issues, concerns, and opportunities. Public issues and management concerns were grouped into the following categories and the indicator of responsiveness for each category follows:

(1) Timber

What timber harvest level can be sustained and how much should be offered and sold in the first decade. These concerns are related to an overall desire to manage timber to help sustain productivity, assist dependent industries, increase utilization, and be cost effective in balance with other resources on the Forest. Indicators of response to this issue are the area of suitable timber land, the allowable sale quantity, and the long-term sustained yield for each alternative.

(2) Visual Quality Objective (VQO)

To what extent should visual quality considerations influence management activities? Concerns were about the size of areas where the landscape would be altered, projected length of time the changes would be visible, reasonableness of change, and preservation of scenic quality, all in light of social and economic tradeoffs for VQO. The indicator for this issue is the proportion of visually sensitive area maintained in each alternative.

(3) Wildlife, Aquatic Environment and Fisheries

How should forest lands be managed to sustain wildlife and fish populations? We can provide for diversity and protection of wildlife, consider the needs of threatened and endangered species, and provide habitat management in a way that takes advantage of other management activities on the Forest. Productivity of elk winter range and the amount of land available for old-growth dependent species are indicators of response to these issues. All alternatives are designed to provide protection of threatened and endangered species.

We can also consider how riparian areas should be managed in general and what fish habitat needs to be improved. Fish population potential is the indicator of response to this issue.

(4) Water and Soils

How can watersheds be managed to maintain or enhance water quality, soil productivity and desirable streamflow? We must insure that Forest lands will be managed so water quality and basic soil productivity can be maintained or improved. All alternatives must protect basic soil and water resources by law, so these issues are taken care of in the way that all alternatives are developed.

(5) Wilderness

How should undeveloped roadless areas be managed? What management should be recommended for the Blue Joint and Sapphire Wilderness Study Areas? Wilderness is a resource to be considered in the planning process. Area assigned to wilderness management is an indicator of response to this issue.

(6) Recreation

To what extent and where should the Bitterroot National Forest be managed for specific types of recreational activities? The public's expressed needs for recreation must be put in perspective by examining the appropriate balance of recreation uses with other resources and funding, the need for a variety of recreation opportunities, and the importance of quality recreation experience to users. The potential for dispersed recreation, the area of wilderness and roadless management, and miles of road on the Forest are all indicators of response to recreation issues.

(7) Roads

How should the Forest road and trail system be developed and managed to meet resource management objectives? We will establish adequate road standards and determine how much open/closed roading is needed on the Forest to accomplish a variety of resource objectives. Road standards are constant for all alternatives. The total road system needed for management is an indicator of response to this issue.

(8) Land and Minerals

How can the Forest be allocated and managed to help provide for the nation's mineral needs? These categories of issues are impacted in similar ways by all alternatives.

(9) Social/Economic

Consider how the impacts of land assignment on local communities and the nation will be incorporated into proposed land management. There are several indicators of the impacts of management, including present net value (PNV), changes in local income and employment, the annual budget needed to implement, and annual returns to the U.S. Treasury.

c. Tradeoffs Among Alternatives

The following tables and discussion identify the tradeoffs between monetary goals (returns to the Treasury and PNV) and addressing the issues. The descriptions of tradeoffs proceed from the alternatives with the highest PNV to the lowest. The ranking of output levels for each of the alternatives is included in Table II-24, and the narrative discusses tradeoffs associated with each alternative and benchmark.

In general the amount of wilderness, roadless, old growth, visual quality, and potential fish population increase as PNV and the level of timber production decrease. Benchmarks maximize the production of a single resource at the expense of other resources and have relatively high PNV's.

As more wilderness and roadless areas are designated, it affects PNV in two ways: 1) the current and long-range timber harvest are reduced due to the reduced production base, and 2) harvest is forced into stands with less valuable timber and higher access costs. As the area managed for visual quality increases it affects PNV by increasing harvest costs and reducing volume removed in the first entry, decreasing benefits. Water quality/fisheries habitat is protected by restricting the types of management in riparian areas. This has a significant effect on PNV because in order to maintain a fairly high timber cut the harvest is forced into areas with higher access costs and lower timber values.

In Table II-24 the indicators identified above are used to show the degree of response of each alternative to these issues, concerns, and opportunities. Developing alternatives that would be responsive to public issues and management concerns was accomplished by using various types of constraints in the FORPLAN model (See Appendix B, Section VII for detailed discussion). The general impact on PNV of major alternative constraints is shown in Figure II-41. The following section discusses tradeoffs between alternatives in more detail.

Present net value represents the net value of the benefits and costs which have been assigned a monetary value and is the basis for the economic comparisons among alternatives. It is the dollar difference between the discounted value of timber sales, livestock use, and recreation use, and all Forest costs over 150 years.

The net value of nonpriced outputs is the total qualitative value of all resources and outputs which have not been assigned a monetary value and is the basis for the environmental and social comparisons among alternatives. The major nonpriced outputs are visual quality, roadless semiprimitive recreation, wilderness, wildlife and fish habitat, and local employment. These major nonpriced benefits are described in detail in Appendix B, section IV. C. In general, as more nonpriced outputs are provided, the present net value decreases.

Figure II-41
Forgone Present Net Value of the Major Alternative Constraints

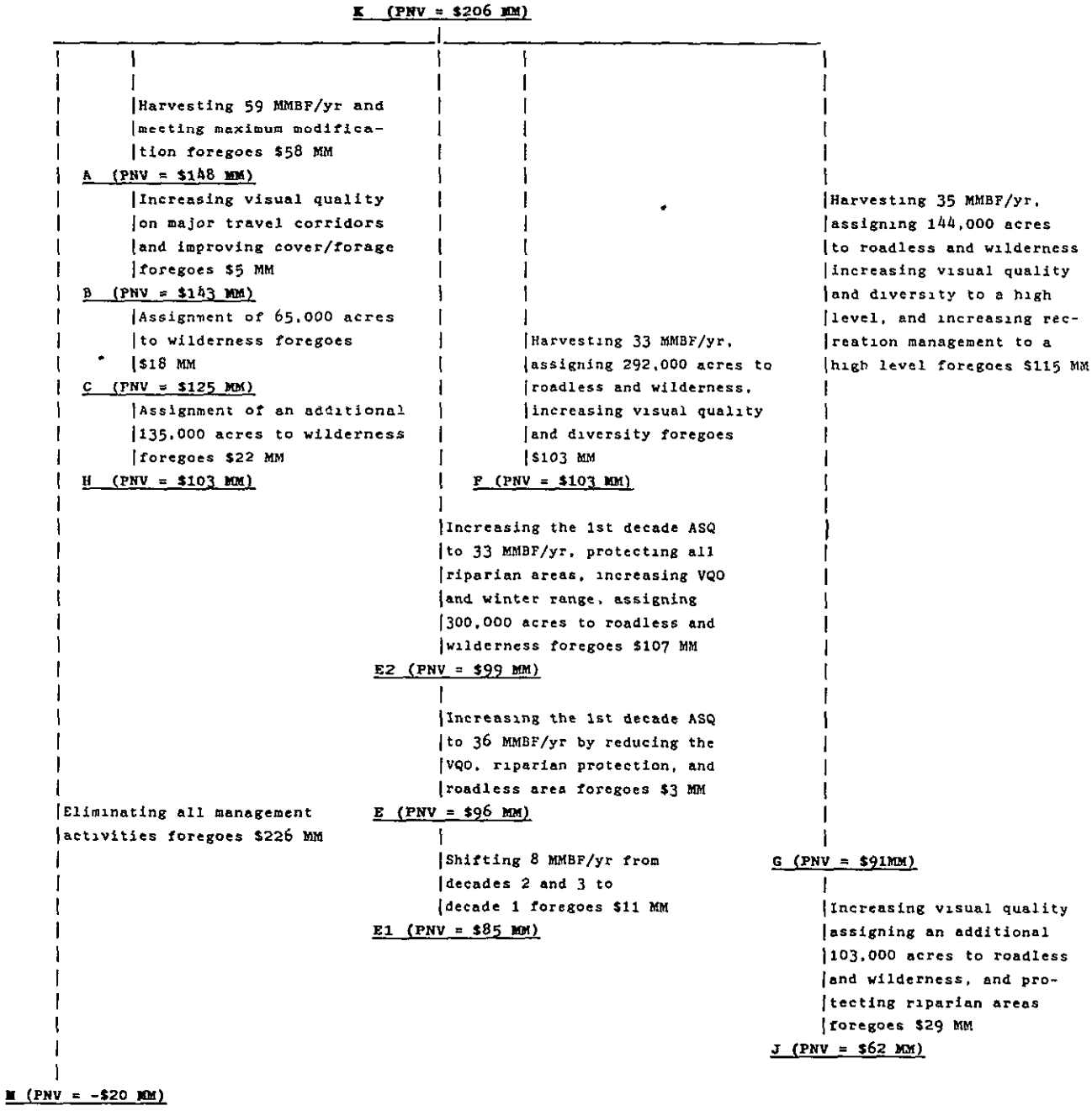


Table II-24
Alternatives Ranked by PNV, Selected Priced and Nonpriced Outputs

			BENCHMARK	ALTERNATIVES								
		UNIT 1/	MAX PNV	A	B	C	H	F	E2	E	G	E1	J
PNV	Present Net Value (4%)	MM $	206	148	143	125	103	103	99	96	91	85	62
		Rank		1	2	3	4	4	6	7	8	9	10
	Reduction in PNV from maximum PNV benchmark	MM $	0	58	63	81	103	103	107	110	115	121	144
		Rank		10	9	8	6	6	5	4	3	2	1
EFFI-CIENCY	Average annual receipts minus costs Decade 1 2/	MM $	-2 1	-4 8	-3 9	-3 7	-4 0	-4 5	-3 2	-4 5	-4 3	-5 8	-4 2
		Rank		9	3	2	4	7	1	7	6	10	5
	Average annual timber receipts minus timber costs 3/	MM $	+0 5	-1 8	-0 8	-0 4	-0 7	-1 9	+0 5	-1 2	-0 5	-2 4	-0 6
		Rank		8	6	2	5	9	1	7	3	10	4
	Average annual wildlife, recreation, range minerals receipts minus costs 3/	MM $	-0 1	-0 4	-0 4	-0 6	-0 7	-0 3	-0 7	-0 7	-1 1	-0 7	-1 1
		Rank		2	2	4	5	1	5	5	9	5	9
BUDGET	To implement Forest Plan, Decade 1 2/	MM $	4 0	7 3	7 3	7 2	6 0	6 0	5 6	6 7	6 6	8 0	5 5
		Rank		8	8	7	3	3	2	6	5	10	1
	Compared to 1986	%	82	149	149	147	122	122	114	137	135	163	112
		Rank		8	8	7	3	3	2	6	5	10	1
EMPLOY-MENT	Change from current Forest related employment Decade 1	%	78	133	125	121	96	102	99	108	106	120	84
		Rank		1	2	3	9	7	8	5	6	4	10
INCOME	Change from current Forest related income Decade 1	%	74	137	126	121	95	100	100	105	105	121	79
		Rank		1	2	3	8	7	7	5	5	3	10
TIMBER	Suitable timberland	M Acres	586	570	569	518	366	451	390	449	464	449	316
		Rank		1	2	3	9	5	8	6	4	6	10
	Allowable sale quantity	MMBF	16	59	51	49	28	33	33	36	35	44	18
		Rank		1	2	3	9	7	7	5	6	4	10
	Change from Bitterroot share of log requirement expressed by Darby mill owners (40 3 MMBF) 4/	%	-60	+46	+27	+22	-31	-18	-18	-11	-13	+9	-55
		Rank		1	2	3	9	7	7	5	6	4	10
	Change from 10-year average sell of 30 1 MMBF	%	-40	+96	+69	+63	-7	+10	+10	+20	+16	+46	-40
		Rank		1	2	3	9	7	7	5	6	4	10
DIVER-SITY	Seedlings - suitable base at end of 100 yrs	%	42	37	40	34	33	30	24	28	26	31	24
	Poletimber - " " " "	%	34	29	29	27	27	25	26	25	23	24	20
	Sawtimber - " " " "	%	12	25	20	21	22	21	29	29	24	25	24
	Old Growth - " " " "	%	11	9	11	18	19	24	21	18	26	20	33
	Old Growth - " " Decade 1	%	38	38	38	38	36	37	37	35	38	36	32
VISUAL	High visual quality objective as a percent of the suitable timber base	%	0	0	16	16	17	28	30	24	39	24	61
		Rank		10	8	8	7	4	3	5	2	5	1
FISH/ WATER	Riparian area assigned to riparian prescription	%	0	0	17	18	21	28	100	36	38	36	N/A
		Rank		9	8	7	6	5	1	3	2	3	
	Nonwilderness catchable fish compared to current end Decade 1	%	100	85	92	85	86	86	100	86	86	76	100
		Rank		8	3	8	4	4	1	4	4	10	1
	Nonwilderness catchable fish compared to current end of 100 years	%	61	70	91	77	84	83	100	85	83	85	100
		Rank		10	3	9	6	7	1	4	7	4	1
	Sediment level above current end Decade 1	%	4	11	12	11	6	8	5	9	8	13	4
		Rank		3	2	3	8	6	9	5	6	1	10
WILD-LIFE	Elk winter range assigned to winter range prescription	%	0	0	41	62	22	32	51	41	40	41	39
		Rank		10	5	1	9	8	2	3	6	4	7
ROAD-LESS	Recommended for wilderness	M Acres	0	0	50	98	296	50	77	77	172	77	401
		Rank		10	8	4	2	8	5	5	3	5	1
	Designated to remain roadless	Acres	133	133	100	111	73	242	214	197	95	197	0
		Rank		5	7	6	9	1	2	3	8	3	10
ROADS	New roads annual average Decade 1	Miles	11	41	36	34	19	23	25	23	24	31	12
		Rank		1	2	3	9	7	5	7	6	4	10
	New roads annual average, Decade 3	Miles	53	39	35	30	19	22	22	22	22	22	13
		Rank		1	2	3	9	4	4	4	4	4	10
	Total new roads needed	M Miles	3 1	2 6	2 3	2 3	1 7	1 8	1 8	2 0	2 0	2 1	1 0
		Rank		1	2	2	9	7	7	5	5	4	10

1/ MM $ = Millions of dollars MMBF = Millions of board feet
% = Percent M Acres = Thousands of acres

2/ Excludes Job Corps but includes fire protection, road maintenance etc

3/ Excludes fire protection, road maintenance etc

4/ Darby and Missoula mills that traditionally have purchased Bitterroot timber

d. Timber Sensitivity Analysis

This section has been added since the DEIS in response to public concern about the validity of timber values, appreciation rates and first decade volumes. The results of this analysis are presented in detail in Appendix B, Section VIII. Sensitivity testing refers to changing an assumption or other input in a model, and then observing the direction and magnitude of the resulting change in the model solution. The "sensitivity" of the model is determined by the magnitude and relative importance of the variables that vary as a result of the model change. For example, if a 25 percent increase in the price of timber resulted in a 1 percent change in first decade timber volume, it would be concluded that first decade timber volume was not sensitive to timber price. A 1 percent increase in timber price that led to a 25 percent increase in timber volume would indicate that timber volume was very sensitive to timber price. Such information allows managers to place confidence in model results based upon the sensitivity of the model to various assumptions.

The economic assumptions that were tested in the sensitivity analysis of the Bitterroot FORPLAN model were those that were thought to be critical in terms of major outputs such as timber volume, suitable timber acreage, and present net value (PNV). Some of the assumptions were tested to respond to specific comments on the Draft EIS, others were tested because of internal Forest Service concerns. The following economic assumptions were tested: timber values, price and cost trends, mileage of road construction, agency costs, nontimber output values, harvest constraints in decades 4 through 15, and first decade timber volume constraints. Timber value and price/cost trend assumptions were determined to be reasonable and not changed. The method of accounting for road costs was revised and this resulted in an increase in first decade volume and PNV, but a reduction in the suitable timber base. Possible reductions in agency and road construction costs are speculative at this time, so the original assumptions were maintained. Valuing recreation and grazing outside the model was more accurate than the method used in the Draft EIS. The result of this new valuation method was an increase in PNV and first decade timber volume, but a reduction in the suitable timber base. Access constraints were added to decades 4 to 15 to accurately reflect how timber management would actually take place on the forest. This change resulted in a reduction of the suitable timber base, a slight reduction in long-term sustained yield, and a minor change in PNV. All other assumptions and constraints in the Proposed Action remained unchanged. As a result of this sensitivity testing, changes were made in the way the Bitterroot FORPLAN model was formulated and revisions have been made in the Draft EIS Proposed Action that resulted in a Preferred Alternative for the Final EIS. Although some assumptions, such as no price and cost trends, were found to cause major changes in model results, the original assumptions are viewed as the most reasonable. Recognition of the sensitivity of model results to these assumptions allows the planning team and managers to carefully monitor changes that could require a revision of or amendment to the Forest Plan.

Alternative E2 was developed to reflect changes that were made in the FORPLAN Model as a result of the sensitivity analysis, and to respond to issues that were presented by the public and government agencies during the comment period on the Draft EIS. The results of the analysis for each of the economic assumptions is presented in Table II-25.

Table II-25
Impact of Economic Assumptions on First Decade Timber Volume, Suitable Timber Base and Present Net Value

Assumption	First Decade Timber Volume (MMBF/Year) 1/	Suitable Base (M Acres)	PNV (MM $)
Original Prices and Trends	5	447	76
New Timber Prices and Trends	2 (-) 2/	447 (0)	54 (-)
No Price or Cost Trends	2 (-)	279 (-)	12 (-)
Change to New Road Formulation	13 (+)	428 (-)	82 (+)
Reduction in Agency and Road Costs	18 (+)	433 (+)	100 (+)
Nontimber Outputs Valued Outside Model	8 (+)	417 (-)	82 (+)
Change Harvest (Access) Constraints	25 (0)	399 (-)	80 (-)

1/ No first decade timber volume constraints were applied.
2/ Increase (+), decrease (-) or no change (0) in output compared to original assumption

The following section discusses the major economic tradeoffs among the alternatives and selected benchmarks and issues addressed by each alternative. The alternatives are listed in order of decreasing PNV. For a more detailed discussion of resource constraints, see Appendix B.

(1) Benchmark K, Maximize Present Net Value

The Max PNV Benchmark was used to provide an indication of the tradeoffs necessary to achieve the highest PNV. This run has a PNV of $206 million. An allowable sale quantity of 16 million board feet of timber in the first decade would be achieved while meeting minimum management requirements and a nondeclining flow policy for timber. A total of approximately 586,000 acres would be managed for timber production. First decade timber harvest is lower than any of the alternatives, but by the third decade it is higher than any alternative. Other resources such as fish populations and total wilderness acres are at levels lower than any alternative.

(2) Alternative A

Alternative A provides the highest level of market resources and the minimum nonmarket outputs. It has the highest monetary value because the nonmarket resource objectives allow for the highest net timber value. The timber and livestock forage outputs in the first three decades are the highest of any alternative. The extensive road system associated with the timber outputs will also provide the maximum access for mineral exploration and development. The high timber harvest level and large Forest timber and road construction budgets provide the highest contribution of jobs and income to the local economy.

One result of the extensive road system is that after the second decade, undeveloped areas for roadless and wilderness recreation are limited to the currently existing wilderness and 133,000 acres of unsuitable timberland. Visual quality will be at the lowest level allowed by policy. Although forage production is high on winter range, easy access and decreased security cover will result in more restrictive hunting seasons. Old growth on suitable timberland will be the lowest of any alternative because of intensive timber harvest. Fish habitat will be at the lowest level of any alternative because of sediment from extensive road construction and most riparian zones are managed for timber production.

(3) Alternative B

Alternative B provides a high level of market resources with some consideration for nonmarket outputs. It is similar to Alternative A except management objectives shift slightly from timber, minerals, and livestock forage production to visual quality, wilderness, and wildlife habitat. Alternative B has the second highest monetary value because the objectives allow for the second highest net timber value. The timber and range outputs in the first three decades are the second highest of any alternative. Like Alternative A, the road system will provide the maximum access for mineral exploration and development. The high timber outputs and the large timber and road construction budget provide for the second highest contribution of jobs and income to the local economy.

After the second decade, undeveloped areas for roadless and wilderness recreation are limited to the current wilderness, 50,000 acres of recommended wilderness, and 100,000 acres of unsuitable timberland. Visual quality will be at the lowest level allowed by policy on most of the nonwilderness, except adjacent to population centers and major travel corridors where visual quality will be at a moderate level. Although forage production is high on winter range, easy access and decreased security cover will result in more restrictive hunting seasons. Old growth on suitable timberland is the second lowest of any alternative because of intensive timber management. Fish habitat and water quality will also be at the second lowest level because of extensive road construction and because most riparian zones are managed for timber production.

(4) Alternative C

Alternative C provides a fairly high level of market resources with some consideration for nonmarket outputs. It is similar to Alternative B except management objectives shift slightly from timber, minerals, and livestock forage production to roadless and wilderness management. An additional 65,000 acres are recommended for roadless and wilderness, and trails are maintained at a higher level. Alternative C has the third highest monetary value because nonmarket resource objectives allow timber values which are higher than most alternatives. The timber and livestock forage outputs in the first three decades are the third highest of any alternative, and the road system will provide moderate access for mineral exploration and development. The timber output, and large timber and road construction budgets provide the third highest contribution of jobs and income to the local economy.

Half of the 405,000 acres of currently roadless area will remain undeveloped to meet the objectives for roadless recreation, wilderness, and elk security. Visual quality will be the same as Alternative B, a low level on most of the Forest and a moderate level adjacent to population centers and major travel corridors. Forage production on winter range is fairly high. Current hunting seasons will be maintained with cover/forage restrictions, unroaded elk security areas, and road closures. A moderate level of old growth is provided. Fish habitat and water quality will be at the same low level as Alternative B. Fish habitat potential will recover slightly after decade 5 because sediment yield decreases and a few fisheries streams are protected from timber harvest by roadless designation.

(5) **Alternative H**

Alternative H provides high levels of roadless, wilderness and elk security opportunities; high wilderness quality; and low timber output. Wilderness opportunities are the second highest of any alternative but the timber, range, and minerals objectives are the second lowest. It has the fifth highest monetary value because roadless/wilderness recommendations reduce the net discounted timber values and wilderness management objectives increase the costs of management activities which do not generate priced outputs. The moderate timber harvest level causes a slight decrease in local employment and income from the present level.

Ninety percent of the 405,000 acres which are currently unroaded will remain undeveloped to meet roadless recreation, wilderness, and elk security objectives. The remaining lands will be managed fairly intensively for market outputs. Visual quality will be at the lowest level allowed by policy on most suitable timberland, except that a moderate level of visual quality is maintained adjacent to population centers and major travel corridors. This alternative provides a moderate level of forage on winter range in the first 50 years. However current hunting seasons probably would not be maintained due to less than optimum cover/forage ratios and high open road densities on suitable timberland. Old growth on suitable timberland is at a moderate level. Fish habitat and water quality will also be at one of the highest levels because much of the riparian area remains undeveloped.

(6) **Alternative F**

Alternative F provides moderate levels of market resources and the potential for moderate levels of nonmarket outputs within a $7.9 million expenditure level. However, the expenditure objective lowers the level of nonmarket resource management below the potential because costs are constrained primarily in programs which do not generate market outputs. It has the fourth highest monetary value even though the nonmarket resource objectives limit the net discounted timber values because cost constraints do not change priced output levels. Timber and range outputs in the first three decades are lower than most other alternatives. The road system will provide moderate access for mineral exploration and development. The moderate timber harvest level will result in a slight decrease of jobs and income in the local economy.

Over 70 percent of the 405,000 acres which are currently unroaded will remain undeveloped to meet roadless recreation, wilderness, and elk security objectives. Timber management activities will dominate the landscape on much of the Forest, except that a high level of visual quality is maintained in the foreground and middleground adjacent to population centers and major travel corridors. Although this alternative has the lowest level of forage production on winter range, current hunting seasons will be maintained with cover/forage restrictions, roadless elk security areas, and road closures. It provides for a high amount of old growth. Fish habitat will be at a moderate level in the first 50 years.

(7) Alternative E2 (Preferred Alternative)

Alternative E2 (Preferred Alternative) provides moderate levels of nonmarket and market resources. It has the sixth highest monetary value because the nonmarket resource objectives limit the net discounted timber value and increase the costs of nonmarket outputs which do not generate income. The timber and range outputs in the first three decades are the eighth highest of the alternatives, and the road system will provide moderate access for mineral exploration and development. The timber output and Forest budget provide for a slight decrease (1 percent) in local employment and constant income compared to the present level.

Over 70 percent of the 405,000 acres which are currently unroaded will remain undeveloped to meet roadless recreation, wilderness, and elk security objectives. Timber management activities will occur on 25 percent of the Forest, but a high level of visual quality is maintained in the foreground and middleground adjacent to population centers and major travel corridors. Forage production on winter range is fairly high and current hunting seasons will be maintained by cover/forage restrictions, unroaded elk security areas, and road closures. A fairly large area of old growth will be maintained, especially along fisheries streams. Fish habitat and water quality will be protected by restrictions on timber harvest in riparian zones, relatively light road construction program, and road maintenance designed to reduce sediment delivery to streams.

(8) Alternative E

Alternative E provides moderate levels of nonmarket and market resources. It has the seventh highest monetary value because the nonmarket resource objectives limit the net discounted timber value and increase the costs of nonmarket outputs which do not generate income. The timber and range outputs in the first three decades are the fifth highest of any alternative, and the road system will provide moderate access for mineral exploration and development. The moderate timber output and moderate Forest budget provide for a slight increase in local employment and income over the present level.

Over two-thirds of the 405,000 acres which are currently unroaded will remain undeveloped for roadless recreation, wilderness, and elk security objectives. Timber management activities will be allowed to dominate the landscape on much of the Forest, except that a high level of visual quality is maintained in the foreground and middleground adjacent to population centers and major travel corridors. Forage production on winter range is fairly high and current hunting seasons will be maintained by cover/forage restrictions, unroaded elk security areas, and road closures. A fairly large area of old growth will be maintained,

especially along fisheries streams. Fish habitat and water quality will be protected by restrictions on timber harvest in riparian zones and a moderate road construction program. Timber harvest is restricted along all fisheries streams.

(9) Alternative G

Alternative G provides high levels of roadless, wilderness and elk security opportunities; recreation quality; wildlife and fish habitat; water quality; and visual quality; with moderate timber and range outputs. The level of recreation management, wilderness and roadless recreation opportunities, visual quality, wildlife and fish habitat are the second highest of any alternative but the timber, range, and minerals objectives are the second lowest.

It has the third lowest monetary value because nonmarket resource objectives limit the net discounted timber value and recreation management objectives increase the cost of recreation management but do not generate priced outputs. The moderate timber harvest level and moderate timber and road construction budgets slightly decrease jobs and income in the local economy.

Two-thirds of the 405,000 acres which are currently unroaded will remain undeveloped for roadless recreation, wilderness, and elk security objectives. A high level of visual quality is maintained on the Forest. This alternative provides for a moderate level of forage on winter range but also maintains current hunting seasons through cover/forage restrictions, unroaded elk security areas, and road closures. A high level of old growth is provided. Fish habitat and water quality will be at one of the highest levels due to restrictions on timber harvest in riparian zones and a moderate road construction program.

(10) Alternative E1

Alternative E1 provides moderate levels of nonmarket and market resources. This alternative has the same objectives as Alternative E (Proposed Action) except that harvest flow departs from the policy of nondeclining yield. Timber harvest is 20 percent higher than Alternative E in the first decade, and lower in the second and third decades. It has the eighth highest monetary value because the nonmarket resource objectives limit the net discounted timber values and increase the costs of nonmarket outputs which do not generate income. It has a lower monetary value than Alternative E because the first decade timber output is higher and results in more costly timber being harvested in decade 1. The timber and range outputs in the first decade are the fourth highest of any alternative, and the road system will provide moderate access for mineral exploration and development. The fairly high timber output and large timber and road construction budgets provide the fourth highest contribution of jobs and income to the local economy.

Over two-thirds of the 405,000 acres which are currently unroaded will remain undeveloped for roadless recreation, wilderness, and elk security objectives. Timber management activities will be allowed to dominate the landscape on much of the Forest, except that a high level of visual quality is maintained in the foreground and middleground adjacent to population centers and major travel corridors. Forage production on winter range is fairly high and current hunting seasons will be maintained by cover/forage restrictions, unroaded elk security areas, and road closures. A fairly large area of old growth will be maintained, especially along fisheries streams. Fish habitat and water quality will be protected by restrictions on timber harvest in riparian zones and a moderate road construction program.

(11) Alternative J

Alternative J provides high levels of roadless, wilderness and elk security opportunities; recreation quality; wildlife and fish habitat; water quality, visual quality; and low levels of timber and range outputs. The level of recreation management, wilderness and roadless recreation opportunities, visual quality, wildlife and fish habitat potential are the highest of any alternative while the timber, range, and minerals objectives are the lowest. It has the lowest monetary value because the roadless/wilderness acreage and wildlife, fish and visual quality objectives reduce the net discounted timber value and recreation management objectives increase direct management costs. The low timber harvest level and budget result in a decrease in local employment and income from the present level.

Undeveloped areas for roadless and wilderness recreation will comprise over 70 percent of the Forest including the current wilderness and 402,000 acres of recommended wilderness. A high level of visual quality is maintained on the Forest. This alternative provides a moderate level of forage on elk winter range, maintains current hunting seasons through cover/forage restrictions, roadless elk security areas, and road closures. A high level of old growth is provided at the end of 100 years. Fish habitat will be at the highest level in the first 50 years because of the low level of road building and because harvest activities are excluded from riparian zones.

(12) Benchmark M (Minimum Level)

As the name indicates, this benchmark has the lowest PNV and employment outlook. This benchmark assumes that the Forest would cease all commercial operations, so any output associated with these operations will be very low. Environmental outputs, such as visual quality protection, roadless management, and old-growth species diversity, are at very high levels. The reduction in PNV associated with this benchmark relative to the Max PNV Benchmark is $226 million. The present value of costs to implement is the lowest of all alternatives or benchmarks at $81 million. When existing contracts expire, there will be no further returns to the Treasury and all community impacts for job and income would be negative relative to the current level since timber harvest and all other income-producing resources will drop to zero.

The following Table II-26 has been modified since the draft to:

- Correct an error in 1980 elk hunting RVD. This is now in line with Montana Department of Fish, Wildlife and Parks figures.

- Eliminate specific fish habitat improvement in Alternatives E, E1, G and J to make fish numbers directly comparable.

- Catchable trout numbers have been increased to reflect the results of recent Montana Department of Fish, Wildlife and Parks shocking surveys.

- Allowable sale quantities have been changed to include dead material and post, pole, and pulp as well as green sawtimber.

- Allowable sale quantities have also been changed to reflect Regional Guide (6- to 7-inch DBH) utilization standards rather than the 8.5 inch DBH standard used in the Draft EIS.

- A comparison of green sawtimber board foot volume at Regional Guide, current contract, and Draft EIS utilization standards has been added.

- The Fiscal Year 1986 budget (total costs) in 1978 dollars has been added as an indicator of budget trends since 1980.

Table II-26
Average Annual Resource Outputs

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Developed recreation	M RVD	123												
Decade 1			103	103	103	103	103	103	103	103	103	103	103	16
Decade 3			155	155	155	155	155	155	155	155	155	155	155	12
Decades 5, 10, 15			230	230	230	230	230	230	230	230	230	230	230	0
Roaded recreation	M RVD	227												
Decade 1			266	266	266	266	266	266	264	266	267	266	266	114
Decade 3			458	457	457	457	458	458	455	457	458	457	459	152
Decade 5			736	734	735	735	735	735	732	734	736	734	736	241
Decade 10			733	732	734	734	734	734	732	733	735	733	732	241
Decade 15			735	734	734	734	734	735	732	734	735	734	736	241
Semiprimitive motorized recreation	M RVD	47												
Decade 1			41	38	39	42	42	45	44	36	32	27	41	16
Decade 3			30	22	26	46	46	58	53	23	14	0	31	16
Decade 5			47	36	42	73	73	93	85	37	23	0	49	24
Decade 10			47	36	41	73	73	93	85	37	23	0	48	24
Decade 15			47	36	42	73	73	93	85	37	23	0	49	24
Semiprimitive non-motorized recreation	M RVD	10												
Decade 1			7	7	7	8	8	8	8	6	6	5	7	3
Decade 3			5	4	5	8	8	10	9	4	3	0	5	3
Decade 5			8	6	7	13	13	16	15	6	4	0	8	4
Decade 10			8	6	7	12	12	16	15	6	4	0	8	4
Decade 15			8	6	7	13	12	16	15	6	4	0	8	4
Wilderness recreation	M RVD	109												
Decade 1			133	136	136	132	132	129	128	139	144	150	133	134
Decade 3			241	249	245	222	222	208	212	248	259	275	240	171
Decade 5			358	371	364	327	327	304	312	369	386	412	356	269
Decade 10			357	370	364	327	327	304	312	369	386	412	355	269
Decade 15			358	371	364	327	327	304	312	369	386	412	356	269
Elk hunting potential	M RVD	29												
Decade 1			29	28	29	29	29	29	26	28	29	29	29	27
Decade 3			31	28	30	30	30	30	26	29	31	29	32	27
Decade 5			33	30	31	31	31	31	27	30	32	29	33	27
Decade 10			29	27	30	29	30	29	27	28	32	29	27	27
Decade 15			32	30	30	30	30	31	27	30	32	30	33	27
Wilderness management	M Acres	743 1	743 1	793 2	840 7	819 9	819 9	819 9	793 2	914 8	1039 4	1143 9	743 1	743 1
Roadless management	M Acres	241 5	132 7	99 7	110 5	197 3	197 3	213 9	241 5	95 4	73 1	0	132 7	399 8
Total trails	Miles	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Visual quality on suitable timberland	M Acres													
Retention		99 1	0	0	1 0	13 4	13 4	5 2	87 5	78 5	0	110 8	0	0
Partial retention		43 2	0	90 7	83 0	92 4	92 4	112 3	38 3	100 6	62 1	83 0	0	0
Modification		119 6	0	64 9	118 5	129 8	129 8	170 9	48 9	63 8	55 0	122 2	0	0
Maximum modification		243 8	569 8	413 2	315 1	213 6	213 6	101 4	276 5	220 9	249 5	0	585 8	0
Total suitable timberland		505 7	569 8	568 8	517 6	449 2	449 2	389 8	451 2	463 8	366 4	316 0	585 8	0
Wildlife habitat improvement	Acres	1737												
All decades			0	0	140	285	285	285	285	285	0	285	0	0

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Elk forage potential	M Elk	5 8												
Decade 1			6 4	6 2	6 3	6 2	6 2	6 1	5 6	6 1	6 4	6 1	6 3	5 7
Decade 3			7 2	6 5	6 8	6 7	6 7	6 6	5 8	6 4	6 8	6 3	7 5	5 8
Decade 5			8 2	7 2	7 2	7 1	6 9	6 8	6 0	6 9	7 3	6 4	8 0	5 8
Decade 10			6 9	6 5	7 0	6 6	6 8	6 3	6 0	6 3	7 2	6 2	6 5	5 7
Decade 15			7 9	7 0	7 2	7 0	6 8	6 8	6 0	6 6	7 2	6 5	8 2	5 7
Old growth on suitable timberland in 100 years	Percent	41	9	11	18	18	20	21	24	26	19	33	11	0
Fish habitat improvement - All decades	Acres	10	5	5	5	5	5	5	5	5	5	5	0	0
Catchable trout non-wilderness streams	M Fish	161												
Decade 1			137	137	137	138	122	161	139	138	139	161	161	161
Decade 3			112	112	115	138	138	161	137	137	139	161	116	161
Decade 5			126	129	130	137	137	161	137	135	139	161	111	161
Decade 10			113	127	124	137	137	161	134	134	136	161	99	161
Decade 15			110	122	123	137	161	161	159	161	158	161	117	161
Potential range forage	M AUM	14 2												
Decade 1			14 0	12 8	12 7	12 4	12 6	11 2	11 3	12 2	12 3	11 0	12 4	6 3
Decade 3			16 0	13 7	14 2	13 3	13 3	11 4	13 1	13 5	12 3	10 8	19 6	0
Decade 5			20 0	18 1	17 3	16 3	15 4	14 8	17 0	16 1	15 6	12 0	22 5	0
Decade 10			11 4	14 5	14 7	11 3	11 6	9 6	16 4	10 5	13 6	11 2	13 9	0
Decade 15			21 6	17 0	17 7	16 3	15 5	13 9	17 3	14 8	15 3	10 8	20 1	0
Timber volume with Regional Guide utilization standards	MMBF													
Plan Period														
Green sawtimber			54 9	48 1	45 7	34 1	40 7	31 2	31 3	33 2	26 2	16 8	15 9	8
Dead, posts, poles, pulp			3 8	3 4	3 2	2 4	2 8	2 2	2 2	2 3	1 8	1 2	0	0
Allowable Sale Quantity		31	58 7	51 5	48 9	36 5	43 5	33 4	33 5	35 5	28 0	18 0	15 9	8 0
Projected Period														
Decade 3			58	50	47	36	34	33	33	34	28	18	79	0
Decade 5			72	75	60	49	49	43	51	45	44	27	74	0
Decade 10			70	67	62	51	64	44	51	49	44	29	72	0
Decade 15			57	48	42	38	13	38	30	32	32	25	56	0
Long-term Sustained Yield		63	59	59	52	46	46	42	40	44	40	30	60	0
Timber volume with Regional Guide utilization standards	MMCF													
Plan Period														
Green sawtimber			12 5	10 8	10 2	7 8	9 4	7 0	7 1	7 4	5 9	3 8	3 4	2 0
Dead, posts, poles, pulp			0 9	0 8	0 7	0 5	0 7	0 5	0 5	0 5	0 4	0 3	0	0
Allowable Sale Quantity		7	13 4	11 6	10 9	8 3	10 1	7 5	7 6	7 9	6 3	4 1	3 4	2 0
Projected Period														
Decade 3			13	12	11	8	8	8	8	8	6	4	18	0
Decade 5			17	17	14	11	11	9	11	11	10	6	18	0
Decade 10			17	17	15	13	16	11	12	12	11	7	18	0
Decade 15			17	17	15	13	6	11	12	12	11	7	18	0
Long-term Sustained Yield		14	17	17	15	13	12	11	12	12	11	8	18	0
Reforestation	Acres													
Decade 1		2852	4829	4487	4150	3469	4033	2892	3566	3250	2623	1785	1364	0
Decade 3			4392	4112	3793	2850	2736	2549	2526	2486	2204	1222	6108	0
Decade 5			6497	6164	5340	4913	4964	3390	5177	4588	4125	2739	7323	0

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Timber stand improvement	Acres													
Decade 1		2012	1200	1200	1200	1200	1200	1200	1200	1200	1200	0	0	0
Decade 3			0	0	0	0	0	0	0	0	0	0	0	0
Decade 5			0	1428	0	0	48	100	0	0	0	0	2709	0
Timber volume utilization standard comparison, green sawtimber	MMBF													
Plan Period														
Regional Guide			55	48	46	34	41	31	31	33	26	17	16	8
Current Contract			51	45	43	32	38	29	29	31	24	16	15	8
Forest Plan DEIS			49	43	41	31	37	28	28	30	24	15	15	8
Minerals management	Cases		100	100	100	100	100	100	100	100	100	100	100	100
Locatable minerals														
Category A	M Acres													
Low potential			600	628	628	628	628	628	628	657	683	721	600	600
Moderate potential			150	172	190	193	193	193	172	249	306	351	150	150
High potential			2	2	6	9	9	9	3	19	48	58	2	2
Very high potential			0	1	1	1	1	1	1	3	14	16	0	0
Total			752	803	825	831	831	831	804	928	1051	1146	752	752
Category B	M Acres													
Low			26	24	25	25	25	25	24	22	19	16	26	26
Moderate			35	36	35	34	34	34	35	36	22	17	35	35
High			15	13	12	12	12	12	15	12	7	7	15	15
Very high			1	4	4	4	4	4	1	5	4	3	1	1
Total			77	77	76	75	75	75	75	75	52	43	77	77
Category C	M Acres													
Low			140	141	151	165	165	179	174	136	129	110	140	206
Moderate			154	133	150	184	184	219	195	146	106	100	153	251
High			29	32	42	75	75	90	72	53	42	37	29	78
Very High			17	15	18	3	3	5	20	20	11	12	17	27
Total			340	321	361	427	427	493	461	355	288	259	339	562
Category D	M Acres													
Low			113	86	74	61	61	47	51	64	48	37	113	48
Moderate			191	189	157	120	120	85	127	108	93	55	191	93
High			85	79	66	55	55	40	43	48	36	26	85	36
Very high			22	23	19	11	11	8	18	12	12	18	22	12
Total			411	377	316	247	247	180	239	232	189	136	411	189
Leasable minerals														
Category A	M Acres													
Low			738	789	789	791	791	791	788	863	919	1070	738	738
Moderate			5	5	22	32	32	32	5	53	121	48	5	5
High			0	0	0	0	0	0	0	0	0	0	0	0
Very high			0	0	0	0	0	0	0	0	0	0	0	0
Total			743	794	811	823	823	823	793	916	1040	1118	743	743
Category B	M Acres													
Low			31	42	42	42	42	42	41	33	29	24	31	31
Moderate			45	36	35	34	34	34	36	33	25	22	45	45
High			0	0	0	0	0	0	0	0	0	0	0	0
Very high			0	0	0	0	0	0	0	0	0	0	0	0
Total			76	78	77	76	76	76	79	66	54	46	76	76
Category C	M Acres													
Low			200	196	215	134	134	138	234	199	144	168	200	317
Moderate			126	126	148	177	177	189	216	219	141	136	126	243
High			0	0	0	0	0	0	0	0	0	0	0	0
Very high			0	0	0	0	0	0	0	0	0	0	0	0
Total			326	322	363	311	311	327	450	418	285	304	326	550

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Category D	M Acres													
Low			241	194	175	254	254	250	134	98	124	54	241	124
Moderate			193	193	155	117	117	105	124	62	77	60	193	77
High			0	0	0	0	0	0	0	0	0	0	0	0
Very High			0	0	0	0	0	0	0	0	0	0	0	0
Total			434	387	330	371	371	355	258	180	201	114	434	201
Roads needed for management	Miles	2057	4697	4357	4382	4027	4112	3869	3842	4022	3715	3029	5187	2087
Road construction	Miles/year	33												
Decade 1			41	36	34	23	31	25	23	24	19	12	11	3
Decade 3			39	35	30	22	22	22	22	22	19	13	53	0
Decade 5			35	22	26	20	18	13	18	18	15	4	37	0
Decade 10			22	11	17	15	20	14	14	14	12	5	24	0
Decade 15			1	0	0	0	0	1	0	0	0	0	1	0
Local Forest-related employment	Jobs	1050												
Decade 1*			1400	1310	1270	1130	1260	1040	1070	1110	1010	880	820	390
Decade 2			1540	1410	1390	1240	1210	1140	1180	1220	1110	990	1540	380
Local Forest-related income	MM $	19												
Decade 1			26	24	23	20	23	19	19	20	18	15	14	7
Decade 2			28	26	25	22	21	20	21	21	19	17	29	7
Total costs (Budget)	M $	8100												
Decade 1		(6600)*	9200	9200	9100	8600	9900	7500	7900	8500	7900	7400	5900	3300
Decade 3			9800	9500	9400	8300	8300	7400	7400	8400	7600	7000	10400	3200
Decade 5			8600	8800	8500	8300	8200	7700	7500	8500	7800	7100	8900	3200
Decade 10			8200	8600	8400	8000	8500	8000	7100	8200	7800	7600	8400	3200
Decade 15			8300	8500	8400	7900	7100	7700	7300	8200	7600	7100	8200	3200
* Fiscal year 1986 budget in 1978 dollars														
Recreation/wildlife costs	M $													
Decade 1			500	500	700	800	800	800	400	1200	800	1200	200	30
Decade 3			500	500	700	800	800	800	400	1100	900	1100	200	30
Decade 5			500	500	700	800	800	800	400	1100	900	1100	200	30
Decade 10			500	500	700	800	800	800	400	1100	800	1100	200	30
Decade 15			500	500	700	800	800	800	400	1100	800	1100	200	30
Range costs	M $													
Decade 1			100	100	100	100	100	100	100	100	100	100	100	10
Decade 3			100	100	100	100	100	100	100	100	100	100	100	0
Decade 5			100	100	100	100	100	100	100	100	100	100	100	0
Decade 10			100	100	100	100	100	100	100	100	100	100	100	0
Decade 15			100	100	100	100	100	100	100	100	100	100	100	0
Timber costs	M $													
Decade 1			4100	4100	3800	3200	4500	1800	3200	2700	2500	1700	1300	200
Decade 3			4600	4300	4000	2900	2900	1700	2700	2700	2200	1300	5600	0
Decade 5			3200	3500	3000	2700	2700	2000	2700	2700	2200	1400	3900	0
Decade 10			2700	3200	2800	2400	2900	2200	2400	2300	2200	1800	3300	0
Decade 15			2800	3000	2800	2400	1500	2000	2500	2200	2000	1300	3100	0

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Other costs*	M $													
Decade 1			4500	4500	4500	4500	4500	4800	4100	4500	4500	4500	4300	3100
Decade 3			4600	4600	4600	4600	4600	4800	4200	4500	4500	4500	4500	3100
Decade 5			4800	4800	4700	4700	4700	4800	4300	4600	4600	4500	4700	3100
Decade 10			4900	4900	4800	4700	4700	4900	4200	4700	4700	4500	4900	3100
Decade 15			4900	4900	4800	4800	4700	4800	4300	4700	4700	4600	4900	3100
*Other costs include Job Corp, road maintenance, protection, general administration, minerals, lands, and facilities														
Road costs*	M $													
Decade 1			1700	2200	1900	1600	2400	800	1400	1100	1200	700	500	100
Decade 3			2600	2500	2200	1400	1300	700	1300	1300	1000	500	3000	0
Decade 5			600	600	500	400	400	400	400	300	300	100	700	0
Decade 10			400	600	400	300	400	700	200	300	300	600	800	0
Decade 15			400	500	600	500	300	400	600	500	400	200	300	0
*Road costs are the total of purchaser credit, capital investment, and engineering road costs														
Purchaser credit road costs	M $													
Decade 1			900	1000	900	800	1200	300	700	500	600	300	200	100
Decade 3			1200	1200	1100	700	600	300	600	600	500	200	1400	0
Decade 5			300	300	200	200	200	200	200	200	200	100	400	0
Decade 10			200	400	300	200	300	400	200	200	200	500	500	0
Decade 15			400	400	500	500	300	400	500	500	400	200	300	0
Capital investment road costs	M $	340												
Decade 1			400	400	400	300	500	100	300	200	300	100	100	0
Decade 3			500	500	500	300	300	100	300	300	200	100	600	0
Decade 5			100	100	100	100	100	100	100	100	100	0	200	0
Decade 10			100	100	100	100	100	100	0	100	0	0	100	0
Decade 15			0	0	0	0	0	0	0	0	0	0	0	0
Total capital investment costs	M $	1400												
Decade 1			3500	3600	3700	3300	4300	2200	2800	3100	2700	2300	1300	100
Decade 3			4000	3800	3700	2800	2700	2000	2300	2800	2300	1700	4700	0
Decade 5			2300	2400	2300	2200	2200	2000	1900	2400	2000	1700	2700	0
Decade 10			1900	2300	2400	2100	2400	2300	1800	2300	2000	2100	2200	0
Decade 15			2000	2000	2100	1900	1400	1900	1700	2000	1700	1500	2100	0
Operation/maintenance costs	M $	6400												
Decade 1			5800	5600	5400	5300	5600	5300	5000	5400	5200	5100	4600	3200
Decade 3			5800	5700	5700	5600	5600	5400	5000	5600	5400	5300	5800	3200
Decade 5			6300	6400	6200	6000	6000	5700	5600	6200	5900	5500	6100	3200
Decade 10			6200	6300	6100	5900	6100	5700	5300	5900	5800	5500	6200	3200
Decade 15			6300	6500	6400	6100	5700	5800	5600	6100	5900	5600	6200	3200
Returns to U.S Treasury	M $	1600												
Decade 1			2500	3400	3500	2200	2200	2400	1500	2300	2000	1300	1900	900
Decade 3			6900	5600	5100	4200	3700	3800	3800	3900	3600	1900	11000	100
Decade 5			17300	16800	13500	10900	11500	10000	10600	10100	9800	5500	18900	100
Decade 10			21100	17000	16600	16000	18900	14400	11800	15500	12200	8100	18900	100
Decade 15			20000	17000	14300	12900	5800	12000	10600	11300	11400	6500	20300	100
Returns to States	M $	400												
Decade 1			600	900	900	500	600	600	400	600	500	300	500	200
Decade 3			1700	1400	1300	1100	900	900	1000	1000	900	500	2800	20
Decade 5			4300	4200	3400	2700	2900	2500	2700	2500	2500	1400	4700	20
Decade 10			5300	4200	4200	4000	4700	3600	2900	3900	3100	2000	4700	20
Decade 15			5000	4200	3600	3200	1500	3000	2700	2800	2900	1600	5100	20

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Special uses returns	M $	5												
Decade 1			130	130	130	130	130	130	130	130	130	130	130	120
Decade 3			80	80	80	80	80	80	80	80	80	80	80	70
Decade 5			80	80	80	80	80	80	80	80	80	80	80	70
Decade 10			80	80	80	80	80	80	80	80	80	80	80	70
Decade 15			80	80	80	80	80	80	80	80	80	80	80	70
Range returns	M $	10												
Decade 1			20	20	20	20	20	20	20	20	20	20	20	10
Decade 3			30	20	20	20	20	20	20	20	20	20	30	0
Decade 5			40	30	30	30	30	20	30	30	30	20	40	0
Decade 10			20	20	20	20	20	20	30	20	20	20	20	0
Decade 15			40	30	30	30	30	20	30	30	30	20	40	0
Timber returns	M $	800												
Decade 1			2300	3300	3400	2000	2100	2300	1300	2200	1800	1100	1800	700
Decade 3			6800	5500	5000	4100	3600	3700	3700	3800	3500	1800	10900	0
Decade 5			17200	16700	13400	10800	11400	9900	10500	10000	9700	5400	18700	0
Decade 10			21000	16900	16500	15900	18800	14300	11700	15400	12100	8000	18800	0
Decade 15			19900	16800	14200	12800	5700	11900	10500	11200	11300	6400	20200	0
Market resource benefits	M $													
Decade 1			2700	3600	3700	2300	2400	2600	1600	2500	2100	1400	2100	1000
Decade 3			7100	5800	5300	4400	3900	3900	4000	4100	3800	2000	11300	70
Decade 5			17600	17100	13700	11100	11700	10200	10800	10400	10000	5700	19200	70
Decade 10			21200	17200	16800	16100	19000	14600	12000	15700	12400	8200	19100	70
Decade 15			20300	17200	14500	13100	6100	12200	10900	11500	11700	6700	20600	70
Nonmarket resource benefits	M $													
Decade 1			3700	3700	3700	3700	3700	3600	3600	3700	3800	3800	3700	1600
Decade 3			6700	6700	6700	6600	6600	6300	6500	6700	6800	6800	6800	1900
Decade 5			12900	12900	12800	12600	12600	11800	12400	12800	13000	13100	12900	3300
Decade 10			12700	12800	12800	12600	12600	11800	12400	12800	13000	13000	12700	3300
Decade 15			12800	12800	12800	12600	12600	11800	12400	12800	13000	13100	12900	3300
Costs discounted at 4%	MM $													
Recreation/Wildlife		-	12	12	18	20	20	20	11	29	21	29	4	1
Range		-	3	3	2	2	2	2	2	2	3	2	2	0
Timber		-	58	55	50	44	46	47	43	40	35	26	50	0
Roads		-	46	47	42	32	37	18	29	27	24	14	38	1
Other		-	116	116	116	115	116	104	106	115	114	113	113	79
Benefits discounted at 4%	MM $													
Recreation/Wildlife		-	173	172	173	170	170	163	167	173	175	176	172	52
Range		-	6	5	5	5	5	5	5	5	5	4	6	1
Timber		-	202	196	173	131	128	120	119	125	118	65	233	6
Other		-	2	2	2	2	2	2	2	2	2	2	2	2
Present value benefits (4%)	MM $	-	383	376	353	309	306	290	294	305	300	247	414	61
Present value costs (4%)	MM $	-	235	233	228	213	221	191	191	214	197	185	208	81
Present net value (4%)	MM $	-	148	143	125	96	85	99	103	91	103	62	206	-20
Opportunity cost (4%)	MM $		58	63	81	110	121	107	103	115	103	144	0	226

Table II-26 (continued)

Resource	Unit of Measure	1980	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Benefit/cost ratio (4%)			1 6	1 6	1 5	1 5	1 4	1 5	1 5	1 4	1 5	1 3	2 0	0 8
Present value benefits (7 1/8%)	MM $	-	157	156	150	129*	127	124	120	129	126	105	170	33
Present value costs (7 1/8%)	MM $	-	134	132	130	122*	129	107	109	121	111	105	109	46
Present net value (7 1/8%)	MM $	-	23	24	20	7*	-2	17	11	8	15	0	61	-13
Research natural areas	Acres	0	6302	6790	12154	12154	12154	12154	0	12154	11666	12154	0	0
Forest work force in first decade	Work-year equiv		320	310	310	300	330	280	280	310	280	280	220	160
Energy Consumption	Billion BTU	-												
Decade 1			235	218	211	186	221	146	179	174	159	131	125	80
Decade 3			297	281	267	228	224	191	223	224	206	175	344	93
Decade 5			333	340	319	298	294	202	300	309	286	254	346	139

* Alternative E (Proposed Action) was rescheduled in FORPLAN using 7 1/8% discount rate and the PNV was $8 million.
** 1986 Budget in 1978 dollars

23. References

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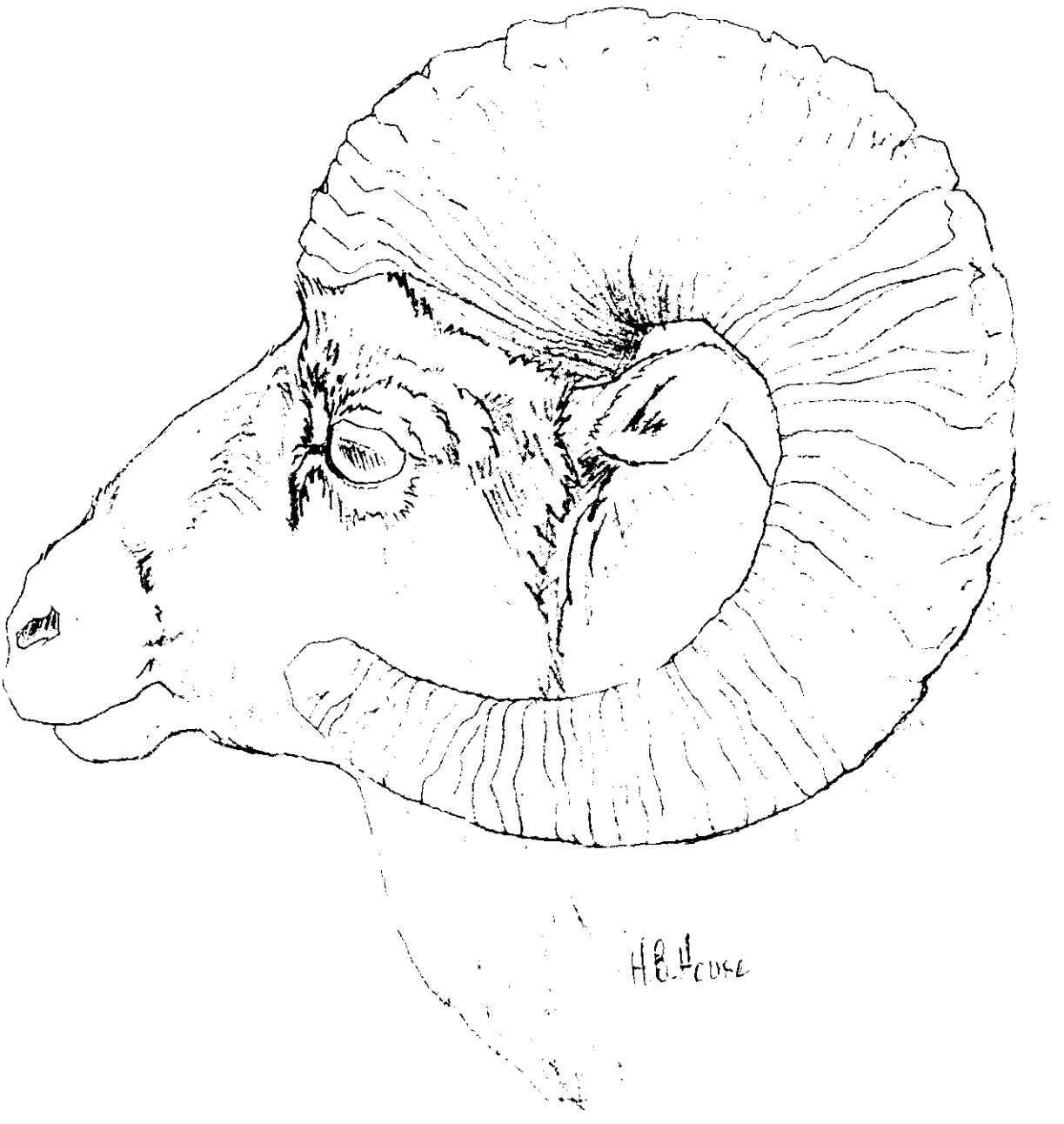

III. AFFECTED ENVIRONMENT

This chapter describes the environment that may be changed by the implementation of the Preferred Alternative or alternative plans considered. This description is presented in two sections. Section A describes the physical, biological, social, and economic settings, and section B describes the Forest's current resource situation. Most of the resource discussion focuses on the nonwilderness portion of the Forest.

Changes in this chapter between the Draft and Final EIS include: a new paragraph under fish, describing sediment and fish response models; a paragraph under watershed, explaining Bitterroot River sediment conditions; new estimates of catchable trout populations, from 1985 shocking surveys conducted by the Montana Department of Fish, Wildlife and Parks; several new paragraphs under timber - below-cost sales, timber supply and demand analysis, slope and productivity characteristics of the tentatively suitable base, and restocking success; and other minor updates and corrections throughout the text.

A. Physical, Biological, Social, and Economic Settings

1. General Setting

The Rocky Mountain region is characterized by generally north- to south-oriented mountain ranges separated by flat valley floors and foothills. As with most other mountainous areas, the vertical perspective dominates. Atmospheric conditions, as modified by aspect and slope, become progressively cooler and more humid in the transition from lower to higher elevation. Climatic zones include: the semiarid and relatively warm valley bottoms; a broad range of cool, moist coniferous forests; and the cold, moist subalpine and alpine region characterized by bedrock escarpments, coarse rock debris, and cirque lakes and headwalls carved by alpine glaciation in the recent geologic past. This topographic variety provides a diverse mosaic of plant and animal communities, and distinctive panoramas of high mountains and broad valleys.

Most of the population lives in the wide Bitterroot Valley. The balance of water supply, arable land, grassy foothills, National Forest land, outdoor recreation opportunities, and scenic beauty contribute toward a complex social and economic structure of irrigated farming, ranching, timber production, and recreation. There is also a significant and expanding retirement community and a number of rural homes on small tracts, many within commuting distance of Missoula, the area's major trade center.

The following table, added since the DEIS, displays some characteristics of the Bitterroot and adjacent National Forests that are discussed in this chapter, to provide an overall perspective.

Table III-1
Bitterroot Forest Characteristics

Characteristics	Thousand Acres Bitterroot NF	Contiguous NF's	Total
Wilderness			
Anaconda-Pintler	40	120	160
Frank Church-River of No Return	190	2,170	2,360
Selway-Bitterroot	510	830	1,340
TOTAL	740	3,120	3,860
Roadless Areas			
Montana Wilderness Study Act (PL 95-150)	110	60	170
Other Roadless Areas	295	190	485
TOTAL	405	250	655
Roaded and Developed	435		
Total Bitterroot Forest Land	1,580		

Resources	Unit	
Recreation	MRVD's*	520
Trails	Miles	1,590
Big Game	Species	Elk, deer, bear, moose, bighorn sheep, mountain goat
Fish	Trout	Cutthroat, rainbow, eastern brook
Timber	Acres	589,000 acres tentatively suitable
Soils	N/A	Primarily granitics
System Roads	Miles	2,100

*Thousands of recreation visitor days

2. Physical Setting

a. Topography

The Bitterroot Valley floor is about 60 miles long, ranging in width from 4 to 10 miles. To the west, the Bitterroot Range rises abruptly from the valley floor, dominating the view of all who live or travel in the valley. Vertical relief of about 5,000 feet is attained in 3 to 4 airline miles. Breaking this front at intervals of 1 to 3 miles are 30 deep, rocky, glaciated canyons.

To the east, vertical relief along the Sapphire Mountains is much less pronounced, about 3,000 feet in 4 to 5 airline miles. Grassy foothills provide a relatively gradual transition from the valley floor to the crest of the Sapphires. Major stream courses are much less frequent or rugged, and occur at intervals of 4 to 7 miles. Although less dominant or ruggedly spectacular, much of the Sapphire Range, particularly the northern portion, is also in full view of most valley residents and travelers.

Slopes on the Forest are characteristically steep. Gentle slopes lie adjacent to the larger streams, along ridges, and are fairly extensive at higher elevations. Midslopes between streams and ridges are steep. Those rising above major streams are usually very steep.

Slope classes on the nonwilderness portion of the Forest are:

Class	Percent Slope	Percent of Area
Gentle	Under 40	30
Moderate/steep	40 to 60	40
Very steep	Over 60	30

Source: Forest Plan data base

The opportunities for and consequences of Forest management are greatly influenced by slope. Generally, lands with gentle slopes are also the most productive for many resources, including recreation, wildlife, and timber. They are the least costly to manage, allow the greatest range of management practices, and offer the widest range of management opportunities with the lowest potential to adversely affect other values. As slope increases, management costs escalate, the potential for adverse impacts increases, and the range of management practices becomes restricted.

b. **Precipitation**

The Bitterroot Valley is semiarid with annual precipitation less than 14 inches. Precipitation increases with elevation. About 10 percent of the Forest receives less than 20 inches of annual precipitation and does not support a continuous forest cover. South- and west-facing slopes generally support the driest ponderosa pine/bunchgrass forest habitat types, and grasslands. North- and east-facing slopes support scattered trees on dry sites, with continuous tree cover on more moist sites.

About 30 percent of the Forest receives 20 to 30 inches of precipitation annually. The steeper south- and west-facing slopes in this precipitation zone support open ponderosa pine climax forest habitat types, but other slopes have a continuous tree cover.

Precipitation on 60 percent of the Forest is above 30 inches. It ranges from an annual average of 50 inches on the Sapphire Divide, to 100 inches in higher elevations of the Bitterroot Range. This zone is heavily forested, but the growing season is very short. Above 7,500 feet there are park-like stands of spruce, subalpine fir, whitebark pine, and alpine larch; wet meadows; mountain grasslands; and rock. Approximately two-thirds of the precipitation falls as snow, the primary source for ground water recharge and streamflow.

3. **Biological Setting**

This section describes general vegetative categories on the Forest.

a. Vegetation

There are eight vegetative groups on the Forest (On and Losensky, 1976):

Group	Characteristics
Warm and dry	Open stands of ponderosa pine or Douglas-fir with bunchgrass in the understory. Normally found at lower elevations on south-facing slopes.
Moderately warm and dry	Mixed Douglas-fir and ponderosa pine with a shrub and pinegrass understory. Found on all aspects at lower elevations.
Moderately cool and dry	Douglas-fir is dominant, but there is some ponderosa pine, lodgepole pine, and grand fir. The understory is beargrass and huckleberry, and pinegrass on ridges or dry south slopes.
Cool and moderately dry	All aspects from 5,000 to 6,800 feet. Pure stands of lodgepole pine are most common. Subalpine fir, Engelmann spruce and Douglas-fir on more moist sites. Beargrass, huckleberry, and grouse whortleberry are understory species.
Moderately cool and moist	Stands vary from pure spruce to Douglas-fir, larch, grand fir, and lodgepole pine mixtures. Found on north-facing slopes, stream bottoms, and lower south-facing slopes.
Cool and moist	Stands are Douglas-fir, lodgepole pine, larch, subalpine fir and spruce. Occur on moist north-facing slopes, stream bottoms, and moist benches.
Wet	Subalpine fir, spruce, Douglas-fir, and lodgepole pine in poorly drained soils in streamside zones, wet benches, and the heads of drainages.
Cold and moderately dry	All aspects from 6,800 to 9,600 feet. Lodgepole pine at lower portions, and whitebark pine and subalpine fir higher. Some Engelmann spruce and alpine larch.

4. Social and Economic Setting

The primary social and economic impact area for the Forest is Ravalli and Missoula Counties in Montana. The Forest has lesser impact on Idaho and Lemhi Counties in Idaho.

a. Population

In 1980, almost 100,000 people lived in the two-county area, 36 percent more than in 1970. Population in Ravalli County increased 56 percent; much of the rapid growth was immigration of commuters in the northern portion of the county, retired people, and others seeking a rural lifestyle in a scenic environment (Sylvester, 1981).

Missoula County also experienced rapid growth between 1970 and 1980; however, the population remains much younger than in Ravalli County.

The population in both counties is predominantly white, with small numbers of Native Americans, Blacks, and Asians. Before 1804 the valley was the home of Indian tribes, most recently the Salish, who were moved to the Flathead Indian Reservation in 1891. The Confederated Salish and Kootenai tribes retain hunting, fishing and grazing rights in the Montana portion of the Forest for tribal areas ceded to the U.S. Government (Treaty with the Flatheads, 1855). The Nez Perce Treaty of 1855 gives that tribe hunting, fishing, and grazing rights in the Idaho County portion of the Forest. There has been little activity under these rights, but the potential for use exists.

b. Economy

The local economy is becoming more service- and trade-oriented, especially in Ravalli County. In the two-county area, federal and state government employed 25 percent of the 1980 labor force, and wood products manufacturing employed 10 percent. In addition, Missoula serves as the trade center for western Montana, is the home of the University of Montana, and has a fairly large travel and tourism industry. Almost 50 percent of Missoula County's labor force is employed in the trade and services sector.

The economy in Ravalli County is similar to Missoula's, except the agricultural sector employs 20 percent of the Ravalli County labor force. Because of the influx of commuters and retirees, the proportion of income generated from local employment is decreasing. In 1979, 43 percent of personal income in Ravalli County was not related to current labor force participation. This compares to 32 percent statewide. Fourteen percent of personal income was earned outside the county, and 36 percent was received from transfer payment (such as social security or retirement) and property income (Sylvester, 1981). Ravalli County has always experienced a higher unemployment rate than the rest of the state, reflecting the seasonal nature of employment as well as the situation of people moving into the area and not finding work.

c. Lifestyles

The population and economic changes that have occurred in Ravalli and Missoula Counties can be attributed to the environmental setting. People live in the Bitterroot Valley because of the picturesque rural mountain environment, rich in historic and cultural heritage. Native residents appreciate those values, and those characteristics have attracted a steady stream of immigrants to the area, ranging from those escaping chaotic urban life, to retirees (Boyer and Savageau, 1983), and young people seeking self-sufficient, outdoor-oriented lifestyles.

Public ownership of about 70 percent of Ravalli County ensures retention of many of the rural characteristics of the area. Much of the private land in the Bitterroot Valley was subdivided in the early 1900's into 5- to 20-acre tracts, during the apple orchard boom. Since that time farmers and ranchers have consolidated some of those lands. A real estate boom in the 1970's resulted in new subdivision of agricultural lands, and purchase of the original orchard tracts. There are about 650 private landowners whose tracts border National Forest land.

The people are independent; value personal, civil, and property rights; and resist government regulation. They are concerned about resource uses and generally want the area to remain as it is. However, for loggers, ranchers, outfitters, and others who depend on Forest resources for a livelihood, a guaranteed supply of resources is essential to their social and economic well-being.

The Forest provides timber, livestock forage, irrigation water, recreation opportunities, and scenic backdrop for the local valley population. There are two large sawmills; several smaller mills; and about 24 house log, post and pole businesses in Ravalli County dependent on National Forest timber. Ranching has been declining in the valley, due primarily to subdivision of ranch properties. Firewood cutting, big-game hunting, and fishing are important to the lifestyle of many local residents. Others use the Forest for hiking, camping, backpacking, ski touring, and snowmobiling.

Many of the valley's landowners have small tracts of pasture land, and depend on irrigation water flowing from Forest streams. Others living adjacent to the boundary use open stream water for domestic purposes.

d. Forest Receipts

Forest receipts come primarily from the sale of timber, but also from grazing permits, mineral leases, special use permits, and campground fees. Twenty-five percent of the gross receipts are returned to state and local governments, primarily Ravalli and Idaho Counties. Much of the fluctuation in receipts is due to cyclical timber harvests.

Forest receipts in 1978 first quarter dollars (1978-I $) are:

Dollars	Year
1,381,200	1977
1,246,800	1978
2,439,600	1979
1,555,200	1980
2,748,400	1981
250,800	1982

e. Forest Service Employment and Budget

Forest Service employment in 1980 was 307; in 1981, 361; and in 1982, 282 work years. The average annual budget for 1980-83 was $7 million (1978-I $). Excluding inflationary effects, the annual budget increased until 1981, and has been decreasing since then.

In 1981 and 1982 annual budget allocations were:

Activity	Percent of Budget
Timber management and road building	40
Trapper Creek Job Corps	26
Fixed costs, including administration and fire	29
Recreation, wildlife, minerals, soil, water & range	5

Source: Forest budget records.

B. Current Resource Situation

1. Recreation

Recreation use is measured by recreation visitor days; one day equals 12 hours of use. In 1980, 515,700 recreation visitor days were recorded on the Forest. About 25 percent of this use was at developed recreation sites, and 75 percent was dispersed use such as hiking, camping, and backpacking. Dispersed use occurs in wilderness and nonwilderness areas. Future recreation use is expected to increase in direct proportion to population.

a. Dispersed Recreation

The major uses, documented in the Recreation Information Management System (RIM), are automobile travel, camping, hunting, hiking, fishing, and horseback riding. While automobile travel is shown as the predominant use, this results from a great deal of travel on U.S. Highway 93 and several roads that traverse the Forest. Camping is the second most popular activity, and much of that use is a spinoff of hunting season. Hunting season provides the greatest concentration of use. A great deal of this use is due to the national recognition of the Selway and Bitterroot elk herds. Winter recreation use is light.

In 1985 there were 26 outfitter-guides with permits on the Forest.

b. Developed Recreation

There are 33 developed recreation sites on the Forest, including campgrounds, boating sites, end-of-road trailheads, and one downhill ski area. In 1980, developed recreation use was 123,100 recreation visitor days. Developed site use approaches or exceeds capacity at Lake Como day-use area and at Larry Creek Campground. Currently, use fees are charged at five campgrounds. The Lost Trail Ski Area recorded 14,000 skier visits in 1980, and 26,000 in 1982 after expansion of the area.

c. Recreation Settings

The Recreation Opportunity Spectrum system is used to evaluate the recreation potential of the Forest. This system defines five types of recreational settings ranging from primitive, where human disturbance is minimal, to rural, where roads and users are concentrated. The primitive setting applies to wilderness areas.

The percent of current recreation settings on the Forest outside wilderness is:

Primitive	0 percent
Semiprimitive nonmotorized	10 percent
Semiprimitive motorized	29 percent
Roaded natural	60 percent
Rural	1 percent

Source: Forest Plan data base

Since 47 percent of the Forest is wilderness and closed to motorized vehicles, most of the remaining roadless areas suitable for off-road vehicles (semiprimitive motorized) do not have restrictions on motorized travel. Motorized travel is prevented by topographic and vegetative features, or by lack of trails, on lands in the semiprimitive nonmotorized category. An estimated 10 percent of the roadless inventory is physically suited for off-trail use by snowmobiles or trail bikes.

d. Recreation Trails

Access in the Forest is provided by 1,594 miles of trails, with 937 miles in wilderness and 657 miles outside wilderness. Less than 20 percent of the total trail system is available and suitable for mechanized use, due to wilderness classification or topography that limits suitability. There are four National Recreation Trails, and parts of the Continental Divide National Scenic and Lewis and Clark and Nez Perce (Nee-Me-Poo) National Historic Trails, on the Forest.

On the trails outside wilderness, about 87 percent are open to all uses, 12 percent have restrictions on motorized use, and 1 percent are closed to stock use. About 25 percent of the trail system is in poor condition, requiring extensive reconstruction or relocation. The poor condition results from poor location rather than user impacts. In the past few years, about 2 miles of trail have been constructed or reconstructed annually.

Trail miles by maintenance category are:

Category	Wilderness Miles	Nonwilderness Miles
Custodial care only	113	0
Tread maintained	315	319
Tread maintained, trailside brushed	502	318
High standard maintenance	0	20

2. Cultural Resources

Over 70 prehistoric archaeological sites have been identified on the Montana portion of the Forest. These sites date from 5,000 to 6,000 years ago up to the early 1800's.

Early Native Americans inhabited a wide variety of areas and ecological zones on the Forest, from the river valleys to high elevation sites. In more recent times, the Flathead and Nez Perce Indians occupied the Bitterroot Valley and surrounding forest. Sites have been located along the Magruder Corridor, Southern Nez Perce Trail, and Nez Perce Fork of the Bitterroot River (Thomas and Turner, 1969). Many geologic formations and landmarks in the valley and Forest are important in Salish legends. Three sites on the Forest have been identified as significant by the Flathead Tribe's culture committee.

The Lewis and Clark expedition traversed the Bitterroot Valley in 1805-1806. Many early missionaries, explorers, traders, and miners used the Southern Nez Perce trail in their travels. Homesteads, mining areas, and logging camps from the 19th and early 20th centuries are located throughout the Forest. The Montana portion of the Forest contains over 40 recorded historic sites, and the Alta Ranger Station is in the National Register of Historic Places.

The Forest has completed two cultural resource overviews: "A Cultural Resource Overview - Bitterroot National Forest" (Caywood and Light, 1984), and "The Prehistory of the Lolo and Bitterroot National Forests" (McLeod and Melton, 1986). These documents will provide guidance, and will be updated periodically. A historic overview is also needed and will be completed in the future.

3. Wilderness, Roadless, Wild and Scenic Rivers, and Special Areas

The Forest contains units of nationally recognized wilderness, wild river, and historic/scenic/recreation trail systems. These include portions of the Selway-Bitterroot, Anaconda-Pintler, and Frank Church-River of No Return Wildernesses; segments of the Salmon, and Middle Fork of the Clearwater (Selway) Wild and Scenic Rivers; portions of the Lewis and Clark Historic Trail and Continental Divide Scenic Trail; and four National Recreation Trails. These attract nationwide recreation users.

a. Existing Wilderness Areas

(1) Selway-Bitterroot Wilderness

The Selway-Bitterroot Wilderness contains 1,340,360 acres located in southwestern Montana and east central Idaho; 511,897 acres are on the Bitterroot Forest. It is the second largest classified wilderness in the continental United States, and is adjacent to the Frank Church-River of No Return Wilderness which is the largest. These two wildernesses are separated by the 600-foot Nez Perce Trail Road corridor.

Because of its size, this wilderness has large areas without trails which provide significant opportunities for visitors to experience solitude in some of the country's most pristine areas. The wilderness is characterized by rugged terrain with spectacular, steep-walled, rocky canyons fronting the Bitterroot Valley. The rapid elevational changes provide a diversity of ecosystems.

The Selway River flows through the wilderness and has been designated a wild river. Large repeated wildfires in the early 1900's created extensive brushfields which provide forage for an elk herd of national significance.

Among the permitted but nonconforming uses in the area are 17 active irrigation dams. An additional 21 dams have been abandoned. The dams are located along the east face of the Bitterroot Range.

Use of the interior portion of the wilderness is light, with the exception of the Selway River corridor. The canyons along the east slopes of the Bitterroot Range, particularly the northern portion, receive heavy use due to their proximity to population centers and the relatively good road access. Hunting is the most popular use, with camping second. Hiking produces slightly more recreation visitor days than does horseback riding.

(2) Frank Church-River of No Return Wilderness

The Central Idaho Wilderness Act of 1980 created this 2.4 million-acre area, of which 193,703 acres are on the Bitterroot Forest. All of the Forest's portion is in Idaho County, Idaho. The total wilderness is vast and undeveloped, thus offering opportunities for solitude in areas remote from human influences.

The Forest's portion extends north from the Salmon River to the Nez Perce Trail Road. The Salmon River, part of the Wild and Scenic River System, is administered by the Salmon Forest. The rugged breaks along the river are sparsely forested and have a long history of fire activity. The area is rich in historic and archeological resources. The breaks and river are the most spectacular features of the area. Further north, the slopes become more gentle, cooler, higher in elevation, and more forested.

Recreation use is light, except along the Salmon River. Heaviest concentrations of use occur during the big-game hunting season.

The Nez Perce Trail Road, and spurs to Hell's Half Acre Lookout, Paradise, and Magruder Station, provide access in the summer and fall. Senate Report 96-414 established congressional intent for management of these nonwilderness road corridors: "The existing low standard roads provide ample access well matched to the rugged and remote character of the wilderness on either side. Maintaining the wilderness environment and atmosphere - for enjoyment by those using the roads and those leaving the roads to enter wilderness - must be the guiding principle in future management of the roads and immediate surroundings." Additional roadside development should be minimized to maintain the roadside wilderness character.

(3) Anaconda-Pintler Wilderness

This 157,874-acre area is located along the Continental Divide in southwestern Montana. It is relatively small and unknown in comparison to the Selway-Bitterroot and Frank Church-River of No Return Wildernesses. There are 44,162 acres on the Bitterroot Forest.

Use is light on the Forest's portion, with about 95 percent originating at the East Fork portal. A comparison of use figures from 1970-80 indicated no appreciable increase for the decade (Jubenville, 1970; USDA Forest Service, 1982). Day and overnight use is nearly equal. Overnight use is about equally divided between hikers and stock users. The Continental Divide Scenic Trail is within the area. Designation of this trail has not created a noticeable increase in use or impacts.

b. Roadless Areas

About 47 percent of the Forest is wilderness, and another 25 percent is roadless and undeveloped. Timber harvest, minerals, or road building activities have occurred on about 28 percent of the Forest.

In the 1979 Roadless Area Review and Evaluation (RARE II), approximately 557,000 acres of roadless land outside of existing wilderness were identified on the Forest (USDA, 1979). In that process about 221,000 acres were recommended for wilderness, and about 171,000 acres were added to the wilderness system in the 1980 Central Idaho Wilderness Act. No action has been taken on the remaining 50,000 acres recommended for wilderness in RARE II.

Of the remaining 336,000 acres inventoried in RARE II, 109,000 were identified for further planning in the Forest Plan by the 1977 Montana Wilderness Study Act (MWSA). About 227,000 acres were released for nonwilderness uses. Because of management activities, about 28,000 acres released for nonwilderness uses in RARE II no longer meet the roadless inventory criteria.

As a result of the Ninth Circuit Court decision on the RARE II Final EIS, the Forest is again evaluating roadless areas. This inventory includes 50,000 acres of land recommended for wilderness in RARE II, 109,000 acres of MWSA areas, 199,000 acres released for nonwilderness uses in RARE II, and 28,000 acres from Land Management (Unit) Plans that weren't included in the RARE II inventory. These area figures were adjusted to account for refined acreage calculations in the Forest Plan data base (Table II-2).

Eleven areas covering about 405,000 acres of the Forest are roadless; some are contiguous with roadless areas on adjacent Forests. A summary of the wilderness characteristics of these areas is in this section, and resource values are in Table III-2. Appendix C contains details on the characteristics and values of each roadless area.

Table III-2
Resource Summary for Roadless Areas

Roadless Area	Net Acres	Tentatively Suitable Timberland (acres)	Suitable Range (acres)	Minerals* Nonenergy (acres)	Minerals* Energy (acres)	Big Game Winter (acres)	Fishery Streams (miles)
North Big Hole	56,789	44,831	8,307	56,789	56,789	320	0
Beaverhead NF	53,098	42,361	8,127	53,098	53,098	320	0
Bitterroot NF	3,691	2,470	180	3,691	3,691	0	1
Swift Creek	744	684	0	744	0	0	1
Needle Creek	1,085	1,061	0	1,085	0	633	0
Selway-Bitterroot	115,751	40,992	1,187	42,273	0	13,116	66
Bitterroot NF	115,151	40,907	1,187	42,273	0	13,116	65
Nez Perce NF	600	85	0	0	0	0	1
Sapphire	116,530	71,224	25,864	39,303	0	0	79
Bitterroot NF	44,116	27,758	5	21,033	0	0	26
Deerlodge NF	72,414	43,466	25,859	18,270	0	0	53
Lolo Creek	16,747	10,317	4,880	15,247	0	0	5
Lolo NF	14,660	10,154	4,880	14,660	0	0	4
Bitterroot NF	587	163	0	587	0	0	1
Stony Mountain	103,266	52,275	5,137	57,645	0	4,732	51
Bitterroot NF	43,720	18,646	0	43,720	0	2,990	35
Lolo NF	34,930	17,198	0	12,585	0	632	4
Deerlodge NF	24,616	16,431	5,137	1,340	0	1,110	12
Blue Joint	65,860	44,089	1,172	63,890	0	4,451	51
Bitterroot NF	65,370	43,662	1,172	63,890	0	4,451	51
Salmon NF	490	427	0	0	0	0	0
Allan Mountain	153,267	101,311	2,823	131,002	0	14,085	82
Bitterroot NF	102,286	64,976	2,823	80,021	0	14,085	64
Salmon NF	50,981	36,335	0	50,981	0	0	18
Tolan Creek	7,088	4,729	1,110	7,088	0	5,780	4
Sleeping Child	21,423	20,333	525	11,806	5,473	0	22

*These are areas of moderate to very high potential

(1) Allan Mountain Roadless Area

This is a large, relatively compact area shared by the Bitterroot and Salmon Forests. Natural integrity is unimpaired, except for intermittent sections of dozer constructed trail providing access for mineral exploration near Overwhich Falls and several ridgetops to the west. These impacts occur on less than 1 percent of the lands near the center of the area, and are evident to visitors when onsite.

Opportunities for solitude are high for a large core area (45 percent of the area) enclosed by ridgetops, which screen out most evidence of civilization outside the area. The core encompasses the upper reaches of Warm Springs, Slate, Overwhich, Indian, Hughes, and Twin Creeks. Opportunities for primitive recreation are moderate and include hiking, hunting, fishing, ski touring, camping, horseback riding, and viewing a moderate diversity of wildlife and scenery; however, challenging opportunities are rare. Wilderness attributes within the northern portion are enhanced by its large, compact size. Overwhich Falls, and subalpine larch stands on Allan Mountain are special features.

(2) Blue Joint Roadless Area

This area borders the Frank Church-River of No Return Wilderness on the west and south. Activities that have significantly altered natural appearances are minimal and concentrated along the boundary. They include timber harvest and several miles of road. Less than 1 percent of the land area has been impacted. These impacts are readily apparent to any visitor when onsite.

Opportunities for solitude are exceptional within the Blue Joint drainage (45 percent of the area), which is entirely enclosed by high ridgetops that screen out evidence of civilization. Another 15 percent in the upper reaches of Deer and Chicken Creeks offers solitude, but outside impacts are less effectively screened out. Primitive recreation opportunities are moderate and include hiking, hunting, fishing, camping, horseback riding, and viewing a moderate diversity of wildlife and scenery; however, challenging opportunities are rare. A natural rock arch and large streamside meadows are special features. The area's large compact size and proximity to existing wilderness enhances wilderness attributes.

Most of the area is a Congressionally designated wilderness study area under the Montana Wilderness Study Act (PL 95-150). Until Congress determines otherwise, and subject to existing private rights, this portion of the roadless area will be administered to maintain its existing wilderness character and potential for inclusion in the National Wilderness Preservation System.

(3) Needle Creek Roadless Area

This is a small area bordering the Anaconda-Pintler Wilderness. Natural integrity is unimpaired. Opportunities for solitude are low due to significant evidence of civilization outside the area. Primitive recreation opportunities are limited primarily to hunting with some day hiking and berrypicking. Challenging opportunities are nonexistent, and there are no special features.

(4) Sapphire Roadless Area

This is a large area shared by the Bitterroot and Deerlodge Forests. It borders the Anaconda-Pintler Wilderness to the south. Activities that have significantly altered natural appearances are concentrated in Martin Creek and along the exterior boundary. These are: mining prospects and development on private land in Frogpond Basin; many miles of dozer constructed fireline and primitive roads in Martin Creek; and several other primitive roads along the boundary. These impacts occur on about 3 percent of the land area and would be evident to visitors when onsite. Otherwise the area retains a high degree of naturalness.

Opportunities for solitude are high for a large core area (45 percent of the area) enclosed by high ridgetops, which screen out most off-area evidence of civilization. The core encompasses most of the Ross' Fork of Rock Creek, Moose Creek, Copper Creek, and the upper reaches of Skalkaho Creek. Primitive recreation opportunities are moderate, consisting of hunting, fishing, horseback riding, hiking, and viewing a moderate diversity of vegetation, wildlife, and historic mining activity. Challenging opportunities are rare. Special features include several large streamside meadows and rocky peaks. Wilderness attributes within the central core area are enhanced by its large and compact size.

Most of the area is a Congressionally designated wilderness study area under the Montana Wilderness Study Act (PL 95-150). Until Congress determines otherwise, and subject to existing private rights, this portion of the roadless area will be administered to maintain its presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System.

(5) Selway-Bitterroot Roadless Area

This is a long, narrow roadless area bordering the eastern boundary of the Selway-Bitterroot Wilderness. Activities which have significantly altered natural appearances are minimal (less than 1 percent of the area) and confined to Bass, Fred Burr, Blodgett, Little Rock Creek, North Fork Trapper, and Lost Horse Canyons. These include a dozer constructed trail, an irrigation dam and reservoir, several irrigation diversions and ditches, and mineral exploration. Impacts are readily apparent to any visitor when onsite.

Opportunities for solitude are high in most canyons (45 percent of the area). They are enclosed by high ridgetops which effectively screen out most off-area evidence of civilization. Solitude is enhanced by the adjoining wilderness. Primitive and challenging recreation opportunities in this portion of the area are abundant, consisting of hiking, rock climbing, ski touring, fishing, hunting, and viewing a wide diversity of vegetation, wildlife, rock formations, avalanche chutes, waterfalls, and lakes. Sharp relief contributes to the feeling of vastness. Special features include a natural rock arch in Blodgett Creek, a massive landslide in Nelson Creek, spectacular and varied scenery, and historic evidence of irrigation dam construction around the turn of the century.

(6) Sleeping Child Roadless Area

This is a relatively small roadless area in the middle reaches of the Sleeping Child drainage. Activities that have significantly altered natural appearances are concentrated in the southeast corner, and affect about 7 percent of the area. They include dozer constructed firelines and primitive fire roads, and are readily apparent to visitors when onsite. The remainder of the area retains a high level of naturalness.

Opportunities for solitude are low due to the area's small size, and roads and development surrounding it. However, a central core (40 percent of the area) is somewhat enclosed by ridgetops which screen out some off-area evidence of civilization. Diversity of primitive recreation opportunities is limited to hunting, fishing, hiking, and horseback riding. Challenging opportunities are rare. There are no special features.

(7) Stony Mountain Roadless Area

This is a large, relatively compact roadless area shared by the Bitterroot, Deerlodge, and Lolo Forests. It retains a high degree of naturalness. Exceptions include mineral exploration near the boundary in Gold, Wyman, and Stony Creeks, and Skalkaho Mountain. These impacts occur on less than 1 percent of the area and are evident to most visitors when onsite.

Opportunities for solitude are high for a large core area (50 percent of the area) enclosed by high ridges, which screen out off-area evidence of civilization. The nearby Quigg Peak Roadless Area (Lolo Forest) enhances solitude on the Rock Creek side. Primitive recreation opportunities are moderate, consisting of hunting, hiking, fishing, horseback riding, and viewing a moderate diversity of vegetation, wildlife, geology, and historic mining activity. Challenging opportunities are rare. The Skalkaho Game Preserve is a special feature.

(8) Swift Creek Roadless Area

This is a small area bordering the Anaconda-Pintler Wilderness. Natural integrity is unimpaired. Opportunities for solitude are relatively low due to the proximity of off-area activities. Primitive recreation opportunities are limited and confined primarily to hiking and hunting. Challenging opportunities are nonexistent and there are no special features.

(9) Tolan Creek Roadless Area

This is a small area which retains a high degree of naturalness, altered somewhat by ridgetop jeep trails. Opportunities for solitude are low due to the proximity of off-area roads and timber harvest. Primitive recreation opportunities are limited primarily to hunting. Challenging opportunities are nonexistent.

(10) Lolo Creek and North Big Hole Roadless Areas

These are minor parts of larger areas in adjoining National Forests. See Appendix C for descriptions.

c. Wild and Scenic Rivers

(1) Existing Wild and Scenic Rivers

The Bitterroot Forest part of the system is all in Idaho and includes Wild and Recreational segments of the Selway River, which is part of the Middle Fork Clearwater Wild and Scenic River, and a Wild segment of the Salmon Wild River.

The Salmon River segment and a Wild segment of the Selway River occur within the Frank Church-River of No Return Wilderness. Another Wild segment of the Selway occurs in the Selway-Bitterroot Wilderness. The Recreational River segment of the Selway River lies along the east bank of the River from Magruder Crossing to Paradise.

(2) Wild and Scenic Rivers Eligibility

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 Forest is charged in the land management planning process, with the identification of potential inclusions in the Rivers System in addition to those already classified above. As a result, streams on the Forest were analyzed for their eligibility and potential classification in the System.

To be eligible for inclusion, a river must be free-flowing and, with its adjacent land area, must possess one or more "outstandingly remarkable" values. Scenic, geologic, historic, cultural, ecologic, or fish and wildlife habitat, are examples of such values.

Eligible river segments are assigned a potential classification of wild, scenic, for recreational. Characteristics of these classifications are:

Wild River areas - Those rivers or sections of rivers that are free of impoundments, generally accessible only by trail, with the watersheds or shorelines essentially primitive and the water unpolluted.

Scenic River areas - Those rivers or sections of rivers that are free of impoundments, with shorelines and watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.

Recreational River areas - Those rivers or sections of rivers that are readily accessible by roads, have some development along their shorelines and may have some history of impoundment or diversion.

By application of the eligibility and classification criteria, two streams were identified as eligible and potential classification was assigned as follows:

Blodgett Creek - This 15 mile mountain stream is eligible for study from the Forest boundary to Blodgett Lake near the Idaho-Montana border. The potential classification is wild except for the first quarter mile from the Forest boundary to and including Blodgett Canyon Campground which is potentially a recreational segment. The stream has outstanding scenic qualities including rushing white water, pools, and small meadows and the canyon walls include spectacular cliffs and rock outcrops including a natural rock arch. The stream and surrounding canyon are an outstanding representative of a alpine glaciated "U" shaped valley with rocky upper slopes and mountain peaks, and forested lower slopes with avalanche chutes. About 6 miles of the stream are in the Selway-Bitterroot Wilderness and about 8 miles are in a wilderness recommendation except for the campground and access road which are located in a retention prescription.

Lost Horse Creek - The main fork of Lost Horse Creek is similar to Blodgett Creek in geologic formation. The major difference is the presence of an old primitive dirt road which parallels the stream from the Forest boundary to the Idaho-Montana border. The road provides an outstanding recreational opportunity to view a large mountain stream surrounded by rocky mountain peaks, snow slides, and old growth timber. The stream is about 15 miles long from the Lost Horse bridge to Bear Creek Pass and there is another 1 mile from Lost Horse to Twin Lakes dam. The upper 14 miles are in a semi-primitive recreation management area and the lower 1 mile is in a retention management prescription. The potential classification is scenic.

The eligibility and classification determination do not change by alternatives. It is also not anticipated that these determinations will have any effect on the present environment.

A separate suitability study will be completed for each eligible river segment or Forest group of eligible river segments at a later date. Details on the rivers considered and the interactions leading to eligibility are documented in the Forest Planning Records.

d. Special Areas

(1) Research Natural Areas

Table III-3 shows Research Natural Area targeted needs on the Bitterroot Forest, types present which fill other Forest targeted needs, and areas recommended to fill the needs. There are no existing Research Natural Areas on the Bitterroot Forest.

Table III-3
Research Natural Area Targets

Research Natural Area Type	Recommended Area
Scree	Salmon Mountain
Ponderosa pine/bluebunch wheatgrass (Pipo/Agsp)	Sawmill Creek
Ponderosa pine/Idaho fescue (Pipo/Feid)	Sawmill Creek
Douglas-fir/bluebunch wheatgrass (Psme/Agsp)	Sawmill Creek
Douglas-fir/ninebark (Psme/Phma)	Boulder Creek
Douglas-fir/blue huckleberry (Psme/Vagl)	Boulder Creek
Douglas-fir/twinflower (Psme/Libo)	Lower Lost Horse Canyon
Douglas-fir/snowberry (Psme/Syal)	Lower Lost Horse Canyon
Douglas-fir/pinegrass (Psme/Caru)	Lower Lost Horse Canyon
Grand fir/queencup beadlily (Abgr/Clun)	Bass Creek
Western red cedar/queencup beadlily (Thpl/Clun)	Lower Lost Horse Canyon
Grand fir/twinflower (Abgr/Libo)	Bass Creek (Lolo NF target)
Subalpine fir/queencup beadlily (Abla/Clun)	Boulder Creek
Subalpine fir/sweet scented bedstraw (Abla/Gatr)	Bass Creek
Subalpine fir/dwarf huckleberry (Abla/Vaca)	East Fork (Beaverhead target)
Subalpine fir/bluejoint (Abla/Caca)	Salmon Mountain
Subalpine fir/twinflower (Abla/Libo)	Bass Creek
Subalpine fir/menziesia (Abla/Mefe)	Bitterroot Mtn Snow Avalanche
Subalpine fir/beargrass (Abla/Xete)	Bitterroot Mtn Snow Avalanche
Subalpine fir/grouse whortleberry (Abla/Vasc)	Upper Lost Horse Canyon
Subalpine fir/smooth wood-rush (Abla/Luhi)	Sapphire Divide
Whitebark pine/subalpine fir (Pial/Abla)	Sapphire Divide
Alpine larch/subalpine fir (Laly/Abla)	Sapphire Divide
Whitebark pine (Pial)	Sapphire Divide
Rough fescue/Idaho fescue (Fesc/Feid)	Sawmill Creek
Idaho fescue/blue bunch wheatgrass (Feid/Agsp)	Sawmill Creek
Green fescue (Fevi)	Salmon Mountain
Type I streams	Boulder Creek
Type II streams	Salmon Mountain
Beaver ponds	East Fork
Cold springs	Salmon Mountain
Rivers	Bitterroot River
Low production potential lakes	Salmon Mountain
Lakes without fish	Salmon Mountain
Fresh marsh deep	Target filled by Kootenai NF

(2) National Historic, Scenic, and Recreation Trails

There are 4 Recreation trails including Easthouse Trail, 23 miles, and Palisade Trail, 6 miles, in the Stony Mountain roadless area; the Lake Como Trail, 7 miles, and the Big Hole Battlefield Trail, 3.8 miles.

A segment of the Continental Divide National Scenic Trail and segments of the Lewis and Clark, and Nez Perce National Historic Trails occur on the Forest.

(3) Nez Perce Trail Road

This special area includes the narrow road corridors between the Frank Church-River of No Return and Selway-Bitterroot Wildernesses on the Idaho portion of the Forest. The New Perce Trail Road is the main road but the area also includes the Hell's Half Acre Road and the Selway River Road to Paradise.

4. Visual Quality

The General Setting part of Chapter III, section A, describes many of the natural and social factors which create a unique and highly scenic visual setting for portions of the Forest. Approximately 22 percent of the Forest outside of wilderness is in foreground viewing areas adjacent to major highways, roads, recreation routes or use areas, and residential private land. This portion is very sensitive to management activities which disturb the landscape.

About 24 percent is readily visible from the same travel routes and areas, but is either less sensitive to management because of distance (middleground), lesser scenic significance, or a combination of both. The remaining 54 percent is of lesser scenic significance and not seen from major travel routes and areas except, perhaps, as a distant background. This portion is not as sensitive to management, and most existing timber harvest and road activities are found here.

Under current management, visual quality objectives outside of existing wilderness are:

Visual Quality Objective	Percent of Forest	Current Management
Preservation	6	RARE II wilderness recommendations
Retention (unroaded)	29	Roadless recreation (semiprimitive)
Retention (roaded)	13	Suitable timber base*
Partial retention	5	Suitable timber base*
Modification	7	Suitable timber base*
Maximum modification	40	Suitable timber base*

* The total suitable timber base includes about 100,000 acres that are not suitable for timber production but are intermingled with suitable lands.

The capacity of the landscape to absorb ground-disturbing activities profoundly influences the ability to achieve a specified visual quality objective. Generally steep slopes, light-colored soils, and slow vegetative recovery contribute to a low visual absorption capacity for much of the Forest (Table III-4). Consequently, activities such as roads and clearcuts must be well-spaced on the landscape over time, to maintain a specified visual quality objective. Visual

degradation was one of the central issues in the public controversy on the Forest in the 1960's.

Visual quality objectives are measured by the character of the landscape, and by the diversity of features and vegetative patterns (USDA, 1977). Four visual quality objectives and their characteristics are displayed in Table III-5. A fifth category, preservation, is reserved for classified wilderness, scenic areas, and research natural areas, where change would be natural and not induced by management.

Table III-4
Visual Absorption Capacity

	Percent of Forest	Ability to Absorb Impactive Practices
Slopes		
Gentle	30	High
Moderate-steep	40	Moderate
Very steep	30	Low
Soil color		
Light	65	Low
Other	35	High
Vegetative recovery		
Fast	5	High
Moderate	30	Moderate
Slow	65	Low

Source: USDA, 1980.

Table III-5
Visual Quality Objective Characteristics

Objective	Scenic Quality	Management Activity	Viewed from Major Travel/Residential Areas
Retention	High-very high	Not visually evident	Yes - in foreground
Partial retention	High-very high	Visually subordinate	Yes - in middleground
Modification	Moderate	May visually dominate	Maybe, in background
Maximum modification	Low-moderate	Visually dominant	No

5. Threatened and Endangered Species

The Grizzly Bear Recovery Plan (USDI, 1982) mentions the Selway-Bitterroot ecosystem, with undefined boundaries, as an area with unknown potential for supporting grizzly bears. There is little doubt that the bear occurred in the Upper Selway at the turn of the century. However, in recent times only scattered and unverified sightings have occurred. The population may have been eliminated as a result of the loss of anadromous fish runs in the 1930's, and confrontations with man. The Recovery Plan states: "There is little that can be done at this time except exercise the normal protective actions in accordance with current federal and state regulations." In April, 1986, a work group of wildlife biologists defined the Bitterroot Range Evaluation Area, which includes all of the Selway-Bitterroot and Frank Church-River of No Return Wildernesses on the Bitterroot Forest. The vegetative capability of the area to support grizzly bears will be evaluated.

The current approximate distribution of gray wolves includes the Upper Lochsa, the Upper Middle Fork of the Salmon, and the Big Hole-Salmon River divide. Wolves are sporadically sighted, but they are thought to be highly mobile individuals and no pack activity has been documented (USDI, 1983). No recent confirmed sightings have occurred on the Forest. The wilderness areas, especially the Selway-Bitterroot and Frank Church-River of No Return, seem to be the most likely places for wolves to become established. The draft Wolf Recovery Plan (USDI, 1983) includes all of the Idaho portion of the Forest in the Idaho recovery area.

Several of the canyons on the west side of the Bitterroot Valley have what appears to be suitable habitat for nesting peregrine falcons, although no nesting sites have been identified. USDI (1984) indicates the birds are migrants through this area.

Bald eagles are possible residents of the Bitterroot Forest (USDI, 1984); but no currently occupied nest sites or roost areas have been identified. The most likely habitat on National Forest land is on two 40-acre parcels along the Bitterroot River.

At this time no plants have been classified as threatened or endangered within the boundaries of the Forest. One plant, Penstemon lemhiensis (Keck), has been recommended to be treated as a threatened plant by the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council (University of Idaho, 1981). The plant may occur in the southern part of Ravalli County.

In Montana, the Montana Rare Plant Project has assembled a list of rare plants (Peterson and others, 1983). The identification of rare vascular plants that occur in the Bitterroot Valley is based on the checklist developed by Lackschewitz and others (1980) and is referenced in Forest Plan Note No. 168.

6. Wildlife

Many species of birds, small mammals, and furbearers inhabit the Forest; and there are sizeable populations of elk, moose, mountain goat, bighorn sheep, white-tail deer, mule deer, and black bear.

The winter elk population on or adjacent to the Forest is about 5,700, of which 2,600 are in wilderness. About 60 percent of the winter range in the Bitterroot River drainage is in federal ownership, about 7 percent is owned by the State of Montana, and about 33 percent is in private ownership. Much of the private range has been subdivided for residences. The elk herd is of national significance, and is hunted heavily in both Idaho and Montana. About 136,000 recreation visitor days are spent hunting all game animals and birds each year. Approximate numbers of game animals harvested are listed in Table III-6.

Table III-6
Approximate Annual Harvest of Game Birds and Big Game

Species	Population Trend	Montana Harvest	Idaho Harvest
Elk	stable	1,000	150
Mule deer	up	1,100	75
White-tail deer	up	200	20
Moose	stable	20	closed
Bighorn sheep	stable	5	5
Mountain goat	stable	50	closed
Blue grouse	*	3,700	*
Ruffed grouse	*	2,300	*
Franklin's grouse	*	1,700	*

* no information

Areas of 5,000 to 8,000 acres, below 7,000 feet elevation, that provide high-use fall habitat for elk are considered elk security areas. In certain instances, these are also high-use summer areas. They usually occur in the heads of drainages; have gentle slopes; and are either roadless or have easily controlled road access, providing places where elk can escape harassment during hunting season. Without security areas, hunting regulations would need to be more restrictive.

There are about 2,000 miles of system roads on the Forest; about 30 percent have yearlong or seasonal travel restrictions. Restrictions are designed to protect soil and water resources, and to limit vehicular traffic during hunting season.

The Forest has one of the few indigenous Rocky Mountain bighorn sheep herds in the northwestern United States. This herd winters in the Upper Selway in Idaho, and summers in Sheephead and Watchtower Creeks in Montana. No sheep have been transplanted to the herd, and they have a unique migration pattern between winter and spring/summer ranges that, if interrupted, would probably not be reestablished.

Wildlife species are dependent on the amount and distribution of old-growth forest, riparian zones, and habitat diversity. Currently, about 35 percent of the 586,000 acres tentatively suitable for timber production is old growth.

Stands which meet the following age criteria will usually have characteristics necessary to meet the old growth definition (Chapter VII):

Douglas-fir over 120 years
Ponderosa pine 200 years or older
Mixed conifer stands over 160 years
Lodgepole pine over 80 years and larger than 6 inches in diameter

About 10 percent of the Forest is riparian zones. These are mostly streamsides, which are important for timber production, wildlife and cattle forage, recreation use, and fisheries.

Habitat diversity is a measure of the variety, distribution, and structure of plant communities as they progress through various vegetative stages. Each stage supports different wildlife communities. Wildlife management indicator species can be used as indicators of habitat diversity. The most critical element of diversity is old growth. If sufficient old growth is retained, all other vegetative stages from grassland through mature forest will be represented in a managed forest. Pine marten, pileated woodpecker, and elk are the management indicator species for mature forest, old-growth forest, and big-game habitat (Planning Record: Forest Plan Note No. 133).

Sensitive Species are those plant and animal species identified by the Regional Forester, for which population viability is a concern as evidenced by:

significant current or predicted downward trends,

significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

In September, 1986, the Regional Forester listed the Western Big-eared Bat, Ferruginous Hawk, Harlequin Duck, Boreal Owl, and Common Loon as sensitive species on the Bitterroot Forest. Population information for the species is lacking, and some of the species may not be residents of the Forest.

7. Fish

The Montana portion of the Forest has 86 lakes which received about 7,600 recreation visitor days of use in 1980. There are 13 high mountain lakes in Idaho which received about 1,800 days of use. About 1,600 miles of stream in Montana and 300 miles in Idaho provided 55,000 and 1,600 visitor days respectively. The clear, cold streams are only moderately productive, primarily because many of them flow through relatively sterile granitic soils. Estimated catchable trout populations have been increased to reflect the results of recent Montana Department of Fish, Wildlife and Parks shocking surveys. The total of about 410,000 fish includes 160,000 in nonwilderness streams, and 250,000 in lakes and wilderness.

The Idaho portion of the Forest has runs of spring chinook salmon and steelhead trout. Spawning activity occurs in Sabe Creek on the Salmon River and in the Upper Selway River. All of the Forest rivers and streams used by anadromous fish are either National Wild Rivers or are in wilderness. Anadromous fish runs have been depleted by downstream activities, especially large hydroelectric dams, but attempts to restore runs with artificial hatching channels have been partially successful in the Selway. There is a hatching channel on the Forest at Indian Creek.

The Bitterroot River has a nationally recognized trout fishery. The Forest administers less than one mile of the main stem of the river, but Forest streams contribute to the quality of its water.

Two models: "Guidelines for Predicting Sediment Yields" and "Guide for Predicting Salmonid Response to Sediment Yields" were developed by Forest Service research personnel, and have been used to predict sediment yield and fish response. These models are best suited for comparing relative differences among alternatives, not for calculating the absolute value of either sediment yields or fish populations. This is because both models simplify an extremely complex physical system and some coefficients have not been specifically calibrated for local conditions. Application of the models indicates that sediment yield, primarily from roads and timber harvest, is approaching a threshold above which significant fish displacement or loss could occur. Because of the need to calibrate the models for local conditions, biologists designed a monitoring program to obtain reliable local data for several critical coefficients used in the model. This program was implemented in 1985. It will take 3 to 4 more years to calibrate the models for local use, and validate the magnitude of effects on fish habitat and population.

The fish management indicator species is cutthroat trout, which are sensitive to increases in sediment (Planning Record: Forest Plan Note 172).

8. Range

The Bitterroot Valley is cattle country, but many ranches have been subdivided into residential lots, and the number of cattle in Ravalli County has declined since 1975. The 1980 production of cattle was equal to production in 1955. Permitted livestock use on the Forest has decreased from 23,900 animal unit months in 1950 to 14,200 in 1980. The 37 permittees actually used only 12,800 of the 14,200 unit months on 160,900 acres of suitable livestock range in 1980. Actual use was down to 9,500 animal unit months in 1986 and demand for livestock permits is not expected to increase. A large portion of the suitable cattle range occurs on big-game winter range and riparian areas, where there is potential for competition for available forage and adverse effect on riparian habitat. There are about 17,000 acres in packstock allotments in wilderness.

9. Timber

This paragraph and Table III-7 have been expanded since the Draft EIS, to discuss and display tentatively suitable timberland (See Appendix B section II for details). About 586,000 acres are available and tentatively suitable for timber production; 359,000 acres on currently developed land and 227,000 acres on inventoried roadless areas. Currently developed acreage is significantly more productive and of gentler terrain, than the roadless acreage (Table III-7). Forty percent of the currently developed area is capable of producing more than 50 cubic feet of wood fiber per acre per year, and is on gentle to moderate slopes with nonsensitive soils. Only about 16 percent of the roadless area is in this category.

Yield capability ranges from 20 to 80 cubic feet per acre per year, with a mean of about 60 (Pfister and others, 1977). Approximately one-half to two-thirds of the yield capability is merchantable and can be harvested under intensive management, because optimal stocking and elimination of insect and disease problems can rarely be attained.

Growing stock on the tentatively suitable land totals 1.3 billion cubic feet or 5.6 billion board feet. Growing stock meets minimum merchantability standards of 6-inch dbh for lodgepole pine and 7-inch dbh for other species, with 4.6-inch top diameter (USDA, 1983b). Approximately 80 percent of growing stock is sawtimber.

At present, annual mortality probably exceeds one percent of growing stock or about 13 million cubic feet. Since mortality estimates include all trees 0.6 inches and over, the total volume cannot be considered potentially saleable.

In addition to annual mortality, seven to 18 tons per acre of older dead woody material, with some stands of 60 tons or more per acre, have accumulated on the forest floor. A portion of this material meets current utilization standards and could be used for house logs, posts, poles, fuelwood, or chips. Currently less than one million cubic feet (one to three million board feet) of material having sawlog potential is salvaged annually. Fuelwood, pulpwood, posts, and poles account for the equivalent of another two to five million board feet of salvage.

Current timber information is summarized in Table III-7.

Table III-7
Timber Statistics - Existing Stands

Timber Characteristic	Unit of Measure	Habitat Types* HT123	HT4	HT567	RIP	Total
Tentatively suitable	Thousand					
Currently developed**	Acres					
Land class -40, MN+40		112	51	14	17	194
S40M60, SS+60		99	31	10	25	165
Developed Total		211	82	24	42	359
Currently undeveloped**						
Land class -40, MN+40		17	50	11	9	87
S40M60. SS+60		43	71	15	14	143
Undeveloped Total		60	119	25	23	227
Suitable Total		270	203	48	65	586
Productivity	Cubic Feet/					
Potential, all stems	Acre/Year	60	48	65	77	
Managed, useable		36	25	35	35	
Growing stock	MMCF	540	410	150	210	1,310
	MMBF	2,320	1,760	640	900	5,620
Species composition	Percent					
Douglas-fir	by Volume	23	13	5	7	47
Ponderosa pine		9	1	0	0	10
Lodgepole pine		6	9	4	6	26
Other		3	7	3	4	17
Total		41	30	12	17	100
Condition class	Thousand					
Sawtimber	Acres	199	135	30	59	423
Poletimber		39	40	13	4	95
Seedling/sapling		29	24	5	2	60
Nonstocked		3	4	0	0	8
Total		270	203	48	65	586
Sawtimber and poletimber	MBF/Acre	9.8	10.0	15.0	15.0	10.9

Source: Forest Plan data base

*HT123 is mostly habitat types Douglas-fir/pinegrass, Douglas-fir/snowberry, Douglas-fir/ninebark, and Douglas-fir/huckleberry, which contain ponderosa pine, lodgepole pine, and Douglas-fir.

HT4 is the subalpine fir/beargrass habitat type which is mostly lodgepole pine.

HT567 and RIP (riparian) are moist habitat types. The most significant acreage is subalpine fir/menziesia. The major species are subalpine fir, Engelmann spruce, lodgepole pine, and Douglas-fir.

** May not add to total tentatively suitable due to rounding.

The following analysis has been added since the DEIS, in response to public concern over identification of tentatively suitable timberlands [36 CFR 219.14(a)(3) and 36 CFR 219.27(c)(3)]. Data has recently been compiled on the success of restocking cutover areas since enactment of NFMA in 1976. Records were examined for all stands harvested since that date with the following findings: Regeneration has been certified or is progressing toward certification on 88 percent of the final regeneration harvest areas (certification occurs when stand height reaches 1 1/2 feet); on about seven percent, stand records were not sufficient to determine status without returning to the site; and on five percent, there has been at least a partial regeneration failure.

Failures were then analyzed to see if any consistent patterns emerged, such as by habitat or landtype, that would call for removal of additional land from the tentatively suitable timber base because of regeneration problems (36 CFR 212.14(a)(3)). Approximately 35,000 acres of dry ponderosa pine and Douglas-fir/bunchgrass habitat types, and rocky stands of Douglas-fir infected with dwarf mistletoe, have been removed because of regeneration problems. Other sites with failures will remain in the tentatively suitable timber base, since no patterns emerged to warrant removal.

Time required to provide adequate restocking was also analyzed, to determine if experience indicates that land can be adequately restocked within 5 years of final harvest as required by 36 CFR 219.27(c)(3). In this case, 96 percent of successfully restocked stands (certified and progressing) met the criteria. No consistent pattern that would call for removal of additional land from the tentatively suitable timber base was found.

Regulated volume sold during the past 5, 10, and 15 years has averaged 25.4, 28.7 and 27.2 million board feet per annum, respectively. Harvest has been somewhat below this level. Consequently, uncut volume under contract steadily increased to over 90 million board feet as of September 1982, but has since dropped to 43 MMBF as of June 30, 1987. Volume sold during this period has not been proportional to species composition. Ponderosa pine constituted 35 percent of the volume sold, but only 10 percent of the growing stock; lodgepole pine constituted 11 percent of the volume sold and 26 percent of the growing stock.

The following analysis has been added since the DEIS in response to public concern about below-cost timber sales. Additional analysis is contained in Chapter II. Annual timber receipts do not consistently recover timber-related costs, and would not be expected to in the near future if the current program was continued. The following examples from 1978 and 1985 illustrate this imbalance.

	FY 1978	FY 1985
Timber Sale Preparation with Road Costs (M $)	1,417	1,682
Sale Preparation (M $)	361	411
Road Survey, Design and Construction Allowance (M $)	1,056	1,271
Timber Sale Bid (M $)	4,457	1,488

When comparing these 2 years, it appears that the Forest experienced a "profit" of $3,040,000 in FY 1978 and a "loss" of $192,000 in FY 1985 from the timber program. This simple comparison ignores the benefits of meeting total resource objectives, and future returns associated with current investments. Where appropriate, timber prescriptions were also designed to reduce the risks of insects and disease, and to maintain reasonable supply levels to support the local economy.

In addition to ignoring benefits of resource protection, a one-year display of costs and returns can be very misleading. Fiscal year 1978 was a period of strong timber demand which resulted in relatively high timber values and road construction costs. In FY 1985, the country had not yet fully recovered from a recession, and timber values were depressed. This led to a loss when timber returns are compared to sale preparation and road costs. Sale preparation started in 1978 when timber demand was strong, and sold five to seven years later when markets were depressed. Roads provide access for future timber management, but the benefits to future management are not displayed in a single year of data. Timber management is a long-term operation which requires cost and revenue information over an extended period, to obtain an accurate representation of the true economic implications of management. The discounted flow of net revenue (PNV) over many decades is the best way to show the economic impacts of timber management. The PNV of each alternative and benchmark is displayed in Chapter II, where the benchmarks and alternatives are discussed in detail.

Annual production for Ravalli and Missoula Counties' sawmills and plywood plants is equivalent to about 500 million board feet lumber tally, or 350 million board feet log scale (Montana Department of State Lands, 1983). The Forest provided about 14 percent of this timber; however, two mills in Ravalli County depend on the Forest for about 60 percent of their logs. Mill needs could outstrip the Forest's current production if both facilities were to operate on a two-shift basis. In addition, 24 house log and post and pole businesses purchase products from the Forest. Annual production for the Darby mill group ranges from less than 70 percent of capacity to full capacity (Keegan, 1985). Most house logs are purchased from adjacent National Forests and Canada. House logs, posts and poles, and other convertible products are not a part of this supply and demand analysis.

The following timber supply and demand analysis has been added since the DEIS, in response to industry concern over the cumulative effects of Forest Plans on timber supply. Additional analysis is in Chapter II. The mill group bid area for sawlogs is roughly defined as the Bitterroot, Beaverhead and Lolo National Forests in Montana, and the Salmon National Forest in Idaho. The Darby mill group relies on National Forest timber for about 90 percent of volumes processed (Keegan, 1985 and planning records). Table III-8 shows the historic average annual volume offered, sold, and harvested for the four-Forest group, including the average percentage of sold volume that is destined for the Darby and Missoula mills. All volumes contain salvage estimates, for comparison with processed volumes reported by the Bureau of Business and Economic Research (op. cit., 1985).

Annual log requirements of the Darby mill group, as reported by owners, is about 50.0 MMBF log scale. Log requirements for the Missoula mills are assumed to be a constant proportion of total requirements, or 8.5 MMBF, bringing total log requirements to about 58.5 MMBF with a National Forest share of about 54.5 MMBF (45 MMBF for Bitterroot Forest). Assuming that the Darby mill group will continue to purchase timber volume from the same sources and in the same proportions as in the past, it is possible to project future log requirements from each source. The final column in Table III-8 is based on these assumptions, and shows that the Bitterroot Forest would have to provide approximately 40 MMBF/year in order for the Darby mill group to operate at 50 MMBF/year. A discussion of the ability of various alternatives to respond to this level of demand is presented in Chapter II, Section D.

Table III-8
Timber Supply and Demand Analysis

Source of Timber	(Average annual for period) Bid Area Timber Sale Information 1976-85 (Ave/Yr)										Distribution of Reported Volume Requirements Percent x 54.5 MMBF
				Purchased Volume							
	Offered Volume	Sold Volume	Harvested Volume	Darby Mills		Missoula Mills		Total		Percent of Total by NF	
	MMBF	MMBF	MMBF	MMBF	%	MMBF	%	MMBF	%	%	MMBF
Bitterroot NF	34.0	30.1	27.5	23.8	79	6.3	21	30.1	100	74	40.3
Beaverhead NF	23.3	19.8	17.7	2.0	10	NA 1/	NA	2.0	10	5	2.7
Salmon NF	31.9	24.6	22.9	4.7 3/	19	NA 1/	NA	4.7	19	12	6.6
Lolo NF	114.9	76.2	70.3	3.8 3/	5	NA 1/	NA	3.8	5	9	4.9
TOTAL NF	204.1	150.7	138.4	34.3	23	6.3	4	40.6	27	100	54.5
Private and Other	4.0	4.0	4.0	3.0	75	1.0	25	4.0	100	NA	4.0
TOTAL	208.1	154.7 2/	142.2	37.3	24	7.3	5	44.6	29	NA	58.5

1/ Volume destined for home Forest mill groups is not included.
2/ Volume sold equals 74 percent of offered volume.
3/ A portion of National Forest volume purchased by Darby Lumber Company has been used as a proxy for about 21 MMBF processed from Champion fee lands prior to purchase of the mill by Darby Lumber Company. It is assumed that Darby Lumber Company will remain competitive for at least this volume in the future, but from National Forest lands.

10. Soils

Outside of wilderness, about 60 percent of the soils are associated with the Idaho Batholith granitics. These are weakly cohesive, sandy-textured soils that are low in nutrient- and water-holding capacity, and are generally light colored. They occupy much of the southern and western portions of the Forest and are mostly in land types -40, S40M60, and SS+60 (Table III-9).

About 30 percent of the soils are associated with the Belt rocks. These are loamy-textured, moderately cohesive soils with low to moderate water- and nutrient-holding capacities. They normally have a high content of angular, hard rock fragments. They occur primarily in the northern half of the Sapphire Mountains and the southern portion of the West Fork Bitterroot River drainage, mostly in land types MN+40 and S40M60.

Much of the soil at elevations above 6,000 feet has a thin, nutrient rich, volcanic ash surface deposit originating from ancient eruptions in the Pacific Northwest. Also, the higher elevation soils are influenced by alpine glaciation, resulting in areas with a high percentage of rock outcrops and bluffs.

Forest lands are categorized into land types based on slope and sensitivity of soils. Four general land types are used in Forest planning (Table III-9).

Table III-9
Land Types on Suitable Timberland

Symbol	Land type	Percent of Area
-40	All soils on slopes under 40%	32
MN+40	Moderately- to non-sensitive soils on 40 to 60% slopes	15
S40M60	Sensitive soils on 40 to 60% slopes and moderately-sensitive soils on slopes over 60%	49
SS+60	Sensitive soils on slopes over 60%	4

Source: Forest Plan data base

11. Watershed

Forest and private land management activities affect and are a part of the changing Bitterroot River system. Forest activities which have an effect on stream flow, sedimentation, and riparian habitat are: timber harvest, road construction, timber skidding, slash disposal, site preparation, livestock grazing, and mining. Private land management activities having effects include: stream dewatering for irrigation; irrigation return flows with sediment and nutrients; channel alterations for irrigation withdrawal and water transmission; channel stabilizations for roads, houses, and farm land; and reservoirs.

On the Forest, watershed conditions are generally good and water quality is high. Sedimentation is the major water quality variable affected by Forest management and use. The effects of activities have been monitored for several years. The current baseline sediment yield routed to streams is 13.9 tons per square mile, of which 10.7 tons are natural and 3.2 tons (a 30 percent increase in sediment) are produced by management activities. This baseline is within the range of baseline sediment yields of natural granitic landscapes (Cline, et al, 1981). The average geomorphic threshold, the point at which hillslope and stream channel stability are affected, is estimated to be at the point where sediment is increased 260 percent over natural conditions (Wilson, et al, 1982).

Cartier (1984) measured the annual sediment yield in the Bitterroot River near Stevensville at 74 tons per square mile per year. Cartier's study and another by Simons, Li and Associates (1981) note that the Bitterroot River has changed from a sinuous or meandering channel pattern to a more braided pattern in the past 40 to 50 years. This river channel change appears to be due to natural characteristics of the climate, hydrology, and geology of the area. The shift from a meandering river channel to a braided channel may relate to increased precipitation after 1946. Geologic downdrop of portions of the Bitterroot Valley may also be causing the river to readjust with a braided pattern, particularly between Hamilton and Stevensville. The Bitterroot River is probably near the geomorphic threshold, alternating between a relatively stable meandering channel to a relatively unstable braided channel.

Simons' study shows that Forest tributary sediments are substantially finer than those composing the river bed. Most of the fine sediments that enter the river from banks and tributaries are washed downstream, without settling onto the river bed. Most of the sediment available for deposition is from the natural river bed formed of glacial- and water-deposited sands, gravels, and cobbles.

The Forest provides about 2.6 million acre-feet of water to the Columbia River watershed during an average year; 1.7 million feet flow into Montana and 0.9 million feet flow into Idaho.

Major local uses of water from the Montana portion of the Forest are: the irrigation of about 117,000 acres in the Bitterroot Valley; recreation; and cold water fisheries. Thirty-two dams store water, primarily for irrigation. Lake Como and Painted Rocks Reservoir store 66,500 acre-feet, and the remaining 30 high mountain lake dams store 14,500 acre-feet (Bitterroot Conservation District, 1980). Since irrigation is a major use, quantity, quality and timing of runoff are major concerns.

In 1982 there were 62 special use permits for water-related facilities such as ditches and reservoirs. One small municipal watershed, Cow Creek, serves the town of Pinesdale.

The Forest's granitic watersheds produce few dissolved minerals for the support of aquatic life, and are not highly productive fish habitat. Watersheds in the Belt rocks, particularly the Wallace formation, produce more dissolved minerals and provide a more productive habitat for aquatic life and fish.

12. Minerals and Energy Resources

The Forest lies on the extreme western edge of the Montana Overthrust Belt, a north-south linear structure of folded and faulted slabs of sedimentary rock thrust over younger formations. The Idaho Batholith, a large irregular mass of igneous rock, is situated to the west of and meets the Overthrust Belt along the eastern edge of the Bitterroot Range.

Mineral exploration began in the 1860's with interest primarily in gold and silver. Placers and small- to medium-sized mines have produced intermittently since then, with considerable production in the past. The potential for gold and silver is still significant throughout parts of the Forest.

Fluorite was discovered in the southern Sapphire Mountains in 1952, and the mine produced ore until 1973. There are still substantial reserves, and production could resume with increased demand for flourite. Vermiculite was discovered in the Sapphire Range in 1930 and the mine operated between 1947 and 1950, mainly for the local market. There are substantial known reserves. The current increase in interest may mean production could resume in the near future. This is the only known occurrence of vermiculite on the Forest.

In 1977, muscovite was claimed in the Bitterroot Range on the north end of the Forest. Surface exploration and drilling have been done, but as yet there has been no production.

Currently there is very limited prospecting and exploration for mineral or energy resources on the Forest. Small, scattered discoveries of copper, iron, columbium, tin, molybdenum, barite, uranium, tungsten, and titanium have been made. Much of the Forest is in a favorable geologic setting for uranium and geothermal energy, but there have been no lease applications for these resources. About 1,100 claims are scattered throughout the Forest.

As of 1986, oil and gas lease applications have been received on about 75,000 acres and over 67,000 acres have been leased, mostly on the north end of the Forest in the Sapphire Mountains. There are 827,000 acres available to mineral entry, and 836,000 available to mineral leasing. An oil and gas leasing environmental assessment (USDA, 1981) documents the possible environmental consequences associated with leasing, and provides the basis for the Forest's lease stipulations. It includes all nonwilderness land on the Forest, and is incorporated into this EIS by reference. Site-specific stipulations to protect surface resource values are found in Appendix N of the Forest Plan.

The responsibility for oil and gas leasing of National Forest lands resides with the Bureau of Land Management (BLM). The Forest Service has the responsibility for reviewing any leasing proposal submitted by the BLM, and for making leasing recommendations and/or consent for any land under Forest Service jurisdiction (Federal Register, 1984). The role that the respective agencies play in the oil and gas leasing process depends on whether the lands and minerals are public domain, or acquired. The Forest Service has the lead for environmental analysis and documentation of this analysis. The Bureau of Land Management is a cooperating agency. The BLM participates in the NEPA scoping of each proposed lease, coordinates with the Forest Service in the development of stipulations, and normally adopts the Forest Service environmental analysis documentation to meet NEPA requirements.

13. Human and Community Development

Human and community development activities include programs that assist people and communities, while enhancing Forest management. Scheduling of outputs in any of the alternatives will not directly affect these programs, or their budgets.

The largest program on the Forest is the Job Corps Center at Trapper Creek, which provides educational and vocational training for young adults from Colorado, Wyoming, Montana, Utah, North Dakota, and South Dakota. In 1983 there were 496 enrollees in the program.

The volunteer program had 45 participants in 1983. Volunteers perform duties in every aspect of Forest management.

Fourteen people participated in Comprehensive Employment Training Act and Youth Employment Programs, employment programs for unemployed adults and youths, in 1983. During 1983, six people also participated in the Senior Community Service Employment Program, which provides part-time work for unemployed, low income persons over 55.

In the past, the Forest has had Young Adult Conservation Corps and Youth Conservation Corps programs, which emphasized conservation work and environmental awareness.

Management emphasis in providing jobs and services expands opportunities for all sectors of the population, including minorities, elderly and handicapped. The current program provides moderate levels of both jobs and services. Alternatives in Chapter II provide a range in jobs/service emphasis.

14. Lands Program

a. Special Uses

In 1980, the Forest administered 114 special use permits: 56 for ditches, dams, and water sources; 24 for roads; 11 for recreational occupancy; 11 for utilities and communications; and 12 for other types of use.

b. Rights-of-Way Acquisition

Rights-of-way are acquired by the Forest from private landowners for roads and trails. Annually the Forest completes about five road rights-of-way and two trail rights-of-way. Road rights-of-way are primarily acquired in connection with timber sales.

c. Property Boundary Location

About 3,500 land survey corners define the Forest's property lines, and 700 miles of Forest property line border private land. About 16 miles of boundary have been surveyed annually, although needs vary with the level of timber harvest and road construction.

d. Cost-Share Agreements

Agreements are negotiated between the Forest and private land managers for sharing the costs of road and trail construction and maintenance. Since less than 5 percent of the land within the Forest boundary is in private ownership, annual needs are minimal.

e. Landownership and Adjustment

Consolidation of ownership is not a major problem. There is only one area of checkerboard ownership involving federally- and privately-owned lands. The corporate private landowner is Plum Creek Timber Company, and the lands are located along the divide between Rye and Sleeping Child Creeks in the Sapphire Range. About 17.5 sections are private and 16 sections are federal land. About two-thirds of the area is accessed by road. Annually the Forest processes about four exchange proposals.

15. Road System

The main transportation link to and from the Forest is U.S. Highway 93, which bisects the Forest from north to south. State secondary highways and county roads, mostly two-lane paved roads, feed out from Highway 93 to and through the Forest, accessing the major drainages such as East Fork, West Fork, Skalkaho, Lake Como, Sleeping Child, Threemile, Ambrose, and Burnt Fork. The Forest road system branches into the National Forest serving these and other drainages, the Magruder area and the Nez Perce Forest in Idaho.

The Forest road system comprises approximately 3,500 miles of road and logging spurs, providing access to about 430,000 acres or 25 percent of the Forest. About 2,000 miles of this system are maintained. Most are single-lane dirt roads built by purchasers of National Forest timber within the last 30 years. Some roads were built by Forest Service crews or contractors, and a few were built by the Civilian Conservation Corps in the 1930's. During the 1960's, about 66 miles of road were built annually; during the 1970's, about 37 miles were built annually. The average road density on the developed portion of the Forest is 3.3 miles of road per square mile.

16. Fire, Insects and Disease

Wildfires and insect epidemics have played a major role in the development and present conditions on the Forest. They will continue their influential role in the future.

a. Fire

In the late 1920's and early 1930's, a mountain pine beetle epidemic killed many trees over large areas of continuous lodgepole pine stands. The resulting heavy fuels were a major factor in failure to control large fires in the 1960's: Saddle Mountain, 3,050 acres, and Sleeping Child, 28,000 acres. Over 200,000 acres have similar heavy fuels from the same beetle infestation and are susceptible to stand replacement fires.

A program of wilderness fire management was begun in 1972, with approval of the 66,000-acre White Cap Fire Management Plan. The primary objective of wilderness fire management is to allow fire to play its natural role in shaping and maintaining the wilderness. Presently, there are approved fire management plans for 660,000 acres of wilderness. Since 1972, fires from unplanned ignitions have been allowed to reduce the fuel buildup on 19,000 acres.

b. **Insect and Disease Conditions**

According to Gibson and Dooling (1982), potentially significant insect and disease pests include: mountain pine beetle in ponderosa and lodgepole pines; western spruce budworm in Douglas-fir; Douglas-fir beetle in Douglas-fir; pine engraver beetle in ponderosa pine; pine butterfly in ponderosa pine; dwarf mistletoe in Douglas-fir, lodgepole pine, and western larch; root diseases in all species; stem rusts; and stem decays.

Major insect infestations are likely to begin in the currently developed portion of the Forest since the roadless areas are relatively free of and are less susceptible to the major insect problems common elsewhere on the Forest as noted below:

The high elevation/lattitude and generally poor site quality, which limits tree size and growth, on most roadless land are low risk conditions for infestation of lodgepole pine stands by mountain pine beetle.

The lack of ponderosa pine in roadless areas limits problems caused by mountain pine beetle, pine butterfly, and pine engraver beetle.

The higher elevation, cooler, moist sites and/or low density of Douglas-fir in most roadless areas reduces the risk of damage from western spruce budworm.

Douglas-fir habitat types, where most of the mortality from the Douglas-fir beetle occurs, occupy a minor portion of the roadless area.

The reverse is generally true for lodgepole pine stands susceptible to dwarf mistletoe. The presence of dwarf mistletoe tends to be greater on poor sites and in dense stands typical of the lodgepole pine type at higher elevations in roadless areas. However, even though dwarf mistletoe is present in many stands, growth loss averages only about 20 percent (Dooling and others, 1980) and mortality from dwarf mistletoe is low.

(1) **Mountain Pine Beetle**

There are no major infestations of mountain pine beetle in ponderosa pine, but there are small groups of attacked or beetle-killed trees throughout the Forest. Infestations covered 830 acres in 1981, with only scattered mortality in 1982.

An infestation in lodgepole pine exists in the Frank Church-River of No Return Wilderness near Dennis Mountain, 16 miles west of the nearest suitable timberland in Montana. The area of infested trees was 600 acres in 1980, 1,200 acres in 1981, scattered mortality in 1982, and 3,600 acres in 1983. Outside of wil-

derness, the acres of lodgepole pine habitat type rated for susceptibility to mountain pine beetle outbreak are:

High	20,636 acres
Moderate	103,864 acres
Low	172,470 acres

(2) **Western Spruce Budworm**

Douglas-fir, spruce, and fir defoliation was light and scattered during 1980 and 1981. Aerially visible defoliation increased from 4,330 acres in 1981 to 385,401 acres in 1982 (USDA, 1983a). Defoliation appears to have decreased in 1983, but not to pre-1982 levels. In those stands which have experienced defoliation for several years, many understory and smaller diameter trees have been killed or damaged. Some top killing has occurred in dominant and codominant trees.

(3) **Dwarf Mistletoe**

Three dwarf mistletoes - Arceuthobium americanum on lodgepole pine, A. douglasii on Douglas-fir, and A. laricis on western larch - occur on the Forest. A 1979 survey showed dwarf mistletoe infestation in 44 percent of the lodgepole pine type (59,100 acres), 43 percent of the Douglas-fir type (162,900 acres), and 52 percent of the western larch type (1,600 acres) (Dooling and others, 1980). Annual growth loss was estimated at about 3.7 million cubic feet.

17. **Air Quality**

The Clean Air Act established wildernesses as Class I air quality areas. Protection of air quality will be a critical factor in the management programs for the Forest's portion of the Selway-Bitterroot, Anaconda-Pintler, and Frank Church-River of No Return Wildernesses. Protection of air quality in Class I areas will also be a major consideration in fuels management programs adjacent to wilderness areas.

The Forest is an active member of the Montana State Airshed Group and adheres to the practices and policies of the State's Cooperative Smoke Management Plan.

18. **Utility Transportation Corridors**

Three corridor window segments have been identified on the Bitterroot Forest. Segment R27 is located between Rye Creek and the upper East Fork of the Bitterroot River. This window is roaded, except where it passes across the Sapphire Montana Wilderness Study Act area between the Bitterroot and Deerlodge Forests.

Segment R28 follows the road along the West Fork and Nez Perce Fork of the Bitterroot River, and along the road to Elk City, Idaho. There is a road the entire length of the corridor except for one short fork that enters the Allan Mountain Roadless Area near Rombo Mountain. The Selway-Bitterroot roadless area and the Blue Joint Montana Wilderness Study Act area are immediately adjacent to the road along the Nez Perce Fork. The Selway-Bitterroot and Frank Church-River of No Return Wildernesses are adjacent to the road in Idaho, leaving only a narrow strip of nonwilderness which is to be maintained in its existing condition in accord with the Central Idaho Wilderness Act.

Segment R29 enters the Bitterroot Forest from the south along Highway 93 and could connect with segments R27 and R28.

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IV. *ENVIRONMENTAL CONSEQUENCES*

A. Introduction

This chapter forms the scientific and analytic basis for comparison of the alternatives, including the preferred alternative described in Chapter II. Environmental consequences are the expected effects of management activities scheduled to implement an alternative. The effects of all the major activities and resource programs are discussed. The order of discussion begins with those activities or programs which have few effects and ends with those programs and activities which have the greatest effect on the physical and biological components of the environment. Economic and social effects are discussed where applicable.

The consequences are described as quantitative or qualitative changes from the current situation in terms of significance, magnitude, and duration. The discussion identifies consequences that are direct, indirect, cumulative, or unavoidable. The relationship of short-term use of resources to long-term productivity is also discussed, along with irreversible and irretrievable commitment of resources.

Mitigation was an important consideration in the formulation of standards and guidelines, prescriptions, and minimum management requirements associated with each of the alternatives. These items are discussed in detail in Appendix B.

This chapter is organized to avoid repetition. For example, efforts to maintain or improve fish habitat are inherent in several other activities (timber harvest, road building, livestock grazing, etc.). However, specific activities to enhance fish habitat are limited to few acres on the Forest. Therefore, the discussion for specific activities associated with fish habitat improvement is short, but effects on fish habitat are discussed in sections related to other activities or resources.

B. Wilderness

Existing wilderness on the Forest is about 743,000 acres, including portions of the Anaconda-Pintler, Frank Church-River of No Return and Selway-Bitterroot Wildernesses. About 405,000 roadless acres are available for wilderness consideration.

The amount of wilderness proposed in each alternative is dependent on the goals and objectives for that alternative. The activities in wilderness, primarily recreation and trail construction and maintenance, are discussed in section E of this chapter. Acres of recommended wilderness for each alternative are shown in Table IV-1.

Table IV-1
Area Assigned to Wilderness (Existing and Proposed)
(thousand acres)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
743	793	841	820	820	820	793	915	1039	1144	743	743

Alternative A and the benchmarks limit wilderness to the existing level, and Alternatives H and J nearly maximize wilderness potential. Alternatives B and F contain RARE II wilderness recommendations. These are additions to existing wilderness having high wilderness attributes, generally providing for improved topographic boundaries, and are considered by most users as an integral part of existing wilderness. Alternative C adds slightly to this level. Recommendations for Alternatives B, C and F could be achieved with minimal effect on market outputs. Alternative G consists of the Alternative C acres plus other roadless lands having high wilderness attributes and public interest, with greater effect on market outputs. Recommendations for Alternatives E, E1 and E2 include most of the area recommended for wilderness in the RARE II process, and the portion of the Blue Joint roadless area with the highest wilderness attributes.

Wilderness classification reduces the PNV of the Forest because timber harvest provides the primary source of potential income and some of the lands classified wilderness have positive timber values. The contribution to local jobs and income is reduced because less timber will be processed in the area and the Forest will spend less money for salaries and contracts than if the areas were managed for timber production. However, those businesses and individuals dependent on recreation will benefit from the classification of wilderness since this increases the recreation opportunities. The debate of "how much wilderness" tends to polarize the community into groups of wilderness supporters and commodity users.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The establishment of wilderness has some effect on long-term productivity. Opportunities to increase productivity through management of timber and wildlife habitat resources are foregone. Maintenance of primitive recreation opportunities is maximized and maximum protection is given to old-growth timber and its associated wildlife habitat. Threatened or endangered plant and animal species are protected but little can be done to improve their habitat. Natural appearing landscapes are preserved although buildup of natural fuels may increase risks of wildfire.

2. Irreversible and Irretrievable Commitment of Resources

Unless Congress revokes wilderness classification, timber products and minerals can be irretrievably lost.

3. Adverse Effects Which Cannot be Avoided

Control of insects, diseases, and noxious weeds is generally restricted or extremely costly because of the techniques required. Methods to suppress wildfires are restricted to those which cause little or no ground disturbance.

4. Conflicts with Other Land Management Plans

None of the proposed wilderness is adjacent to land in other public ownership and no conflicts with other land management plans or treaty rights are anticipated; however, Alternatives H and J would preclude consideration of energy corridors.

5. Energy Requirements

The energy required for recreation management including wilderness is shown in Table IV-6. The major energy use associated with wilderness is for travel to wilderness trailhead facilities.

C. Research Natural Areas (RNA)

Research Natural Areas are established to preserve undisturbed ecosystems for research, observation and study. They serve as baseline areas for measuring long-term ecological changes and for preserving genetic diversity. About 12,200 acres in 12 areas (listed in the Management Area 9 section of Chapter III of the Forest Plan) are needed to meet 33 ecosystem targets assigned by the Regional Guide. Alternatives A, B and H limit RNA's to areas that are within existing or proposed wilderness. No areas are proposed in Alternative F since none were specified in the current direction. Alternatives C, E, E1, E2, G, and J contain candidates for all areas assigned by the Regional Guide, with all but 488 acres within existing or proposed wilderness and semiprimitive recreation designations. Because of the small area involved, effects on other resources are insignificant.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The few research projects designed for these areas will have minimal resource impacts with no impact on long-term productivity.

2. Irreversible and Irretrievable Commitment of Resources

Timber products, livestock forage and minerals are irretrievably lost as long as the areas remain in RNA status.

3. Adverse Effects Which Cannot be Avoided

Control of insects, diseases and noxious weeds is generally restricted or extremely costly because of the techniques required to protect the natural condition of the area.

4. Conflicts with the Objectives of Other Land Management Plans, Policies and Controls

No conflicts with other land management plans are anticipated.

5. Energy Requirements

Energy requirements associated with managing the Research Natural Areas are expected to be an insignificant portion of total Forest use.

D. Semiprimitive Recreation

Approximately 405,000 roadless acres in 11 different areas are available for semiprimitive recreation designation.

The area assigned to semiprimitive recreation management in each alternative is dependent on the goals and objectives for that alternative. The activities in roadless areas, primarily trail construction and maintenance, are discussed in section E of this chapter. Semiprimitive recreation assignment for each alternative is shown in Table IV-2.

Table IV-2
Area Assigned to Semiprimitive Recreation Management
(thousand acres)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
133	100	146	213	213	233	242	105	73	0	133	405

Alternatives A and B and the Maximum PNV benchmark limit the semiprimitive recreation assignment to blocks of land, generally at the highest elevations, that are not tentatively suitable for timber production. Alternative C incorporates stringers and isolated pockets of tentatively suitable timberland of low-site quality. The assignment would be achieved with little effect on commodity outputs.

In Alternatives E, E1, E2, F and G an effort is made to fill a gap between wilderness and developed recreation by providing high quality roadless recreation opportunities that are less restrictive than for wilderness (mechanized use and limited facilities such as corrals, trail cabins, etc.).

High quality wildlife security is a side benefit. Effect on market outputs is substantial. The semiprimitive assignment is minimal in Alternatives H and J since all or most roadless land is recommended for wilderness.

Semiprimitive recreation classification reduces the PNV of the Forest because timber harvest provides the primary source of potential income and some of the lands qualifying for semiprimitive status have positive timber values. The contribution to local jobs and income is reduced because less timber will be processed in the area and the Forest will spend less money for salaries and contracts. However, those businesses and individuals dependent on recreation will benefit since the mix of recreation opportunities will be maintained. Alternatives which upset the balance of semiprimitive and commodity uses would further polarize local people into groups of amenity and commodity users.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The assignment of acreage to semiprimitive recreation management has some effect on long-term productivity. The productivity of resources is maintained but the opportunity to make the area more productive through intensive management is foregone. Roadlessness maintains the future option for wilderness or development, maintains the opportunity for semiprimitive recreation, and is important in the maintenance of old-growth timber and its associated wildlife habitat. Natural appearing landscapes are preserved although the opportunity for more intensive wildfires is increased by the buildup of fuels.

2. Irreversible and Irretrievable Commitment of Resources

Assignment to semiprimitive recreation management is not irreversible, but changing the designation would involve an intensive analysis, including public involvement. Such analyses may occur each time the Forest Plan is reviewed, at least every 15 years. The result is an irretrievable loss of renewable resources, especially timber, that are grown but not harvested.

3. Adverse Effects Which Cannot be Avoided

Semiprimitive recreation designation means that timber harvest cannot occur except along existing roads. It also increases the difficulty of mineral exploration and development because of lack of access. Many types of wildlife and fish habitat improvement may be impossible or expensive to accomplish. Control of insects, disease, wildfire, and noxious weeds will require special techniques.

4. Conflicts with Other Land Management Plans

Since the assignment primarily results from the desires of the public, there are few, if any, conflicts with local or regional planning efforts or treaty rights outside the Forest.

5. Energy Requirements

Some energy may be used to maintain recreation facilities, primarily trails. Energy expended by the public in dispersed recreation is shown in Table IV-6.

E. Developed Recreation

Thirty-three developed recreation sites are located on the Forest. These sites occupy 461 acres and have little or no effect on management of other resources. Environmental consequences of retaining these sites are severe on the specific location. Due to the use of pavement and gravel, vegetation is destroyed or significantly changed and water infiltration is slowed while overland flow is increased. However, pavement and gravel are necessary to prevent more severe degradation of vegetation, soil productivity and water quality. The Lake Como site is overused but the other sites are presently used at less than full capacity.

The lower the emphasis on developed recreation, the greater the risk of environmental degradation from sewage facilities, garbage problems, and vandalism. Developed recreation is emphasized in Alternatives J and G and to a lesser extent in Alternatives E, E1 and E2 (Preferred Alternative). Additional sites are proposed for Lake Como and at Larry Creek in Alternatives J and G. Also in these alternatives, a visitor center is proposed for construction at Lost Trail Pass. In Alternatives E, E1 and E2 (Preferred Alternative), a day-use site at Lake Como is the only proposed new construction. Developed recreation is not emphasized in any other alternative. The result could be a lower quality experience and greater risk of environmental degradation.

The Forest capacity of over 300,000 recreation visitor days per year exceeds anticipated use for at least five decades (Table IV-3).

Table IV-3
Anticipated Use at Developed Sites
(thousand recreation visitor days)

	Year					
	1980	1990	2000	2010	2020	2030
Anticipated Use	123	103	126	155	189	229

Developed recreation sites have high costs per acre due to construction, maintenance, cleanup, monitoring and policing. Developed recreation management contributes to the PNV of the Forest because the costs are less than the $3/visitor day value assigned to recreation use. The net receipts of the program are negative because people pay only a small portion of the $3 assigned value. Developed recreation use and Forest expenditures contribute to local jobs and income.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The construction and management of these developed sites will have an adverse affect on long-term productivity. The vegetation of much of the site will be replaced by graveled or paved roads and campsites. The vegetation on much of the remainder will be suppressed by trampling. These effects would remain evident for a long time even if the sites were abandoned. Efforts to restore the sites to previous productivity would be costly.

2. Irreversible and Irretrievable Commitment of Resources

Once established, sites are likely to be maintained and become an irreversible, long-time commitment of a resource. Wood fiber and forage which may have been produced on the sites are irretrievably lost.

3. Adverse Effects Which Cannot be Avoided

Much of the vegetation on these sites will be lost or suppressed. Dust and noise from the concentration of campers will exist. The opportunity for vandalism will be present. Most wildlife habitat in the area will be destroyed or vacated.

4. Conflicts with Other Land Management Plans

Construction and management of these sites, particularly where they are near heavily traveled highways, might compete with privately owned campsites.

5. Energy Requirements

Energy will be used in the cleanup and maintenance of sites. Most campgrounds will require regular garbage removal, and yearly maintenance of the facilities will be energy intensive. Energy used by recreationists to reach and use developed recreation sites is estimated to be 51.7 billion BTU's during the first ten years and will increase proportionally with recreation visitor days during the following decades.

F. Dispersed Recreation

Dispersed recreation includes the opportunity to use 1600 miles of trails and about 2000 miles of roads. Recreation activities include driving for pleasure, hunting, fishing, ski touring, berrypicking, firewood gathering, hiking, backpacking, camping, mountain climbing, white water boating and other water sports. Opportunities range from areas with easy access requiring little in the way of self-sufficiency, to remote areas requiring a high level of survival experience.

Dispersed recreation occurs on land and water which is not developed for intensive or concentrated recreation. Forest management activities include maintenance or construction of trails, trailheads, toilets, hitchracks, stock ramps, parking areas, and information signs. The effects of these activities on soils, water, and vegetation are similar to the effects discussed for developed recreation sites although costs per acre for maintaining these sites may not be as high. The acreage available for each category of recreation is shown in Table IV-4.

Table IV-4
Area Assigned to Semiprimitive Recreation, Wilderness, and Roaded Management
(thousand acres)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Semiprimitive	133	100	146	213	213	233	242	105	66	0	133	405
Roaded	701	684	590	544	544	524	542	557	472	433	701	429
Wilderness	743	793	841	820	820	820	793	915	1039	1144	743	743

Differences among alternatives for wilderness and semiprimitive recreation were discussed in preceding sections. Areas not so designated are potentially available for roaded forms of management. Alternatives A, B and C and the Maximum PNV Benchmark have a market emphasis and require a large amount of road construction. Conversely, Alternatives H and J have a nonmarket emphasis and less road construction. In between are Alternatives E, E1, E2, F and G with more of a balanced emphasis on market and nonmarket emphasis. The existing trail system would be affected, and some segments may be replaced by roaded access. The need to retain, relocate, or abandon trail segments will be addressed in project analysis.

Roadless areas provide opportunities for semiprimitive recreation experiences with the convenience of snowmobile, motorcycle, or chainsaw use. Wilderness management precludes the use of such mechanized equipment and provides solitude in the recreation experience. Roaded areas provide the broadest spectrum of recreational use and, if roads are closed, can approximate semiprimitive conditions with the exception of the physical existence of roads. The capacity of the Forest to accommodate recreation use and projected use for all dispersed recreation is shown in Table IV-5.

Table IV-5
Capacity and Predicted Use for Dispersed Recreation
(thousand recreation visitor days)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Roaded												
Capacity	1600	1560	1440	1280	1280	1246	1240	1300	1080	990	1600	990
Predicted Use												
Plan Period												
Decade 1	266	266	266	266	266	266	264	266	267	266	266	114
Projected												
Decade 3	458	456	457	457	458	458	455	457	458	457	459	152
Decade 5	736	734	735	735	735	735	732	734	736	734	736	241
Decade 10	733	732	734	734	734	734	732	733	735	733	732	241
Decade 15	735	734	734	734	734	735	732	734	735	734	736	241
Semiprimitive												
Capacity	160	120	130	230	230	250	280	110	80	0	160	470
Predicted Use												
Plan Period												
Decade 1	48	44	46	50	50	53	52	42	38	32	48	19
Projected												
Decade 3	35	26	31	54	54	68	62	27	17	0	36	19
Decade 5	55	42	49	86	86	109	101	43	27	0	57	28
Decade 10	55	42	48	85	85	109	100	43	27	0	56	28
Decade 15	55	42	49	86	100	109	100	43	27	0	57	28
Wilderness												
Capacity	270	280	300	290	290	290	280	330	370	410	270	270
Predicted Use												
Plan Period												
Decade 1	133	136	136	132	132	129	128	139	144	150	133	134
Projected												
Decade 3	241	249	245	222	222	208	212	248	259	275	240	171
Decade 5	358	371	364	327	327	304	312	369	386	412	355	269
Decade 10	357	370	364	327	327	304	312	369	386	412	355	269
Decade 15	358	371	364	327	327	304	312	369	386	412	356	269

As projected use approaches capacity, recreation can either be limited to acceptable levels by a permit system or the quality of the recreation experience will be degraded. Excessive use in either the semiprimitive or wilderness settings can cause erosion, soil compaction, and loss of vegetation along main trails and at the more desirable campsites. These are minor effects from the total Forest standpoint but are important esthetic effects to those people using the trails. Off-road motorized vehicle use has only a minor effect on the Forest environment because most of the Forest is too steep to accommodate off-road vehicles. We have analyzed the off-road use situation through the Forest Travel Plan process which will be updated annually.

Direct revenue from dispersed recreation is insignificant, but because values have been assigned to recreation visitor days, dispersed recreation has a high value and a positive effect on the present net value of the Forest.

The effect of emphasis on recreation on the lifestyles in the area are similar to those discussed under Wilderness and Semiprimitive Recreation.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The long-term effects of the short-term use of trailhead facilities, toilets, hitchracks, stock ramps, and loading areas will be similar to the effects of developed recreation sites on productivity. Although trails can be abandoned and may eventually return to near original condition, it is not likely to happen as long as the demand for dispersed recreation remains high.

2. Irreversible and Irretrievable Commitment of Resources

Once facilities and trails are constructed, they are likely to be maintained into the foreseeable future. The vegetation displaced by these facilities constitutes an irretrievable loss of resources.

3. Adverse Effects which Cannot be Avoided

The loss of vegetation displaced by the construction and maintenance of the facilities and trails cannot be avoided.

4. Conflicts with Other Land Management Plans

No conflicts with other land management plans or tribal rights are likely to occur as a result of dispersed recreation activities.

5. Energy Requirements

Energy is required for the maintenance of dispersed recreation facilities but at less volume than for maintenance of developed recreation facilities. The major use of energy associated with dispersed recreation is that used by the public in travel to and use of the Forest (Table IV-6).

Table IV-6
Energy Used in Dispersed Recreation During the First Decade
(billion BTU's)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
33.6	33.5	33.6	33.6	33.6	33.6	33.4	33.5	33.5	33.5	33.6	13.5

Energy use in succeeding decades is proportional to the recreation use projected for those decades (Table IV-5).

G. Cultural Resources

The Forest has a significant and diverse cultural history represented by prehistoric and historic sites including Native American campsites, rock art, cambium-peeled trees, and travel routes; and historic sites such as mining areas, logging camps, and homesteads, as well as early administrative sites and facilities. Systematic cultural resource inventories were started in 1975. Well over 100 sites have been inventoried and many are eligible for inclusion in the National Register of Historic Places.

The goals of this program are to comply with various Federal and State cultural resource laws and regulations and to integrate these resources with overall Forest programs. Responsibilities are to inventory, evaluate and manage cultural resources. When significant sites may be affected by proposed activities, alternatives to avoid or mitigate adverse effects are developed in consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation.

Vandalism and irresponsible collecting are and will probably continue to be a problem. Public information and awareness as well as law enforcement will be used to counteract the problem. The process to inventory, evaluate, manage and monitor the cultural resource program is the same for all alternatives.

Protection of cultural resources will have little effect on the present net value of the Forest since so few acres are involved. Some timber may not be harvested on or near the trails and other identified cultural sites but this volume will be small.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Cultural resources are a finite and nonrenewable resource. Once damaged or destroyed, the information contained therein is lost forever. Land on or near these sites may be not managed for timber or managed for reduced levels of timber production.

Even though cultural surveys will be made prior to ground-disturbing activities, these surveys may not always be successful in finding a cultural resource prior to the time the activities occur. Should a cultural resource be discovered during a ground disturbing activity, the activity will be delayed while the area is inventoried and mapped. Analysis of the results of this inventory may show that the activity needs to be diverted away from the site or that the resource needs to be collected and/or catalogued before the activity proceeds. This can cause delay and, if the area is to be completely protected, will affect the long-term productivity of the site.

2. Irreversible and Irretrievable Commitment of Resources

Since the commitment to protect cultural resources is irreversible in the foreseeable future, the harvestable timber grown on these sites represents an irretrievable loss of that resource.

3. Adverse Effects Which Cannot be Avoided

Some ground-disturbing activities will inadvertently enter and disturb some cultural resources despite the care and intensity of surveys prior to the beginning of these activities.

4. Conflicts with Other Land Management Plans

The management of the cultural resource should have little effect on other planning efforts adjacent to the Forest. We have asked the local Indian tribes and religious leaders for an inventory of sites significant to their culture. We have not identified any specific sites which need protection, but will continue to work with them during cultural resource inventories for project work, to ensure the protection of significant sites.

5. Energy Requirements

Managing cultural resources will require little energy expenditure. Some travel will be necessary in the surveys and some energy may be used to excavate or catalog sites that are located.

H. Threatened and Endangered Species

Suitable habitat for the threatened grizzly bear has been identified in the Selway-Bitterroot ecosystem (USDI, 1982), but the habitat is thought to be unoccupied or does not have a viable population. A work group of biologists from the USDA Forest Service, USDI Fish and Wildlife Service and Idaho Department of Fish and Game decided in April, 1986, to establish a "Bitterroot Range Evaluation Area", and to evaluate its vegetative potential to support grizzlies by 1995. The evaluation area is all in wilderness on the Bitterroot. No activities are planned in any alternative that could alter potential grizzly bear habitat. The Forest will cooperate in any future interagency recovery effort for which recovery goals have not been defined.

The current approximate distribution of gray wolves includes the Upper Lochsa, the upper Middle Fork of the Salmon, and the Big Hole-Salmon River divide. Wolves are sporadically sighted, but they are thought to be highly mobile individuals and no pack activity has been documented (USDI, 1983). No recent confirmed sightings have occurred on the Forest. The wilderness areas, especially the Selway-Bitterroot and Frank Church-River of No Return, seem to be the most likely places for wolves to become established, and the draft Wolf Recovery Plan (USDI, 1983) includes all of the Idaho portion of the Forest in the Idaho recovery area. No activities are planned in these areas which will adversely affect the potential wolf habitat. The Forest will cooperate in any future interagency recovery effort for which recovery goals have yet to be defined.

Suitable but unoccupied nesting habitat for peregrine falcons occurs along the canyon faces on the west side of the Bitterroot Valley. The cliffs will remain unchanged by any activity and could provide future sites for reintroduction of the peregrine (USDI, 1977). Peregrine habitat will not be adversely affected by any planned management activity and if birds are introduced or occur naturally, appropriate analysis and management direction will be formulated.

The most likely habitat for bald eagles on National Forest land is on two 40-acre parcels along the Bitterroot River. If some birds begin to use the Forest, appropriate actions will be prescribed to protect or enhance their existence.

Because of the locations threatened and endangered species are likely to occupy, this program is unlikely to affect the economic base or change the lifestyle of the people in the area.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The only short-term use is continued monitoring to see if threatened and endangered species occupy the Forest. Should they occur, there would be an effect on the long-term productivity in that certain restrictions would have to be applied to protect the species.

2. Irreversible and Irretrievable Commitment of Resources

There will be no irreversible or irretrievable commitment of resources unless threatened or endangered species occupy the Forest.

3. Adverse Effects Which Cannot be Avoided

There are no adverse effects associated with monitoring threatened or endangered species.

4. Conflicts with Other Land Management Plans

Unless threatened and endangered species are located on the Forest, conflicts cannot exist with other land management plans adjacent to the Forest.

5. Energy Requirements

There are no energy requirements associated with threatened and endangered species at this time.

I. Wildlife Habitat

Activities specific to the improvement of wildlife habitat on the Forest are limited. Most of the management for wildlife habitat is associated with management of other resources, primarily timber harvest and road building. The area scheduled for burning, shrub planting, or shrub pruning to improve wildlife habitat is shown in Table IV-7.

Table IV-7
Wildlife Habitat Scheduled for Burning, Shrub Planting, or Shrub Pruning
(acres per year)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
0	0	140	285	285	285	285	285	0	285	0	0

The objective of wildlife habitat improvement is to maintain productivity of winter range forage areas, primarily by spring burning on grassland or mixed grass and shrubland. Most burns will be "cool" and vegetation will resprout rapidly. The soil surface will be exposed for a short time and there is a slight risk of accelerated erosion, but the chance for a high intensity rainstorm in the spring is small. Air quality degradation is similar to that from slash control following timber harvest, and managed fire, as discussed in sections S and Y of this chapter.

A wide variety of nongame wildlife occur on the Forest and they are dependent upon a wide variety of habitats. No activities to directly manipulate nongame habitat are planned, but other resource activities will alter nongame habitat and the changes will be evaluated and monitored.

State wildlife agencies are responsible for management of state-owned wildlife. They have no direct management responsibilities for wildlife habitat on National Forest land. But, because wildlife populations are directly related to the quality and extent of their habitat, National Forest land managers will coordinate their activities with the needs of wildlife. This coordination has no direct effect on the environment, but results in recommendations concerning several activities, especially timber harvest and road management.

The specific activities associated with wildlife habitat improvement will not have much effect on the economic base or lifestyle of the area because of the few acres affected.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The productivity of areas that are burned, pruned or planted will be changed. If trees normally occupy these sites, some or all may be killed. This is especially true of tree seedlings which may occupy the area. The production of vegetation which big game prefer will be enhanced.

2. Irreversible and Irretrievable Commitment of Resources

The act of burning, pruning, or planting does not constitute an irreversible commitment of the areas to this activity. Different areas will be scheduled for treatment each year. Areas burned in any one year may never be treated again. Areas pruned or planted will be affected by that activity as long as the plants survive. Any species removed or suppressed by any of the activities constitute an irretrievable loss of that resource.

3. Adverse Effects Which Cannot be Avoided

The soil surface will be exposed by burning for a few days or weeks and there is a slight risk of accelerated erosion. Air quality degradation is similar to that from slash control (Section S of this chapter), but the acreage proposed for burning is small and smoke generation will be slight.

4. Conflicts with Other Land Management Plans

The objectives of State wildlife agencies and the National Forests are different. Therefore, plans for the management of the wildlife occupying Forest land may conflict and special efforts to reconcile differences may be necessary. For instance, roads are required to harvest timber but may provide too much access for hunters. We will have to work closely with wildlife agencies to manage the Forest road system for highest mutual benefit.

5. Energy Requirements

Energy will be used to burn, plant and prune. Because of the small acreage involved, this energy use will amount to only a small percentage of the total energy used on the Forest.

J. Fish Habitat

There are few activities specifically proposed to improve fish habitat. In all alternatives, a small budget item is proposed to replace or retrofit the few bridges and culverts that were improperly designed for fish passage in the past. Some natural barriers to fish passage may be removed. Only one or two projects a year are anticipated, so environmental effects will be inconsequential.

About 100 miles of fisheries streams support less than their potential carrying capacity because they lack pools. The habitat could be improved by adding large woody debris to create pools (Frear, 1982). The carrying capacity of the habitat would be improved by about one-third in the areas treated.

Five acres per year of fish habitat improvement are proposed in all alternatives. No fish habitat improvements were scheduled in the Benchmarks.

The largest single activity proposed in any alternative is the possible expansion of the chinook salmon hatching channel on the Selway River at Indian Creek. Additional facilities would occupy less than two acres and would increase the capacity of the present hatching channel which has only been partially successful in re-establishing chinook salmon runs in the upper part of the river system.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The few projects associated with increasing fish passage and migration will cost little and will ensure that fish can occupy presently unavailable habitat. The creation of debris caused pools in streams lacking this habitat component will enhance the long-term productivity of the fishery.

2. Irreversible and Irretrievable Commitment of Resources

There are few irreversible or irretrievable commitments of resources associated with fish habitat improvement projects because so little area is involved. A few large trees along streams will be cut and left in the stream channel to create pools.

3. Adverse Effects Which Cannot be Avoided

Stream bottoms will be disturbed when fish barriers are removed and when the fish hatching channel is constructed. This may have minor short-term effects on the fish and insects which occupy these areas.

4. Conflicts with Other Land Management Plans

The objectives of the state wildlife agencies and the National Forests are different. Therefore, plans for the management of the fish occupying Forest streams may conflict and special efforts to reconcile differences may be necessary. For instance, roads necessary for timber management may contribute sediment to streams, in spite of best management practices, and fish populations may be reduced. Habitat improvement practices may mitigate those losses, but conflict between agency philosophies would have to be dealt with.

5. Energy Requirements

Some energy will be required in removal of barriers and construction and maintenance of the fish hatching channel. This will be only a small portion of the Forest's total energy use.

K. Minerals and Energy Resources

Potential for mineral resources production on the Forest appears to be low. Small, scattered claims are being worked, and open pit flourite and vermiculite deposits could be developed. Normally, such activity completely alters the on-site environment, but would occupy a very small area on the Forest. If a new development project is proposed, the NEPA requirements will be followed as site specific environmental analysis is performed.

Although potential for oil and gas or geothermal production appears to be low (Planning Record: Minerals Overlay), applications to lease oil and gas rights on over 75,000 acres have been received. Leases have been issued on more than 67,000 acres. No exploration activity has occurred nor has any been positively planned for the future. Criteria for issuing leases can be found in the Forest's Oil and Gas Environmental Assessment, available upon request. Site-specific stipulations to protect surface values are found in Appendix N of the Forest Plan.

Although activity is at a low ebb, significant discovery and development of oil, gas, geothermal, or minerals would have a large effect on the physical, biological, economic and social environment. Vegetation and soils around mines, wellhead locations, and waste deposits would be removed or altered. Water quality would be degraded. The influx of people would cause a change in lifestyle and have an impact on local schools, police and other community organizations and facilities.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Any exploration or development of energy or nonenergy resources is likely to have a long-term effect on the productivity of specific sites. Open pit mines, drill-sites, waste deposits and roads are not easily rehabilitated. The disturbed sites are unlikely to be as productive as before disturbance. Leasing will not affect productivity.

2. **Irreversible and Irretrievable Commitment of Resources**

Leasing for oil and gas is not an irreversible commitment of a resource since the lease may never be subjected to exploration. However, once exploration and development of the resources occurs, the effects are irreversible. Such sites may be rehabilitated, but the vegetation lost while the development was in place is irretrievable as are the resources removed from the area.

3. **Adverse Effects Which Cannot be Avoided**

There are no adverse effects associated with leasing. However, if exploration or development occurs, soil will be disturbed, erosion will occur and water quality will be lowered. The visual resource may be degraded.

4. **Conflicts with Other Land Management Plans**

The guidelines of other agency plans are usually incorporated into lease stipulations. Other agencies may not agree that an area should be leased.

5. **Energy Requirements**

Energy requirements will be slight unless discoveries are made. Some energy will be used in monitoring the few claims which now exist but this will be a small portion of the total Forest requirements.

L. <u>Human and Community Development</u>

A variety of programs provide employment for individuals in Forest activities. Full-time Forest Service employees live and work in and near the Forest. In summer, this number is supplemented by seasonal employees; most of them from local communities. The Trapper Creek Job Corps center is a major program of the Forest. About 225 young persons are in residence and receive job related training and basic education to better fit them for employment.

These programs have significant economic effect on the communities near the Forest but have little effect on the physical and biological environment. In Ravalli County communities, the work force of the Forest is a significant portion of the economic base (Table IV-8). Forest Service employment is directly related to quantities of commodity resource outputs.

Table IV-8
First Decade Forest Service Employment
(person years)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Employees	320	310	310	300	330	280	280	310	280	280	220	160

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

The short-term use of Forest facilities for training young people may result in improvements in long-term productivity because segments of the public will gain an understanding of Forest management techniques and philosophies.

2. **Irreversible and Irretrievable Commitment of Resources**

None were identified.

3. **Adverse Effects Which Cannot be Avoided**

None were identified.

4. **Conflicts with Other Land Management Plans**

None were identified.

5. **Energy Requirements**

Energy use was not estimated because it is such a small portion of the total energy consumed on the Forest.

M. Special Uses

The Forest administers about 100 special use permits; about 50 percent are for dams, ditches, and other water-related facilities and 25 percent are for roads. The construction of these facilities has drastically changed the site where they are located. Dams and ditches result in soil movement and displacement. Ditches remove water from the original channel and if this results in low stream flow fish populations can be lowered or completely eliminated. The vegetation behind the dams and in the ditch bottoms is destroyed and the vegetation along the sides of the lakes and ditches is drastically changed. The special-use roads have the same effect as other roads and are discussed in section CC.

Though the effects of special uses are drastic for the specific site, these uses are limited to a small acreage of the Forest. Each request for a new permit will be subjected to environmental analysis prior to issue.

Special uses do contribute to PNV because fees are collected from permittees. These fees do not offset the administrative costs of the program. Irrigation of croplands is a significant use in the Bitterroot Valley and most of the water used originates on the Forest. The lifestyle of the water users of the Valley would change dramatically in absence of the water storage and distribution system.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

The vegetation on specific sites occupied by special uses is changed or destroyed. The vegetation alongside lakes and ditches is changed as a result of water availability. These effects will remain as long as the facilities do.

2. **Irreversible and Irretrievable Commitment of Resources**

The dams, ditches, roads, and other special uses will likely be maintained into the foreseeable future. The vegetation lost by their existence constitutes an irretrievable loss of resource.

3. **Adverse Effects Which Cannot be Avoided**

Construction of dams, ditches, and roads will cause soil disturbance and accelerated erosion. The stress placed on fish populations by withdrawal of water from streams will continue even though requirements to maintain some water flow in all streams are met. Dams and ditches may not blend well into the natural landscape.

4. **Conflicts With Other Land Management Plans**

None were identified.

5. **Energy Requirements**

Some energy will be used by the Forest in monitoring special uses, but this will be a minor portion of total Forest use. New dams, ditches or roads will require considerable energy use by the permittee.

N. Rights-of-Way and Cost-Share Agreements

Road and trail rights-of-way are acquired by the Forest from private or other owners primarily to provide access for timber harvest. Rights-of-way on which roads are constructed affect about 9 acres of private land each year.

Cost-share agreements are negotiated between the Forest and owners of private land within the Forest boundary, usually to provide access for timber harvest on both ownerships. Agreements cover the administration of roads and both parties share in the construction and maintenance costs. The environmental effects are discussed in section CC.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Rights-of-way give the Forest an opportunity to manage lands which might otherwise be unavailable. Productivity can be maintained or improved. Cost-share agreements allow private land owners access to manage their lands and reduces the cost of roading to both parties.

2. **Irreversible and Irretrievable Commitment of Resources**

Rights-of-way and cost-share agreements can be cancelled although this is unlikely to happen in the foreseeable future. The resulting roads are an irreversible use and the vegetation removed by the construction and maintenance constitute an irretrievable loss of a resource.

3. **Adverse Effects Which Cannot be Avoided**

Adverse effects of the resulting roads are discussed in section CC.

4. **Conflicts with Other Land Management Plans**

Access to and within the Forest does not conflict with other plans in the area.

5. **Energy Requirements**

The only energy used in obtaining access and negotiating cost-share agreements involves surveying appropriate routes. This is small compared to total energy use on the Forest.

0. Property Boundary Location

About 16 miles of property boundary are located each year and this amount varies among alternatives according to the amount and location of timber harvest. The activity involves considerable manpower and time but has few environmental effects. Some vegetation may be trimmed or completely removed to establish line of sight for the survey instrument but this is temporary and inconsequential.

Boundary location establishes, with some finality, the property lines of Forest and other ownership. It enables owners to avoid activities on lands they do not own. Location of boundaries has no effect on PNV nor does it affect the economy of the area.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Location of boundary has no effect on productivity.

2. **Irreversible and Irretrievable Commitment of Resources**

There is no commitment of resources associated strictly with boundary location.

3. **Adverse Effects Which Cannot be Avoided**

Some vegetation may be removed or pruned but the effect should be short-lived.

4. Conflicts with Other Land Management Plans

None were identified.

5. Energy Requirements

Some energy is expended in travel when surveying but this is small compared to total Forest use.

P. Landownership and Adjustment

Land exchange proposals are generally initiated by private owners. Land considered for exchange will vary by alternative. Historically, about four proposals are received each year but less than one exchange is acted on each year. About five percent of the land within the Forest boundary is privately owned and all may, at some time, be subject to consideration for exchange. Each proposal will be subjected to appropriate analysis to help guide subsequent action.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Lands which enter private ownership following exchange will be managed as the new owner desires. Lands obtained by the Forest Service through exchange will be managed to maintain or enhance productivity.

2. Irreversible and Irretrievable Commitment of Resources

Lands entering private ownership through exchange are committed to whatever the new owner desires. Lands obtained by the Forest Service will be committed to particular uses according to the land management plan in effect at the time.

3. Adverse Effects Which Cannot be Avoided

None were identified.

4. Conflicts With Other Land Management Plans

Exchanges or purchase may have an effect on the county tax base.

5. Energy Requirement

Little or no energy is used in land exchange.

Q. Buildings and Other Facilities

Maintenance and reconstruction of administrative structures may cause short-term, localized impacts to the physical and biological environment, but the effects are insignificant on a Forest-wide basis since the structures occupy less than 100 acres. The facility maintenance and reconstruction program is assumed to continue at the current level under all alternatives.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Vegetative productivity will be lost during the life of the facilities.

2. Irreversible and Irretrievable Commitment of Resources

The vegetative productivity loss represents an irretrievable commitment.

3. Adverse Effects Which Cannot be Avoided

Although efforts have been made to landscape building sites, the presence of the facilities do affect natural appearance. Effects of soil disturbance will remain long after the facilities are gone.

4. Conflicts with Other Land Management Plans

None were identified.

5. Energy Requirements

About 15 billion BTU's are required to heat, cool and light the administrative facilities including Job Corps. This is less than 10 percent of the Forest's total energy use and does not vary among the alternatives.

R. Fire Suppression

The purpose of fire suppression is to minimize damage to valuable resources by controlling and extinguishing fires. The extent of fire suppression activities depends on number of fire starts and weather, so there are no differences among the alternatives.

Successful suppression has a favorable short-term effect in areas where timber management is prescribed because it protects the stands from burning.

Suppression also results in the establishment of old-growth forests. Old-growth dependent animals are favored and thermal cover is provided to many wildlife species, though forage is eliminated or suppressed by competition with the conifers. Protection from burning will lead to accumulation of fuels above natural levels and can result in large damaging fires when burning conditions are severe. Excessive heat generated by fires in dense dry fuels consumes litter and duff, which can affect productivity and soil stability. Stream sedimentation is likely to occur after a hot litter- and humus-consuming fire (USDA, 1978). Loss of timber to insects and disease is likely to increase because sources of infection are not burned. Fireline construction with hand tools or heavy equipment can increase the potential for soil erosion. The potential for soil movement is increased by use of heavy equipment on steep slopes or on soils susceptible to erosion.

Alternatives A, B and C and the Maximum PNV benchmark contain the highest levels of direct suppression objectives because of the large acreage of suitable timberland and the necessity to protect those values. Direct suppression shifts to managed fire (next section) as wilderness and semiprimitive recreation assignments expand in Alternatives E, E1, E2, F and G and would be confined to the currently developed lands in Alternatives H and J. Except for Alternative F, the annual cost of fire suppression and managed fire (next section) is $1,033,000 and reduces the PNV for 150 years by $26 million. Under Alternative F, the annual cost of fire suppression is $851,000 and the discounted cost for 150 years is $21 million. The fire suppression program creates jobs and income in the local economy.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Effective fire suppression will minimize damage to existing stands of timber. However, the long-term change in vegetative composition and density may reduce productivity.

2. ***Irreversible and Irretrievable Commitment of Resources***

Since the fire suppression program could be curtailed at any time, there is no irreversible commitment of resources.

3. **Adverse Effects Which Cannot be Avoided**

Loss of soil due to construction of firelines will occur despite preventive measures. Accumulation of fuels will continue in areas protected by fire suppression.

4. **Conflicts with Other Land Management Plans**

Smoke emissions due to fire may exceed State Clean Air Standards, but the objective of the suppression effort is to reduce this problem.

5. **Energy Requirements**

Energy required in the fire suppression program is dependent on the number and kind of fires. In extreme fire years, this use can be a substantial portion of the total energy expended by the Forest.

S. <u>Managed Fire</u>

Managed fires are fires which will be allowed to burn under observation in accordance with a predetermined set of conditions. Managed fire includes prescribed fire within wilderness areas, for slash disposal and site preparation, and wildlife habitat improvement. Prescriptions for managed fires exist for the Anaconda-Pintler, Frank Church-River of No Return and the Idaho portion of the Selway-Bitterroot Wildernesses. The same option is available for proposed wilderness and areas managed for semiprimitive recreation.

The effect of the managed fire program will depend on factors such as fuel loading, proximity to valuable resources, and current weather conditions. Fires tend to increase forage for big game by removing forest canopies or tall shrubs and encouraging forbs and low shrubs. Fires increase vegetative and animal diversity (Leege, 1968); they increase animal species that prefer early seral stages and decrease those that prefer dense forests. In addition, accumulated fuels are consumed which will reduce the severity of future fires. Managed fires seldom burn both overstory and understory because the hotter fires are usually suppressed. Even so, exposed soils lead to soil erosion which results in lower water quality for a short time. Fires may temporarily reduce visual and air quality (USDA, 1982).

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Allowing a fire to burn can have a long-term effect on the kind of vegetation and animals occupying the area. A future generation of the overstory (trees or shrubs) may be entirely destroyed. Some of the present overstory, especially shrubs, is completely removed. Vegetative productivity is not destroyed and, in fact, may be temporarily enhanced by the availability of the minerals in the ash.

2. Irreversible and Irretrievable Commitment of Resources

If the fire is allowed to burn, the consumed material is irretrievable.

3. Adverse Effects Which Cannot be Avoided

The aftermath of the fire will remain visible for a short time. Soil is bared and water quality may be reduced for a short time by accelerated erosion. Smoke will be generated into the atmosphere.

4. Conflicts with Other Land Management Plans

Smoke emissions from managed fires may exceed State Clean Air Standards, but fire management plans have considered weather conditions so appropriate suppression activities may be prescribed if clean air becomes an issue.

5. Energy Requirements

Some energy will be consumed in monitoring the planned fire. This will be a minor amount compared to the energy needed to suppress such fires, and a minor portion of the total Forest use.

T. Range Management

We anticipate that demand for cattle use will not exceed 11,000 AUM's per year, so if properly managed, livestock grazing will be within the potential forage production of all the Alternatives (Table IV-9) and will have minimal effect on the environment. Timber harvest creates transitory cattle range, so the differences in forage production among Alternatives is due to the differences in timber harvest within cattle allotments.

Water developments, grassland burning, and noxious weed control activities may have effects on a site but their effect on the Forest environment will be minimal, because there are only about 100 water developments on the Forest and we burn only 100 to 200 acres a year. Any noxious weed control activity must be preceded by an environmental analysis in compliance with the National Environmental Policy Act. These activities will reduce the risk of environmental degradation by controlling use to acceptable levels or increasing available forage. In riparian zones, vegetation removal, streambank trampling, and soil compaction can have significant effects on soil, water, vegetative productivity, fisheries, and recreation use (Platts, 1979). Only about one third of the riparian area on the Forest is in cattle allotments, and proper cattle management can minimize the risk of adverse environmental effects. No significant competition between cattle and elk will occur at the use level predicted (Ormiston, 1983).

Table IV-9
Potential Livestock Forage
(thousand AUM's)

	Alternative/Benchmark											
Decade	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Plan Period												
1	14.0	12.8	12.7	12.4	12.6	11.2	11.3	12.2	12.3	11.0	12.4	6.3
Projected												
3	14.0	13.7	14.2	13.3	13.3	11.4	13.1	13.5	12.3	10.8	19.6	0
5	20.0	18.1	17.3	16.3	15.4	14.2	17.0	16.1	15.6	12.0	22.5	0
10	11.4	14.5	14.7	11.3	11.6	9.6	16.4	10.5	13.6	11.2	13.9	0
15	21.6	17.0	17.7	16.3	15.5	13.9	17.3	14.8	15.3	10.8	20.1	0

Cattle grazing may annoy some recreationists because of smells, flies, visibility, noise, and manure on trails and around campsites. Cattle use in wilderness is often considered a nonconforming special use. Congress has allowed cattle use to continue in some of the wildernesses. The only area recommended for wilderness which has an existing cattle allotment is the Blue Joint area.

The grazing program adds to the PNV of the Forest. However, total contribution to PNV is less than 1 percent under any alternative, and actual receipts do not recover costs of administering the program. Though grazing is a historic use in the Bitterroot Valley, livestock numbers have declined in recent years. Cattle in Ravalli County declined from about 45,000 head in 1975 to 30,000 in 1980 (Planning Record: Forest Plan Note 126). There are 37 cattle ranchers holding permits on the Forest, and most must depend on other sources of income to make a living. The few larger ranchers are dependent on the Forest forage for a significant portion of their ranching operation, and these are the ones who perpetuate the "old west rancher" lifestyle which is a part of the valley heritage.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The grazing of livestock on the Forest will have little effect on long-term productivity. A few areas near watering places and salt will continue to be overused, which will change the vegetative production of these small areas.

2. Irreversible and Irretrievable Commitment of Resources

There is a long tradition of cattle grazing on the Forest. As long as this tradition exists, there is little likelihood that all livestock will be removed from the Forest. The forage grazed by these livestock is a commitment of that resource.

3. Adverse Effects Which Cannot be Avoided

Conflicts will continue to exist between livestock and big game. Fences and water developments on rangeland will affect the visual resource. Recreationists will continue to be annoyed by smells, flies, sounds, and manure in some areas. Compaction and vegetation change will continue to occur in heavily used areas. Fish habitat and water quality will be adversely affected.

4. Conflicts with Other Land Management Plans

None were identified.

5. Energy Requirements

Energy required by the Forest for livestock management is not great. Some may be required to monitor the resource and maintain some facilities. This will not be a significant portion of the total used on the Forest. Permittees will also use energy to manage livestock while on the Forest and in moving livestock to and from Forest rangelands.

U. Utility Transportation Corridors

An analysis has been made to define the kinds of land which should be avoided in permitting or constructing utility lines, and oil or gas pipelines. The analysis is based on information contained in the Pacific Northwest Long Range East-West Energy Corridor Study, Phase 1 (draft), Part A-Rocky Mountains, Part B-Cascade Mountains (Bonneville Power Administration, 1977), and in the Region 1 Corridor Planning Guidance (1990 letter of October 2, 1982). Existing facilities and potential corridor locations were inventoried. Avoidance areas are those where establishment and use conflict with land management objectives. Exclusion areas are those where such facilities are not allowed.

The potential for a major east-west high-capacity energy transmission corridor to the south of Hamilton (segment R-28) has been foreclosed by the establishment of the Frank Church-River of No Return Wilderness and addition to the Selway-Bitterroot Wilderness (Public Law 96-312, July 23, 1980). Segments R-27 and R-29 are a part of this corridor and may not be viable for east-west use, but may be viable for north-south or Regional needs.

Table IV-10 displays exclusion, avoidance and window status by alternative and segment. Alternatives A, B, C and the Maximum PNV benchmark are the least restrictive to corridor consideration since most land, except for existing wilderness, would eventually be developed by a road system. Alternatives G, H and J are the most restrictive due to a high level of wilderness recommendations. In addition, the Blue Joint and Sapphire Wilderness Study areas (Public Law 95-150) will remain off-limits for corridor consideration pending final wilderness decisions by Congress, even though portions of both areas are designated for roads and development in Alternatives A through G.

Table IV-10
Exclusion, Avoidance and Window Area

Segment Designation	Alternative/Benchmark A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Segment R27, Sapphire Mountains												
Exclusion								X	X	X		
Avoidance				X	X	X	X					X
Window	X	X	X								X	
Segment R28, Elk City Road												
Exclusion	X	X	X	X	X	X	X	X	X	X	X	X
Avoidance												
Window												
Segment R29, Highway 93												
Exclusion												
Avoidance												
Window	X	X	X	X	X	X	X	X	X	X	X	X

There are no major utility lines, or oil or gas pipelines, crossing the Forest. Only when the corridors are occupied do impacts occur. Prior to construction of a utility line or oil or gas pipeline, an appropriate environmental analysis would be required to establish the final location of the facility and its supporting road. The effects of the construction and maintenance of the facilities will then be displayed.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Unoccupied corridors have no effect. Occupied corridors are cleared of trees that interfere with maintenance or pose a safety hazard. Potential productivity is generally not attainable as long as the facility remains.

2. Irreversible and Irretrievable Commitment of Resources

The identification of the corridor is not an irreversible or irretrievable commitment of resources. However, as long as the facility is operational, the ground that it occupies is dedicated to that use. Commercial timber production is irretrievably lost.

3. Adverse Effects Which Cannot be Avoided

Rights-of-way cannot be hidden and will have an impact on the visual resource, particularly when the corridor passes through undeveloped landscapes. Roads, even if closed to vehicle use, provide easier access which could displace game animals.

4. Conflicts with Other Land Management Plans

The utility corridor from south of Hamilton to the Red River area has been closed, by establishment of the Frank Church-River of No Return Wilderness and addition to the Selway-Bitterroot Wilderness. The corridor just north of the Anaconda-Pintler Wilderness could be closed by additions to that wilderness. Proposals for facilities that traverse several ownerships need interagency representation.

5. Energy Requirements

None while the corridor is unoccupied.

V. Insects, Disease and Noxious Weeds

Significant growth loss and some mortality is occurring from dwarf mistletoe and spruce budworm infestations. The primary tools of the pest management program are vegetative manipulation by timber harvest, discussed in section W, and reforestation to selected tree species, discussed in section AA.

There are no plans for use of pesticides on the Forest under any alternative. Should the occasion arise, such proposals would be subjected to detailed analysis prior to initiation.

Alternatives having the largest timberland base provide the best opportunity for conversion of high-risk or impacted stands to young, healthy stands. Alternatives A, B, C and the Maximum PNV benchmark provide the greatest opportunity, Alternatives H and J the least, with the remainder in between.

Spotted knapweed has occupied nearly all the sites to which it is ecologically adapted. It is particularly prevalent on road cut and fill slopes and where native vegetation has been severely disturbed. Several small pockets of leafy spurge are found at lower elevations adjacent to private lands. Although the use of herbicides may be appropriate under some conditions, topography and vegetative cover make control efforts difficult. Biological controls appear to offer the best long-range approach, and are currently being used on spotted knapweed and leafy spurge. An evaluation is currently underway to assess the risk of noxious weed spread in the vegetative communities of the Forest (Losensky, B.J., 1987). Preliminary results suggest a number of management

practices can be used to prevent or reduce the spread of noxious weeds along forest roads; and high- and low-risk vegetative communities have been identified. This evaluation will help formulate control strategies.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

The application of silvicultural methods to maintain vigorous native vegetation helps to control insects, disease, and noxious weeds, and increases the long-term productivity of the Forest from the standpoint of recoverable resources.

2. **Irreversible and Irretrievable Commitment of Resources**

Immature and unsalvaged timber killed by insects or disease because of lack of control represents an irretrievable loss of that resource.

3. **Adverse Effects Which Cannot be Avoided**

None were identified.

4. **Conflicts with Other Land Management Plans**

The Forest philosophy of rather passive methods of noxious weed control may conflict with the aggressive approach of the County Weed Boards.

5. **Energy Requirements**

Energy used in pest management is included in timber sale program energy requirements.

W. Timber Harvest

Timber harvest and associated road construction, slash disposal and site preparation have more effect on the physical and biological environment than do other activities.

Cumulative downstream effects of Forest timber harvest and associated activities are estimated to increase Bitterroot River runoff and sediment less than 1 percent per year. This estimate is for the Bitterroot River drainage above Stevensville which has an annual runoff of approximately 1,700,000 acre-feet and a measured sediment level of 74 tons per square mile (Cartier, 1984).

The upper limit of the physical stream system cumulative effect can be called a geomorphic threshold. Hillslope or stream channel stability may be affected at this point. The average geomorphic threshold for sediment increase on-Forest is approximately 260 percent. We predict the natural level of about 10.7 tons per square mile per year will be increased by 35 to 47 percent by implementation of the various alternatives. The current sediment level is 13.9 tons per square mile per year or 30 percent above the natural level (see Chapter III, section B for further discussion of cumulative effects). Table IV-11 shows the sediment levels expected at the end of the first decade. Timber harvest and site preparation activities contribute about half the predicted sediment yield increase.

Table IV-11
First Decade Sediment Yield
(tons per square mile per year)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Sediment Level	15.4	15.5	15.4	15.2	15.7	14.8	15.0	14.9	14.8	14.5	14.4	14.0

First decade allowable sale quantity (ASQ) and long-term sustained yield are shown in Table IV-12.

Table IV-12
First Decade ASQ and Long-Term Sustained Yield
(million board feet per year)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
First decade timber yield	59	51	49	36	44	33	33	35	28	18	16	8
Long-term sustained yield	59	59	52	46	46	42	40	44	40	30	60	0

Timber harvest is important to the economic base of the valley. Two local mills in the Darby area are primarily dependent on sawlogs supplied by the Bitterroot and adjacent National Forests. Missoula mills purchase a portion of their needs from the Forest. Alternatives A, B, C and E1, along with comparable alternatives on adjoining Forests, meet or exceed log requirements as reported by mill owners and are well above historic purchase levels. The remaining alternatives are below reported log requirements, though all but Alternatives H and J maintain historic purchase levels (see section D.9.b. of Chapter II and section B.9. of Chapter III for details).

Timber PNV is the net discounted stumpage value minus the discounted timber management and road costs. In alternatives with high timber outputs, timber harvest contributes 40 percent or more of the total PNV of the Forest. If timber harvest is constrained by nonmarket values, as in Alternative J, the total value of timber decreases and it contributes only about 30 percent of total PNV. Over the planning horizon (15 decades), timber management contributes to the PNV of the Forest because projected timber receipts recover timber- related costs, including road construction. Conversely, in the first several decades, timber receipts are not expected to recover timber-related costs in any alternative (see Chapter II, section C and Chapter III, section B.9 for discussion). During this period, some below-cost sales can be expected given the alternative objectives. These may be rational offerings based upon noneconomic benefits, examples of which include:

-improvements in age and size class distribution,
-replacement by healthy vigorous stands
-reducing the threat of insects, disease and wildfire
-maintaining supply levels for dependent communities
-providing access to high-value stands
-increased flexibility in the spatial distribution of timber harvest.

Alternative E1 has the highest potential for below-cost sales, primarily because the first decade volume is much above the most efficient level. Alternatives H and J have the lowest potential because much of the road system is currently in place. The other alternatives have a moderate to high potential for below-cost sales. All have first decade volumes considerably above the efficient level. Alternatives A, B and C have the fewest constraints on timber production; however, they have the highest proportionate share of roadless entry, low-value species and rugged terrain. Conversely, constraints on timber production to maintain other resource values are moderate in Alternatives E, E2, F and G, but are offset by lower proportional shares of roadless area entry, low-value species and rugged terrain.

Any alternative which changes the amount of timber to be harvested will significantly change the total present net value and the lifestyle of local communities.

Growth rates lag behind long-term sustained yield (Table IV-13), because most of the land suitable for timber production supports mature trees which are beyond the culmination of mean annual increment, and therefore have growth rates well below their potential. Growth is not significantly increased until a significant portion of the land suitable for timber has been cutover, regenerated, and is producing younger, more vigorous trees. The time required to improve growth is dependent on the proportion of existing young stands to older, slow growing stands, and the constraints that control harvest rates. Growth reaches 90 percent of long-term sustained yield in 7 to 11 decades depending on these two variables. Departures from nondeclining yield do not reduce the time necessary to reach 90 percent of long-term sustained yield.

Table IV-13
Long-term Sustained Yield (LTSY) and Growth Comparisons
(million cubic feet per year)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Long-term sustained yield, mmcf/year	17	17	15	13	12	11	12	12	11	8	18	0
Growth at year 2030, mmcf/year	9.5	8.4	8.6	8.0	8.1	7.1	7.6	8.0	6.4	5.7	8.4	0
Growth as percent of LTSY	57	49	57	62	68	63	63	67	58	71	47	0
Decade when growth = 90% LTSY	9	10	11	11	11	9	10	7	11	7	10	0

About 67 percent of the inventoried roadless area is scheduled for timber harvest and associated roading in Alternative A, about 19 percent in E2, 10 percent in H, and none in J. During the first decade, about 20 percent of the inventoried roadless acreage would be developed in Alternatives A, B, E and E1, 10 percent in Alternatives C, F and G and less than 4 percent in Alternatives E2 and H.

Timber harvest and associated road construction in riparian areas may affect habitat of the sensitive harlequin duck and boreal owl by altering natural habitats and increasing human disturbance by increased access. The disturbance would be greatest in Alternative A and least in J, which does not schedule timber harvest in riparian areas. Effects will be mitigated in Alternative E2 (Preferred Alternative) by retention of high levels of old growth in riparian area. Habitat requirements for other sensitive species will not likely be affected by timber harvest.

The two general categories of silvicultural systems associated with timber harvest are even-aged and uneven-aged systems. Both systems are proposed for use in most alternatives and each has distinct effects. The systems are discussed below.

1. Even-aged System of Harvesting Timber

Clearcut and shelterwood methods of even-aged timber harvest are used in each alternative. In clearcutting, all trees are removed from the area in a single cut. A variation of the clearcut system is the seed tree cutting method where only a few seed-bearing trees are left. In shelterwood cutting, trees are left in the area to provide seed and shelter until seedlings have become established. These systems have potential for adverse environmental effects because all large trees are removed from the area in a short time, openings are created, and soil is exposed to erosion (Bethlahmy, 1967; Megahan and Kidd, 1972).

The choice of even-aged system depends on many environmental criteria including forest cover type (USDA, 1983a and b), habitat type (Pfister, et al, 1977), insects, diseases, fuel conditions, slope, and management objectives as described by the following forest cover types.

Ponderosa Pine/Douglas-fir Forest Cover Type

The shelterwood system is prescribed where the retention of overstory is necessary to shade regeneration from heat damage, to protect sites from excessive moisture depletion during regeneration establishment, and to provide a seed source for natural regeneration. The system is generally applied to sites supporting ponderosa pine and/or Douglas-fir in the DF/Vaca, Phma, Syal, Caru, Caru-Aruv, Vagl, GF/Xete, and similar habitat types (Pfister, et al, 1977); and where ponderosa pine and/or Douglas-fir are the desired regeneration species. Application is limited where dwarf mistletoe and bark beetles are present; and where site preparation, logging, fuels, and slope problems prevent the protection of overstory trees.

Clearcutting is prescribed where full sunlight is desirable to optimize regeneration establishment and growth, and soil moisture is adequate. This system may also be optimum in the habitat types shown above where there are no suitable leave trees; where leave trees can't be protected from logging, slash disposal, and site preparation activities; and where there are serious insect and disease problems. Artificial regeneration is usually prescribed but natural regeneration may be appropriate where unit size, shape, and location are suitable; and where there are desirable seed trees surrounding the clearcut. Seed tree cutting is appropriate on moist sites where natural regeneration is possible, shade is not required and other management objectives can be met.

Lodgepole Pine Forest Cover Type

The clearcut silvicultural system is prescribed to optimize lodgepole pine regeneration establishment and growth. Lodgepole pine seed germination and seedling root development and growth are restricted by shade. Clearcutting is usually optimum on the DF/Vagl, GF/Xete, AF/Xete and similar habitat types (Pfister, et al, 1977) where lodgepole pine regeneration is desired. Most of these types can be regenerated naturally to lodgepole pine, however, planting may be necessary where the seed source is inadequate to assure natural regeneration in 5 years. Dwarf mistletoe, mountain pine beetle, and wind-throw problems prevent biologically sound application of other silvicultural systems. Seed trees may be left to provide seed for natural regeneration following broadcast burning but the trees will generally be killed by the burn.

Spruce-Fir and Mixed Conifer Forest Cover Types

The clearcut system is prescribed to optimize regeneration and growth of mixed species stands of Douglas-fir, western larch, ponderosa pine, and lodgepole pine, which are moderately tolerant and intolerant of shade. This system is also desirable for reducing insect, disease, and windthrow problems in old growth, mixed species stands of spruce, subalpine fir, Douglas-fir, western larch, ponderosa pine, and lodgepole pine, on the DF/Libo, S/Libo, GF/Clun, AF/Clun, AF/Libo, AF/Mefe, AF/Gatr and similar habitat types (Pfister, et al, 1977). The system is also appropriate where leave trees can't be protected due to slope, logging system, slash disposal, site preparation and a high water table. Seed tree cutting can be applied where natural regeneration is required or desirable but shade is not necessary.

The shelterwood system is prescribed to provide a seed source for natural regeneration of mixed conifer stands of spruce, subalpine fir, Douglas-fir, ponderosa pine, and western larch; and to provide shade tolerant spruce and fir regeneration the protection needed for establishment and growth. The system should be applied where there are an adequate number of desirable shelter trees, where insect and disease problems are manageable, and windthrow potential is acceptable.

The percentage of total timber harvest in the first decade to be cut by the two systems is shown in Table IV-14. These figures do not represent percentage targets by method; they are the levels projected by the Forest planning model as appropriate ways of meeting the objectives and constraints for each alternative. Final determination of the harvest method used for a particular project will be made by a certified silviculturist following site-specific analysis.

Table IV-14
Timber Harvested in the First Decade (Plan Period) by Clearcutting and Shelterwood
(percent of total)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Clearcut	83	77	82	59	57	70	47	73	73	80	66	47
Shelterwood	14	22	18	39	35	29	46	26	24	20	34	46
Total	97	99	100	98	92	99	93	99	97	100	100	93

Even-aged management has effects on the visual resource which vary by the visual quality objectives of each alternative. The greatest changes in scenery would occur in the high timber harvest alternatives, in which large areas are assigned to modification or maximum modification visual quality objectives (Table IV-15) (USDA, 1977). These objectives are generally associated with larger cutting units.

Table IV-15
Area in Modification and Maximum Modification Visual Quality Objectives
(thousand acres)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
570	478	434	343	343	272	325	285	304	122	586	0

The maximum modification objective allows as much as one acre in every two to be visually unrecovered on gentle slopes. Visual recovery takes about 30 years (Planning Record: Forest Plan Note 159).

As trees are removed, evapo-transpiration is reduced and more water is added to the ground-water system. Evapo-transpiration is reduced most when even-aged harvest systems are used because the entire mature forest canopy is removed (USDA, 1973). In extreme cases this can lead to mass failure on steep slopes or clay soils (Dyrness, 1967; Fredriksen, 1970; Megahan, 1972). Mass failure hazards are generally low on the Forest, and potential problems will be dealt with case-by-case.

Increased infiltration, and the tendency for snow to accumulate in openings, results in increased water yield which usually occurs at the time of peak flow (Satterlund, 1972). The water regime for an area harvested by an even-aged management system usually recovers to preharvest conditions about 20 years after harvest (Garn and Malmgren, 1973). The increased flow is of little benefit to irrigators in the Bitterroot Valley because capacity does not exist to store the increased flow. Increased peak flow can affect the stability of streambanks and result in some erosion.

Even-aged management of riparian zones affects stream environments if trees are removed from the streambanks (Weaver, 1983). Increases in sediment above normal cause reduction in total fish populations (USDA, 1984). Bank stability is reduced and debris which could provide fish habitat is removed (Bryant, 1983; Frear, 1982). Most of the pools in Forest streams have been formed by woody debris (Planning Records: Bitterroot Stream Inventories). The debris now in streams will eventually rot so the maintenance of satisfactory pool/riffle ratios depends on large trees falling into streams regularly. In the short term, fish populations are not affected, but in 40 years there would be a reduction in fish if large woody debris were not added. Stream temperatures may be raised by the removal of streambank vegetation.

The effect on total fish population of the Forest depends partly on how much of the riparian timberland area will be in the suitable timber base, and how much of the suitable land will be managed with uneven-aged and even-aged systems (Franklin and others, 1981). The riparian area identified as suitable for timber production, and the percent of that area that is planned for timber management using uneven-aged systems, is shown in Table IV-16. The amount of riparian area in the suitable timber base decreases as management objectives change from timber production in Alternative A, where nearly all the riparian area is suitable and planned for even-aged management, to amenity values in Alternative J, where the riparian area is removed from the timber base. Alternatives which attempt to respond to all management objectives, such as Alternative E2, assign some riparian areas to meet roadless, wilderness, and recreation objectives; some riparian areas to meet water, wildlife, and fish objectives while providing a low level of timber through uneven-aged management; and other riparian areas to meet timber and big game habitat objectives through even-aged silvicultural systems.

Table IV-16
Riparian Area Suitable for Timber Production
(thousand acres)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Thousand Acres	64	61	56	49	49	41	49	51	42	0	65	0
Percent Uneven-aged Management	0	17	18	33	33	32	28	38	19	NA	0	NA

Even-aged harvest systems provide the best opportunity for reducing fire hazard. In clearcuts, there are no living trees to be protected from slash disposal activities. Slash and other fuel reduction in shelterwood harvests is more difficult and costly, because the standing trees must be protected.

More forage is produced by clearcutting than all other systems (Planning Record: Forest Plan Note 101). Less forage is produced in the shelterwood system, and the forage response is shorter, because trees occupy more of the site for a longer time. Forage produced under a partial canopy seems to be less palatable than that produced in full light. Transitory range for cattle is created when harvest occurs on allotments. Cattle and big game use the forage produced, and competition for forage could be a problem on some big-game winter range areas.

Even-aged harvest causes reduction in big-game cover, but increases diversity for other wildlife when openings are created in dense canopies (USDA, 1979). Wildlife species which prefer openings or sparse canopies will find more suitable habitat, and those species preferring dense canopy or old-growth trees will find less. Edges are created for those species which rest or hide in dense canopies and feed in the openings.

In all alternatives, at least 5 percent of the suitable timberland must be in old-growth forest at all times (Planning Record: Forest Plan Note 73). The goal was exceeded in all alternatives because other constraints were even more limiting (Table IV-17). Most of the forested wilderness has the potential to produce old-growth stands unless catastrophic fire, insects or diseases kill the trees.

Table IV-17
Old Growth on Suitable Timberland in the Year 2080
(percent of total)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
9	11	18	18	20	21	24	26	19	33	11	100

Even-aged harvest systems provide the best opportunity for control of insects and disease because most diseases and susceptible trees are removed and a young, vigorous stand is initiated. Clearcutting may be the only system which provides this control if all trees are unhealthy. Where shade is necessary for seedling survival, a shelterwood cut may be appropriate provided the diseased overstory is removed before the young trees become infected.

Timber productivity is enhanced by proper application of any silvicultural system. Old, slow growing trees are replaced by young, faster growing trees and the growth rate can be sustained by precommercial and commercial thinning.

Clearcutting is the least costly method of harvesting trees. Shelterwood cutting is more costly because a second harvest of the remaining overstory is required. Costs vary by species harvested, land slope, yarding distance, and other factors, but the removal of all trees from a site is cheaper per unit volume than removal of only a portion of the overstory. The lower costs are partially due to even-aged cutting units being easier to lay out and mark than other harvest units, so slightly less time is required per unit of timber sold.

Even-aged management can adversely affect the recreation experience by disrupting trail systems or creating undesirable openings. The experience may be enhanced somewhat by careful placement of openings to create vistas.

a. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Even-aged harvest systems provide the best chance to improve long-term productivity. To a large extent, insects and diseases are controlled, young and vigorously growing trees replace slow-growing old trees, fire hazards are reduced, and the proper mix of tree species can be introduced. However, with these systems, it is more difficult to maintain visual quality. Some soil is lost and peak flows of water are increased. Habitat for wildlife species which prefer closed canopies is reduced, but habitat for those species which prefer openings is increased.

b. **Irreversible and Irretrievable Commitment of Resources**

Most areas harvested are committed to timber harvest in the future, because the road system necessary for harvest has been constructed and considerable money has been expended in revegetation. The wildlife habitat changed by the harvest, and the dispersed recreation opportunities lost or drastically changed, are irretrievable. Roadless areas are irreversibly lost for future consideration as wilderness once harvest and associated roading occur.

c. **Adverse Effects Which Cannot be Avoided**

Visual quality may be lowered by even-aged management. Some soil erosion will occur and water quality will be lowered. Wildlife habitat will decrease for species which prefer dense canopies. Fish habitat will be changed by harvest in riparian zones and by increased sedimentation. Semiprimitive recreation opportunities will be lost.

d. **Conflicts with Other Land Management Plans**

None were identified.

e. Energy Requirements

Since most of the timber on the Forest will be harvested by even-aged harvest systems, most of the energy required will be directly associated with these systems. The total energy requirements for harvest operations is shown in Table IV-18.

Table IV-18
Energy Consumption Related to Timber Harvest
(million BTU's)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Fell and buck	618	541	514	384	459	343	352	372	295	186	185	104
Mixed yard	12085	11384	10421	9895	12873	5867	8407	5429	4116	3941	2627	0
Tractor yard	1476	3152	3603	2227	2377	3228	1051	2677	1351	1501	2727	2077
Cable yard	2125	2049	1820	1131	1407	1193	1422	1101	1667	504	107	0
Aerial yard	27255	7418	5002	5348	5692	345	8798	9832	4485	2070	0	0
Loading	10300	9028	8569	6401	7652	5734	5880	6213	4921	3128	3086	1730
Hauling	43946	38520	36563	27311	32648	24464	25087	26510	20995	13344	13166	7384
Stand exam	578	465	442	379	551	315	461	334	274	176	112	79

2. Uneven-aged System of Harvesting Timber

The uneven-aged silvicultural system (USDA, 1983a and b), including single tree and group selection, is available for application to suitable timberlands that are silviculturally and biologically suited to this system. These selection systems are prescribed to create or maintain uneven-aged stands of trees by periodically removing from a stand some excess mature or over-mature, or small groups of trees. The remaining younger trees are left undisturbed and are available for future harvests.

The selection system is applied to some extent in all alternatives except Alternative A, where timber management is emphasized, and Alternative J, where amenity values are emphasized. The application of uneven-aged systems is dependent on forest cover type (USDA, 1983a and b), habitat type (Pfister, et al.,

1977), existing stand age and size class distribution, insects, diseases, fuel conditions, slope, and management objectives, as described by the following forest cover types.

Ponderosa Pine/Douglas-fir Forest Cover Type

The single tree and group selection systems are prescribed to provide the continuous cover needed to maintain soil moisture and temperature necessary for regeneration establishment and growth on dry, hot sites. The systems are suited to stands of ponderosa pine on PP/Agsp, PP/Feid, PP/Putr, PP/Syal, DF/Agsp, DF/Feid, and similar bunch grass habitat types (Pfister, et al, 1977), where mountain pine beetles are not a problem. However, since there is no reasonable assurance of regeneration in 5 years on the dry south slopes where these types occur, they are classified as unsuitable for timber production.

The uneven-aged systems are usually not biologically sound in Douglas-fir and ponderosa pine stands in habitat types DF/Vaca, Phma, Syal, Caru, Caru-Aruv, and Vagl, and GF/Xete (Pfister, et al, 1977). Western spruce budworm and dwarf mistletoe infestations would severely reduce growth of, or kill, Douglas-fir regeneration. Ponderosa pine regeneration is intolerant of shade in these habitat types.

Lodgepole Pine Forest Cover Type

Uneven-aged systems are generally not biologically sound in the DF/Vagl, GF/Xete, AF/Xete and other habitat types (Pfister, et al, 1977) supporting stands of lodgepole pine, due to dwarf mistletoe problems and because lodgepole pine is not shade tolerant. Spruce budworms often kill seedlings of shade tolerant species. Group selections, near the maximum limit of 2 acres per group, may be biologically sound on a few sites where windthrow, dwarf mistletoe, spruce budworm, or mountain pine beetle problems are minimal, and other resource objectives require nearly continuous forest cover.

Spruce-Fir and Mixed Conifer Forest Cover Types

The selection system can be prescribed to provide the protection and seed source needed to regenerate, establish, and grow shade tolerant species such as subalpine fir and spruce. The system may be applicable to tolerant species stands on the DF/Libo, S/Libo, GF/Clun, AF/Clun, AF/Libo, AF/Mefe, AF/Gatr, and similar habitat types (Pfister, et al, 1977), where management goals desire continuous forest conditions and it is silviculturally sound. Riparian stands in the AF/Clun, AF/Gatr, and similar habitat types are often suited to uneven-aged management, and selection prescriptions are available for riparian management.

Spruce-fir stands in some upper subalpine habitat types such as AF/Luhi are naturally uneven-aged and suited to this type of management; however, they are not in the suitable timber base because current information is inadequate to project responses to timber management.

The uneven-aged systems have no effect on the visual resource, at least when viewed from a distance. Since only small openings are created, the harvest unit is not considered unrecovered. Water quality and quantity are not measurably affected because the canopy is not altered significantly, soils are not unduly disturbed, and the remaining trees are able to transpire the extra water. Little soil is bared, and accelerated erosion is slight (Rice and others, 1972).

Since trees remain following harvest by selection, the system can be used to enhance fish habitat. However, those trees left to fall into the stream to form pools and riffles will reduce the total timber volume. Uneven-aged management is prescribed in Alternatives E, E1 and E2 along all fisheries streams; in Alternatives B, C, F and H along major streams (e.g., Skalkaho and the East and West Forks of the Bitterroot River); and in Alternative G along most fisheries. Alternative A has no uneven-aged management, and in Alternative J all riparian area is identified as unsuitable for timber production. Where uneven-aged management is prescribed, large trees will be left to protect the streambanks, provide shade, and eventually fall into the stream. The amount of selection harvest in riparian zones is shown in Table IV-19.

Table IV-19
Timber Harvested in Decade 1 by Selection Cutting
(acres/year)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
0	0	0	120	890	100	580	0	0	NA	0	0

Fire and slash disposal are difficult to manage in selection harvest systems. There is little opportunity to reduce fuel loads, and any slash generated by the harvest adds to the problem. There are few openings large enough to allow piling of slash so that burning will not harm the residual stand. Handpiling and winter burning can be done in certain areas, and slash can be reduced by requiring that whole trees be yarded and the slash be disposed of at the landings.

Little forage is produced by selection harvest (Planning Record: Forest Plan Note 101) except in some group selection units. Group selection involves harvest of groups of mature trees. Openings of two acres or less are created that provide good habitat for those species of wildlife that prefer to feed in openings, but need trees for nesting and breeding. The forage produced in these small openings is not great and tends to disappear as the canopy of the remaining trees expands. Selection harvest has little effect on the cover requirements for big game.

The old-growth characteristics of a stand can be retained at the expense of timber volume. If trees are left to die in order to create habitat for cavity nesters or debris dams for fish habitat, this timber volume is lost. In most cases, the older trees, at least those in excess of need for snags, will be removed by application of the selection system.

It is more difficult to control insects and diseases with selection harvest than with even-aged harvest systems. Providing the infestation is not large, some control can be attained by group selection of the infected trees.

The selection system is more costly to apply than even-aged management systems because each tree must be marked (Planning Record: Management Practices). Logging costs are high because little volume per acre is removed, and care must be taken to protect the residual stand. Slash disposal is more difficult and costly.

Recreation quality is little disturbed by selection harvest systems. During the harvesting operation and for a short time thereafter, the noise and debris may disturb some recreationists, but the evidence of the disturbance declines rapidly following completion of slash disposal.

a. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Timber harvest by the selection system has little effect on the natural long-term productivity of the area. There is little opportunity to enhance production by introducing other tree species or by cultural practices such as thinning. Compared to even-aged management systems, the habitats of fish and many wildlife species are at least maintained, and the opportunity to enhance that habitat exists. Visual quality is maintained.

b. Irreversible and Irretrievable Commitment of Resources

The application of selection harvest essentially commits an area to timber harvest, and it is likely the areas will continue to be harvested by this system in the foreseeable future.

c. Adverse Effects Which Cannot be Avoided

There are few adverse effects associated with selection harvest. If applied intensively, there will be few snags for cavity nesters and stream debris enhancement. Recreation can be disrupted for a short time while the timber is being harvested.

d. Conflicts with Other Land Management Plans

None were identified.

e. Energy Requirements

Since a small percentage of the total harvest is done using the selection harvest system, only a small portion of the energy required for timber removal is used by this action. The total energy required for timber harvest is shown in Table IV-18.

X. Logging Methods

The choice of a logging method depends largely on land slope and sensitivity of the soils. On slopes under 40 percent, which is 32 percent of the tentatively suitable timberland, tractor yarding is generally appropriate. On 40 to 60 percent slopes and slopes over 60 percent where soils are less sensitive, 47 percent of the suitable timberland, cable or skyline systems are most often used and helicopters are specified on areas where roads cannot be constructed. Helicopter or other aerial methods are prescribed for slopes over 60 percent with sensitive soils, 4 percent of the tentatively suitable timberland. The combination of logging systems prescribed for various sites is described in the Planning Record: Management Prescriptions.

1. Tractor Logging

The largest impact on the visual resource involves the cutting of trees, but most of the soil disturbance associated with logging is due to skidding the logs to landings. Logging with tractors causes soil disturbance and may impact up to 28 percent of the area (Megahan, 1980). If the soils are light colored, the redistribution of surface layers can be seen from long distances.

Tractor yarding has the potential to cause soil compaction, excessive soil disturbance, and exposure of soil to wind and water erosion (Megahan, 1980; Rice and others, 1972). Soil compaction is a problem on wet soils, especially those with clay or high silt content. Compaction reduces infiltration capacity, air permeability, and productivity (Froelich, 1979a; 1979b; Froelich and others, 1980). Soil compaction can cause overland flow, accelerated erosion, and stream sedimentation which reduces water quality. Forest soils most susceptible to compaction are those with high clay and silt content (Cullen and Montagne, 1981; Davis, 1978). Compaction can be minimized by limiting tractor use to the dry season, requiring a cushion of snow, or operating on frozen soils. Skid trails can be located away from problem areas but, even with restrictions, some soil disturbance inevitably occurs when tractors are maneuvered in a logging unit. Most topsoils are thin. Displacement or mixing of the topsoil can degrade the fertility of disturbed soils. On especially sensitive soils, the number of skid trails can be limited or another logging system can be required. Except on very gentle slopes, tractor logging requires more roads than other logging methods. The effects of roads are discussed in section CC.

Removal of the organic layers or low growing vegetation bares the soil to raindrop splash erosion and overland flow during intense rainstorms (Bethlahmy, 1967; Megahan, 1980). The removal of this protection, plus compaction, causes a decrease in infiltration rate, and the resulting overland flow can cause rills or gullies. In these situations proper and timely erosion control measures are necessary.

If tractors are allowed to operate in streams they can degrade the stream channel and increase sedimentation (Bjornn, 1974). Effects on streams and fish populations result from soil disturbance and erosion (Platts, 1980). An increased sediment load in streams causes the intergravel areas to become plugged, reduces insect populations, and causes fish eggs to smother from lack of circulating water (Phillips, 1971; Ritchie, 1972). To reduce these impacts, tractors are not allowed to operate in or parallel to streams, and crossings will be carefully planned to utilize temporary culverts or log or snow bridges.

Tractor logging has little effect on big-game cover. The major effect is the removal of the trees regardless of the logging method (Lyon, 1979a). Forage growth is stimulated by the scarification caused by tractors.

On soils where compaction is not a serious problem, tractor logging may be of some benefit. Exposure of mineral soil is necessary for seedling establishment (Smith, 1962) and tractor logging does expose mineral soil on about 28 percent of the area. However, if topsoil is excessively disturbed the productivity of the site is decreased (Froelich, 1979b).

Typically, tractor logging is the least expensive method available for getting logs to the landing. This can result in a greater return to the U. S. Treasury and the counties (Planning Record: Management Practices).

Recreation disruption and noise of logging operations cause local, short-term degradation of recreation experiences. In alternatives with low timber harvest levels, the disturbance will be minimal because only a few timber sales will be active at any one time and these are likely to be scattered throughout the suitable timberland. In alternatives with high timber harvest levels there will be several concurrent sales and the recreation value of all those areas will be disturbed.

a. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

In most cases, tractor logging has little effect on long-term productivity. However, if tractor logging occurs on wet soils or on isolated pockets of clay soils, soil compaction will occur and productivity will be affected. Long-term productivity may be affected by soil loss. Short-term water quality and fish habitat degradation may occur if soil enters the stream.

b. Irreversible and Irretrievable Commitment of Resources

Initial tractor logging does not irreversibly commit the area to that system in the future, but if the road system is designed for tractor logging, there is a strong possibility that tractors will be used. The soil lost or unduly disturbed by the tractors is an irretrievable loss.

c. Adverse Effects Which Cannot be Avoided

Tractor logging can leave skid trails which are unsightly to Forest visitors. Trails will eventually revegetate. During the logging operation, considerable noise and dust is generated by tractors, and soils are disturbed.

d. Conflicts with Other Land Management Plans

None were identified.

e. Energy Requirements

The energy requirements for yarding are shown in Table IV-18. Most of the energy use projected for mixed yarding will be used for tractor yarding.

2. Cable Logging

For the purposes of this plan, cable logging is defined as yarding 800 feet or less with any ground lead or skyline cable system. Cable logging, because of soil sensitivity, is used about 10 percent of the time on slopes less than 40 percent. About 30 percent of the logging done on slopes between 40 and 60 percent with sensitive soils and 70 percent of the logging on less sensitive soils on the same slopes is by a cable system. Most of the cable systems now used are capable of lifting one end of the log off the ground. The system has effects similar to tractor logging, but the effects are not as severe because the weight and tread of the tractor is absent. However, cable corridors can be obvious and about 23 percent of the soil surface is disturbed (Megahan, 1980).

Cable logging usually does not cause soil compaction (Froelich and others, 1980). However, because the logs are dragged uphill and the slopes are generally steep, soil erosion and overland flow similar to tractor logging can occur, so erosion control may be required in the cable corridors.

Cable logging generally requires less roads than tractor logging. The effects of roads are discussed in section CC.

a. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The use of cable systems to yard logs has no effect on the long-term productivity of a site.

b. Irreversible and Irretrievable Commitment of Resources

The fact that an area is logged by cable does not commit the area to be logged in the future. However, because the road system exists and considerable money will be invested in generating a new stand of trees, it is likely that the area will be logged by a cable system in the future. The soil lost is irretrievable.

c. Adverse Effects Which Cannot be Avoided

Considerable noise and dust are created by cable logging. Soils will be disturbed and some will erode into streams, causing a loss of water quality and fish habitat. The visual quality will be lowered until vegetation grows and hides the view of skid trails.

d. Conflicts with Other Land Management Plans

None were identified.

e. Energy Requirements

Energy requirements for cable logging are shown in Table IV-18. Some of the energy used in mixed yarding is also a result of cable yarding.

3. Skyline Logging

For the purposes of this plan, skyline logging is defined as a cable system for yarding distances greater than 800 feet. The system is used on about 30 percent of the sensitive slopes between 40 and 60 percent and less sensitive over 60 percent. It is used on about 20 percent of the sensitive soil logged area on slopes exceeding 60 percent and on about 10 percent on less sensitive 40 to 60 percent slopes. Its use on slopes of less than 60 percent is generally restricted to soils that are very sensitive to disturbance. Skyline logging has minimal effect on the visual resource because the upper end of the log is usually suspended above the soil. Therefore, the major disturbance to the soil is at the upper and lower ends of the skyline cable system. Edges of skyline units can be blended into the uncut forest with greater ease than with either tractor or cable systems. Fewer roads are necessary because external yarding distances are greater than for tractor or cable systems. Since roads have the longest and most permanent effect on the visual resource, especially on steep slopes, the logging system which requires the least road is the most desirable from a visual quality standpoint.

Skyline systems have a low potential for damaging soils, except in cable corridors where logs are dragged. The system has low potential for environmental degradation because soil disturbance is confined to the cable corridors and few roads are necessary. Erosion control measures are relatively easy to apply in the corridors.

The topography associated with skyline systems creates problems for the disposal of slash. Steep slopes limit the use of machinery, and handpiling is expensive. Firelines are difficult to build, and broadcast burning is difficult to control on steep slopes without a good fireline. Since soil disturbance is minimal in skyline yarded sites, fire is often necessary to bare the soil for planting. The slash must be burned so as to expose mineral soil while maintaining control of the fire (USDA, 1978).

Skyline logging has little effect on forage or cover. Soil disturbance occurs on less than 23 percent of the area (Megahan, 1980) so forage species are not particularly stimulated. The silvicultural system and post-logging fire have much more effect on forage and cover than skyline logging does.

A well-stocked understory of trees can often be saved by applying a skyline system. In other cases, since little soil is disturbed, regeneration of tree seedlings is a problem unless fire can be used to bare soil. Productivity of the site will be reduced by the amount of time it takes for regeneration to be established (Smith, 1962).

Skyline logging is more expensive than tractor or cable logging (Planning Record: Management Practices). Returns to the Treasury and the counties are reduced as the costs of yarding increase.

Any logging operation causes disruption of recreation traffic on the roads within the active sale area. Interruptions of traffic may be longer for skyline operations than cable or tractor logging because equipment is difficult to move and may block the roads for several hours at a time.

a. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Skyline logging causes little change in the long-term productivity of a site. Although there is some soil disturbance with skyline logging, little is eroded and water quality is seldom affected (Rice and others, 1972). If regeneration is delayed because of difficulties in site preparation, the productivity of the site is reduced.

b. Irreversible and Irretrievable Commitment of Resources

Roads are designed for use of long-line equipment and if harvest occurs in the future, some sort of skyline logging, or an equivalent system, will likely be used. There are no irretrievable commitments of resources.

c. Adverse Effects Which Cannot be Avoided

Despite the fact that skyline systems have fewer environmental consequences than other yarding systems, some soil will be lost or displaced, some water quality will be degraded, and some low growing vegetation will be destroyed. Since most skyline operations are on steep slopes, slash control will be more difficult because of the problems with fireline construction and piling slash, and any visual quality degradation will be readily visible. Recreation opportunities will be degraded while the harvest is occurring because of noise, dust and equipment in the roads. Since the system is costly, returns to the Treasury will be reduced.

d. Conflicts with Other Land Management Plans

None were identified.

e. Energy Requirements

Energy required for skyline logging is shown in Table IV-18. Some of the energy in both mixed and Cable logging is due to the use of skyline systems.

4. Aerial Logging

The only aerial system currently available is helicopters. As with skyline logging, helicopter logging units can easily be blended into the uncut forest. Few roads are needed because external yarding distances are much greater than for conventional systems. Helicopter logging leaves the soil surface virtually undisturbed except at landings. The quarter- to half-acre landing areas are severely disturbed and often require extensive rehabilitation (Megahan, 1980). Helicopter logging disturbs less than two percent of the soil surface in the area logged (Megahan, 1980).

Because of sensitive soil conditions, helicopter logging is applied 30 percent of the time on slopes of 40 to 60 percent, and 80 percent of the time on slopes which exceed 60 percent. Because timber is lifted off the ground, there is virtually no soil disturbance and, therefore, erosion and water quality degradation are not problems even on sensitive soils and steep slopes.

Slash disposal is difficult on areas logged by helicopter. No heavy equipment is available to pile the slash or to construct firelines. Handpiling is quite expensive. The difficulty of slash control and the lack of mineral soil exposure can increase the probability of unwanted fire and have a significant effect on regeneration (Smith, 1962) .

There is considerable noise generated by helicopters. This can have an undesirable effect on recreationists in the area, and may affect the distribution of and stress on wildlife.

The greatest effect of helicopter logging is the volume of traffic produced on the road away from the landing. Logs are moved very rapidly from the woods to the landing and trucks are usually loaded immediately. Twenty or more truck loads may be hauled from one landing in a day. The total volume of traffic would be the same as with other systems but the traffic would be concentrated in a shorter time.

a. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Helicopter logging has little effect on long-term productivity caused by soil erosion, but problems with slash control and regeneration may lengthen the following rotation and therefore reduce the productivity of the site. Since helicopter logging usually occurs on steep slopes, openings can be seen from long distances.

b. Irreversible and Irretrievable Commitment of Resources

Since roads are not built into the area, there is no irreversible commitment of the site to future timber harvest. However, since considerable time and effort is likely to be spent producing another generation of trees, the site has a high probability of being logged in the future. Because most helicopter logging operations take place where roads would cause undesirable effects, helicopters are the sole means of harvest. If helicopters were not used, the timber grown on these sites would be irretrievably lost.

c. Adverse Effects Which Cannot be Avoided

Because of the steep slopes, the logging operation is hard to screen and openings are usually visible for long distances. A high level of noise is generated in a helicopter logging operation. Slash control is difficult or expensive. Regeneration may be delayed because of lack of mineral soil exposure.

d. Conflicts with Other Land Management Plans

None were identified.

e. Energy Requirements

Energy requirements are displayed in Table IV-18. Most of the energy use in aerial is due to helicopter logging.

Y. Slash Control

Limbs, tops, and cull logs usually must be removed from a timber harvest unit before regeneration can take place. The most common method of disposal is to burn the slash on-site, but in some cases large amounts are hauled away to be used as firewood. The objective of slash control and fuels management is to maintain fuel loading within acceptable limits for prevention and control of wildfire. Burning also helps prepare sites for regeneration and eliminates barriers to animal movement (Lyon, 1979b; Smith, 1962).

Slash may be tractor piled and burned on gentle slopes; handpiled and burned or broadcast burned regardless of slope (Planning Record: Forest Plan Note 114). In some situations where slash is not evenly distributed and a mature overstory has been left, underburning of concentrations of slash is the only effective method of disposal. Slash disposal activity varies directly with timber harvest level. Alternatives which generate the highest timber harvest also generate the highest level of slash control.

Slash disposal can cause short-term degradation of foreground viewing. In broadcast burning units, all residual vegetation is usually burned and the unit looks scorched and black. Visual degradation usually lasts only until the next growing season because forbs, grasses, and shrubs grow rapidly after fire (Stickney, 1980). Burned dozer piles leave scars that are readily visible on-site and, in some cases, from several miles away. Burned handpiles are virtually invisible to the casual observer after a short time. Hot underburns can cause scorch marks on trunks of remaining overstory and can kill lower branches. These visual effects will last until red needles fall and the scorched bark is replaced (USDA, 1982).

Air quality will be degraded by slash disposal (Komarek, 1970). Slash disposal activity will be concentrated in times when fuels are dry enough to burn, but weather is generally cool and humid so control is easiest. Suitable conditions occur for only a short time in the spring and fall. Fire weather conditions will be carefully monitored and burning allowed only when smoke will be rapidly dispersed. The higher the timber harvest level, the greater the air quality problem because more slash will have to be burned in the short time available.

Slash is either piled for burning or a fireline is built around the unit for broadcast burning. On gentle slopes, tractors are used to pile slash in windrows. This activity has a high potential for degrading the soil (Klock, 1975). If care is not taken, topsoil, litter, and duff can be pushed into the piles. Excessive mineral soil is then exposed to erosion between the windrows and the windrows will not burn as well because the soil smothers the fires. If windrows and the soil beneath them are too dry when burned, the topsoil may be baked, become sterile and impervious to wetting (Dyrness, 1976). The soil structure may be severely altered (USDA, 1978; Bennett, 1982). Little or no vegetation will grow to protect the soil from erosion during the several years necessary for recovery. Burning handpiles will have no noticeable effect on the soil. Small areas under the piles may be scorched, but handpiles are usually small and burn cool enough to cause little damage. Bennett (1982) described methods of controlling burn intensities to reduce risk of soil degradation and erosion. Soil losses caused by burning can be no greater than natural rates if fires are properly managed (Glassy and Svalberg, 1982; USDA, 1978).

Firelines around broadcast burn units may be a source of sediment if proper erosion control measures are not taken. Mineral soil must be exposed so that fire will not creep over the line, so raindrop splash erosion and overland flow are likely. Ditches to divert water from the fireline into adjacent undisturbed areas are required.

Water yield is affected more by removal of trees than by slash disposal (Garn, 1974). The only measurable effect on water yield would occur where large areas of mineral soil were exposed and overland flow was increased by a decrease in infiltration rate. Water quality would be affected in the same way (DeByle and Packer, 1972). Overland flow could increase sediment delivery to the streams if a sufficient strip of undisturbed vegetation is not present between the burned unit and the stream (Snyder and others, 1975).

Slash disposal affects fisheries and streams if water quality or quantity is affected. The removal of large woody material from streambanks may affect the formation of pools by destroying potential additions to instream debris (Frear, 1982). Overland flow from burned units may carry high levels of nutrients which will temporarily enrich the water and add to available fish food. The duration and magnitude of the nutrient flush is so short and small that detection of the result is unlikely (Snyder and others, 1975).

Slash disposal only has an effect on big-game cover when hiding cover that remains after logging must be burned when the slash is disposed. Forage may be temporarily reduced by slash disposal activities, but the reduced competition from trees and nutrients rapidly released by fire result in a flush of shrub, grass, and forb growth in the subsequent growing season (Planning Record: Forest Plan Note 101).

A totally clean forest floor lacks cover for a wide variety of small animals, many of which depend on insects for food (USDA, 1979). The removal of all dead, down, and decaying logs removes a whole segment of the forest ecosystem. Some harmful insects and animals are eliminated, but beneficial ones also die or move. The objective of slash disposal should include provisions for leaving sufficient woody material to support the full complement of organisms present in the forest ecosystem.

Bark beetles and fungi can build up in slash and spread to living trees. Elimination of slash destroys the habitat for these insects and diseases and controls their spread (Furniss and Carolin, 1977). Dozer piling in a partial cut can result in mechanical damage to residual trees, and make them subject to insect or disease attack.

Costs of slash disposal vary by piling method, size of unit, and slope (Planning Record: Management Practices). Handpiling is more expensive than machine piling, small units cost more per acre than larger units, and units on steep slopes are more expensive to treat than those on gentle slopes. Unit cost is independent of alternative, but the higher the timber output, the higher the total slash disposal costs. Slash disposal is a necessary cost in the production of timber and has an effect on PNV. The amount of slash disposal depends on the acres of timber harvested each year. Some slash control will be required on practically every acre. The average annual area requiring fuel treatment is shown in Table IV-20.

Table IV-20
Average Annual Fuel Treatment
(acres)

	Alternative/Benchmark											
Decade	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
Plan Period												
1	5146	4141	3926	3360	4898	3146	4111	2956	2426	1582	1006	716
Projected												
3	4971	4752	4710	4408	4898	3816	3993	3602	2511	2021	7028	0
5	6937	7766	6881	6883	6983	5345	7020	6778	5260	3239	8243	0
10	5592	6827	5653	5508	6863	4827	5722	4315	4192	3026	8077	0
15	6570	9117	8296	7545	5718	5691	7810	7551	5830	3574	8460	0

Slash disposal activities affect recreation by creating smoke which may degrade air quality enough to cause local short-term problems (Komarek, 1970). Units harvested and unburned may be nearly impassable to people if slash loads are high. The problem would be greater in high timber output alternatives, and when poor weather for burning causes a time lag between harvest and slash disposal.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Slash control, if properly done, has little effect on long-term productivity. Productivity is adversely affected if slash is not treated or is poorly treated. Dozer piling may cause a decline in long-term productivity if too much soil is displaced or erosion occurs. Burning when fuel or weather conditions are too dry may result in a hot burn that reduces long-term productivity. Most other effects of slash control are short-term and have little effect on productivity.

2. Irreversible and Irretrievable Commitment of Resources

Slash control does not irreversibly commit the area to any specific use in the future. The purpose of slash control is to provide suitable sites for another generation of trees to be established. The commitment to timber management for the site has been made and is not easily reversible. The material burned is irretrievably lost.

3. Adverse Effects Which Cannot be Avoided

The most obvious adverse effect is the generation of smoke. Though this effect is short-lived, the more timber harvested, the more smoke. Vegetation will be scorched or blackened and mineral soil will be exposed to erosion forces.

4. Conflicts with Other Land Management Plans

If a lot of slash is treated at any one time, the Forest has a chance of exceeding the standards set by the Clean Air Act due to the generation of smoke.

5. Energy Requirements

Some energy is required for slash control. If machinery is used, the energy required for a particular site can be significant.

Z. Site Preparation

The objective of site preparation is to create micro-sites where tree seedlings have a good chance for survival (Smith, 1962). Site preparation requires the removal of competing vegetation and exposure of mineral soil. The seeds and seedlings of most tree species planted in organic matter and duff dry out and fail to survive.

Site preparation is usually associated with logging and slash disposal activities. Dozers used to skid logs and pile slash displace litter and other organic matter, exposing enough mineral soil to provide planting sites. Cable logging displaces some topsoil, and broadcast burning and burning handpiles result in some spots where mineral topsoil is exposed. In units where insufficient mineral soil is exposed or competing vegetation has had time to regenerate, the soil surface must be scarified or the competing vegetation removed before planting. Scarification can be done by dozers or other machines on gentle slopes, and by hand on steeper slopes.

Site preparation has the same effect on visual quality, soils, water quality and quantity, and fish as the soil-disturbing portion of slash disposal (Section Y).

Handscalping of individual tree planting sites is the least costly method of site preparation, and handpiling and burning is the most expensive (Planning Record: Management Practices). Handscalping is also least effective because less competing vegetation is removed and seedling failure is high. Machine scarification, piling, and burning is the most effective method because enough mineral soil is exposed and most competing vegetation is removed. It is possible to "overscarify" and cause damage to soil and water resources (DeByle and Packer, 1972).

Environmental effects of site preparation vary by factors other than alternatives, but the higher the timber output, the greater the potential for environmental degradation because there will be more site preparation activity.

1. **Short-term Use vs. Maintenance and Enhancement of Long-term Productivity**

Timber productivity depends in part on how quickly trees are established after harvest. Adequate site preparation is necessary to ensure seedling survival and give them a good start to compete with other vegetation. Care must be taken in site preparation so that the relatively thin topsoils are not removed. These soils are necessary for the maintenance of productivity.

2. **Irreversible and Irretrievable Commitment of Resources**

Site preparation does not irreversibly commit a site to timber management, but the investment of time and money is so great that it is very likely trees will be managed into the future. Soil lost or displaced by site preparation activities is irretrievable.

3. **Adverse Effects Which Cannot be Avoided**

The unsightly appearance of sites that have been prepared for regeneration is unavoidable and will remain until vegetation grows and screens the effect from view. Some soil is inevitably eroded or displaced. If burning is used, smoke is generated. The noise and scars of site preparation can affect recreation use for a short time.

4. **Conflicts with Other Land Management Plans**

If burning is used in site preparation, there is a possibility of conflict with the Clean Air Act.

5. **Energy Requirements**

Energy requirements for site preparation are very similar to those for slash control.

AA. Tree Planting

Tree planting occurs after harvest, slash disposal, and site preparation. The proportion of harvest areas to be planted varies by harvest method, land type, and prescription (Planning Record: Management Prescriptions). Clearcuts are nearly always planted but shelterwood and selection harvest units may regenerate naturally. The total area to be planted varies by timber output levels among alternatives.

Tree planting is also scheduled to occur in harvest units where planting failures have occurred, in old burned-over areas, and in selection or shelterwood areas where the remaining trees are heavily infected with dwarf mistletoe. In the high timber output alternatives, most of the nonstocked areas are scheduled for planting. In the low timber output alternatives, fewer nonstocked acres are scheduled to be planted because of the high cost of site preparation, and because planting these sites is a poor investment. Average annual tree planting during the first decade is shown in Table IV-21. The actual area scheduled for planting could vary significantly from the figures shown since this final determination will be made following site-specific analysis.

Table IV-21
Average Annual Tree Planting During the First Decade (Plan Period)
(acres)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
4829	4487	4150	3469	4033	2882	3566	3250	2623	1785	1364	0

After the first decade, the amount of planting to be done in each alternative is directly proportional to the area to be harvested.

The primary environmental effect of planting is the rapid regeneration of trees. This results in rapid recovery of the visual character of the landscape; return to pre-harvest levels of water yield, water quality, and time of peak flow; and protection of soils from erosion. Rapid regeneration causes forage to decrease due to shading and competition from the growing trees (Stickney, 1980) but speeds the process of recovery of big-game hiding and thermal cover.

Insect and disease problems can be minimized by the establishment of a young, vigorous stand of trees. Often, the problems can further be minimized by planting a different species than was harvested or by planting a mixture of tree species. These different species may also enhance the value of the next generation of trees. However, care must be taken to assure that the trees introduced are compatible with the sites on which they are planted.

Planting is labor intensive, costs are high and it has a marked effect on PNV. It is more expensive to plant on slopes over 40 percent, on thin rocky soils, and on clearcuts because more seedlings are planted per acre. Most of the planting will be done by contract which will directly benefit the local economy.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Planting results in quick establishment of a new stand and shortens the time until next harvest. Other species or a mix of species can be introduced on the site, the loss to insects and diseases reduced, and more wood fiber produced. Planting should not affect the natural productivity of the site and will give protection to the soils by rapidly producing an overstory. Though this rapid growth of timber will reduce the forage available to livestock or big game, it will also provide the hiding and thermal cover needed by big game.

2. Irreversible and Irretrievable Commitment of Resources

The next generation of trees will probably be harvested and this is an irreversible commitment. Planting causes no irretrievable commitment of resources.

3. Adverse Effects Which Cannot be Avoided

Some of the plantings on the Forest will fail and the expense will be difficult to recover.

4. Conflicts with Other Land Management Plans

None were identified.

5. Energy Requirements

Some energy will be required in transportation of tree planting crews to the field. This is a small portion of the total energy use on the Forest.

BB. Timber Stand Improvement

Precommercial and commercial thinning are the two activities associated with timber stand improvement. Precommercial thinning occurs when the regenerated stand is about 30 years old (too small for commercial products) and again when the stand is about 70 years old (some commercial products). The objective of thinning is to reduce competition among crop trees so maximum growth per tree is realized (Smith, 1962). The fewer but larger trees will theoretically be more valuable at time of harvest.

Thinning can have a minor adverse effect on foreground viewing until the slash is burned or decays. The more open aspect of the thinned stands is likely to be pleasing to the casual observer (USDA, 1977).

The slash created by thinning is a fire hazard that is difficult to manage. Broadcast or underburning is usually not possible without damage to the remaining trees, and handpiling and burning is expensive and may also result in damage. However, the relatively fine fuels are packed down by snow and decay within one or two years, so the risk of losing the thinned stand to fire is low.

Thinned stands produce slightly more forage for a short time after thinning, but this advantage is soon lost by the rapidly expanding canopy of the remaining trees (Planning Record: Forest Plan Note 101). Hiding cover for big game may be reduced by thinning but recovers rapidly as the remaining trees occupy the available space (USDA, 1979). A less diverse stand can result from thinning if the objective is to feature one species. Therefore thinning could affect the habitat of certain small animals, birds and insects. The removal of insect infested, diseased, and slow growing trees will result in a healthy, vigorous stand (Smith, 1962).

Precommercial thinning results in a decrease in PNV because timber yield tables show very little difference in yield, species composition, or average diameter between thinned and unthinned stands (Planning Record: Timber Yield Tables). Precommercial thinning has been scheduled for 1,200 acres per year for the first decade in each alternative to reduce potential insect and disease problems and to prevent stagnation of lodgepole pine stands.

A small amount of commercial thinning in combination with overstory removal in old burns is scheduled in the first decade in most alternatives (Table IV-22). Commercial thinning has the same environmental effects as selection harvest, discussed under uneven-aged management (Section W.2.).

Table IV-22
Commercial Thinning in the First Decade (Plan Period)
(million board feet per year)

Alternative/Benchmark										MAX	MIN
A	B	C	E	E1	E2	F	G	H	J	PNV	LVL
1.4	0.1	0.2	0.4	1.4	0.2	1.1	0.2	0.6	0.06	0	0

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Forest yield tables show no increase in the per acre volume of stands as a result of precommercial or commercial thinning. Average diameter is increased and therefore the timber should be more valuable.

2. Irreversible and Irretrievable Commitment of Resources

Thinning a stand implies an irreversible commitment to harvest the remaining trees in the stand. Only in unique situations would final harvest not occur. Some of the funds expended may not be retrievable.

3. Adverse Effects Which Cannot be Avoided

Some of the slash created by thinning will not be treated and a fire hazard will be present for a few years after thinning. Temporary loss of hiding cover will affect big-game use. Visual quality will be adversely affected for a short time.

4. **Conflicts with Other Land Management Plans**

None were identified.

5. **Energy Requirements**

Most of the energy used in precommercial thinning will be used in transportation of crews to the sites. This is a small portion of the total Forest use. Energy used in commercial thinning is a part of the energy used in regular timber harvest (Table IV-18).

CC. Road System

Road construction and maintenance has a greater effect on other resources than any other Forest management activity. The primary effects are the displacement of large amounts of soil, increased vehicle access, and degraded visual quality. As roads are built into roadless areas, semiprimitive recreation and wilderness management are precluded. Appendix C contains an estimate of when each roadless area will be accessed.

There are now 2,057 miles of system road on the Forest. About 1,700 miles of local and collector roads are needed to complete the transportation system for Alternative H which prescribes no roads in any roadless area. About 3,000 miles of road are needed to complete the transportation system in Alternative A which would access all the land suitable for timber harvest outside current wilderness. In all the alternatives, most of the roads would be built by the end of the fifth decade (Table IV-23).

Table IV-23
Road Construction
(miles)

	Alternative/Benchmark											
	A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
10-year average for decades 1-5	458	470	408	310	322	203	296	344	264	148	510	0
Total needed for management*	5029	4998	4637	4103	4097	3869	3870	4138	3715	3029	5317	2087

*Total includes 2,057 miles of existing roads.

Roads provide access for increased motorized recreation, but eliminate primitive and semiprimitive opportunities. Wilderness attributes of roadless areas are foregone. People will either shift their recreation use to another roadless area or continue to use the same area and suffer a decrease in the quality of the recreation experience. People who prefer roaded recreation will have more opportunities.

Road management can mitigate potential conflicts in use. Seasonal or year-long road closures can provide a wide variety of recreational opportunities, even though the environment is slightly changed by the physical presence of the road.

Road construction can affect the basic character of the landscape by changing its color, texture, or line. Roads across open areas on steep slopes are visible for many miles. Cuts and fills are often visible even through a screen of vegetation. Where visual quality is important, the effect can be reduced by leaving vegetative screens, seeding, or treating cut and fill slopes with a darkening agent. Cuts and fills can be reduced to a minimum. The transportation system necessary to implement Alternative A would result in an adverse, though not unacceptable, visual effect (USDA, 1977).

Road construction can result in adverse effects to cultural resources. Roads built for timber hauling can facilitate exploration and development of mineral and oil and gas resources.

Roads often cross game trails and change animal movement patterns. Cover is destroyed, and the security of an area is reduced by increased road access. Narrow roads built to follow the terrain with minimum cuts and fills reduce these impacts. Road closures can restore the security of big game to acceptable levels even though the road provides a travelway for horseback riders and hikers (Lyon, 1979a).

Road construction usually occurs in summer so few problems are created on the big-game winter range area. These roads, however, do increase access for hunters.

Road construction activity on big-game summer range displaces the animals. The displacement is usually beyond a topographic barrier (Lyon, 1979b). Road building can be scheduled to avoid activity in adjacent drainages so displacement will be minimized. New roads increase the access for both hunters and other recreationists. Displacement of elk will continue as long as heavy traffic is allowed. Parts of the habitat for some small animals will be destroyed by road construction, but other habitat may be created for those animals who exist along the edge of the forest.

Roads in or near riparian zones can cause significant sediment to be delivered to streams (Packer, 1965). This adversely affects fisheries by smothering eggs, fry, and food organisms. Fry and fingerlings lose hiding cover and are more vulnerable to predators. Water quality is affected by road building to the greatest degree of any Forest activity (Rice, 1981; Megahan 1974; 1975). Roads through wet areas are often responsible for triggering mass soil movement (Dyrness, 1967). New roads in riparian zones will conform to Forest-wide standards in order to minimize adverse effects on riparian environments (Planning Record: Management Practices). The most sediment is produced in alternatives which prescribe the most roads (Table IV-23).

In all alternatives, road building and timber harvest activities are constrained to minimize effects on the stream environment. Forest-wide mitigation measures have been applied to all road construction activities to reduce the sediment delivered to streams (Planning Record: Management Practices). Timber harvest and site preparation activities contribute about one-half the sediment yield increase shown in Table IV-24.

Table IV-24
Decade 1 (Plan Period) Sediment Yield Increase
(percent above current)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
11	12	11	8	13	6	8	7	6	4	4	0

Sediment delivered to streams has an adverse effect on trout populations. The most sediment is produced by road and timber activities in Alternatives A, B and C. The greatest sediment related reduction in catchable trout populations occurs in these Alternatives (Table IV-25). Current trout populations are maintained in Alternatives E2 and J and Benchmark MIN LVL because sediment yield does not exceed the threshold of effect on habitat potential.

Table IV-25
Nonwilderness Stream Fish Population Potential in the Fifth Decade
(thousands of catchable trout)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
126	149	130	137	137	161	137	135	139	161	111	161

Between four and eight acres of land are between the top of the cut and the bottom of the fill slope for every mile of road built. The roadside area can be considered a clearcut with special reforestation problems. Trees will grow on some portions of the cut and fill slopes. There may be a slight reduction in productivity along the sides of roads across steep slopes, but no yield table reductions were made because the loss is insignificant (Pfister and others, 1977).

Roads built into roadless areas result in increased access and increased potential for person-caused fires. However, this same access allows firefighters to respond more quickly and provides fuel breaks.

Road construction is a major cost in all alternatives. The cost reduces returns to the U. S. Treasury and payments to local governments. Most of the roads will be built by local contractors, a significant benefit to the local economy.

Road construction is directly tied to timber harvest, which tends to offset the cost of road building. In Alternative A, the transportation system is built quickly and timber harvest is relatively unconstrained resulting in a relatively large contribution to PNV. In Alternative J, timber harvest is constrained, road building progresses slowly, and the contribution to PNV is lower. All alternatives except E2 have a negative PNV through the third or fourth decade. After the early road investment has been offset by the value of the timber accessed, PNV is positive.

Many of the effects of roads on wildlife, fisheries and dispersed recreation can be mitigated with an aggressive road management system. Closed roads heal more rapidly and sediment production is reduced. Big-game security is enhanced by road closures, and road maintenance requirements are reduced. We will prescribe, through the annual travel planning process detailed in 36 CFR 295, the combination of permanent and seasonal, physical barrier and gate closures that will respond to the public's desire for access to the land with minimal impact on affected resources. All alternatives provide a level of road maintenance that is sufficient to minimize accelerated soil movement, including maintenance of cut and fill slope vegetation, the travel surface and drainage structures.

1. Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Construction of roads has a long-term effect on productivity. Even though efforts may be made to rehabilitate a road, the roadbed and cut and fill slopes will not produce as they did. If the roads remain active, this acreage is removed from the vegetative productivity of the area. Roads reduce habitat for some animals but the edges create habitat for others. Roads facilitate timber harvest and subsequent management activities which may have a positive effect on future productivity of the area. Roads change the type of recreation experience potential of an area. Open roads may interrupt animal movement patterns and allow access for hunters. Too much access can result in a reduction of big-game populations. Roads can have a long lasting impact on visual quality.

2. Irreversible and Irretrievable Commitment of Resources

Road construction is an irreversible commitment of resources since roads are essentially permanent features of the landscape. If roads are not built, timber cannot be economically harvested and an irretrievable loss of resource production occurs. If roads are built, wilderness potential, primitive and semiprimitive recreation, and roadless wildlife habitat are irretrievably lost.

3. Adverse Effects Which Cannot be Avoided

Roads deteriorate the visual resource. Wildlife habitat and wildlife movement patterns are disrupted. Roadless recreation opportunities are lost. Wilderness potential is foregone. Road construction and maintenance cause the greatest amount of soil disturbance and erosion of any proposed activities. Water quality of streams is lowered by sedimentation and fish habitat carrying capacity is reduced.

4. Conflicts with Other Land Management Plans

None were identified.

5. Energy Requirements

Road construction and maintenance require the largest amount of energy use of any activity on the Forest (Table IV-26).

Table IV-26
Energy Required for Road Construction and Maintenance During the First Decade (Plan Period)
(billion BTU's)

Alternative/Benchmark											
A	B	C	E	E1	E2	F	G	H	J	MAX PNV	MIN LVL
46.3	56.2	54.0	44.1	67.3	25.4	38.6	34.2	33.1	19.8	16.5	3.3

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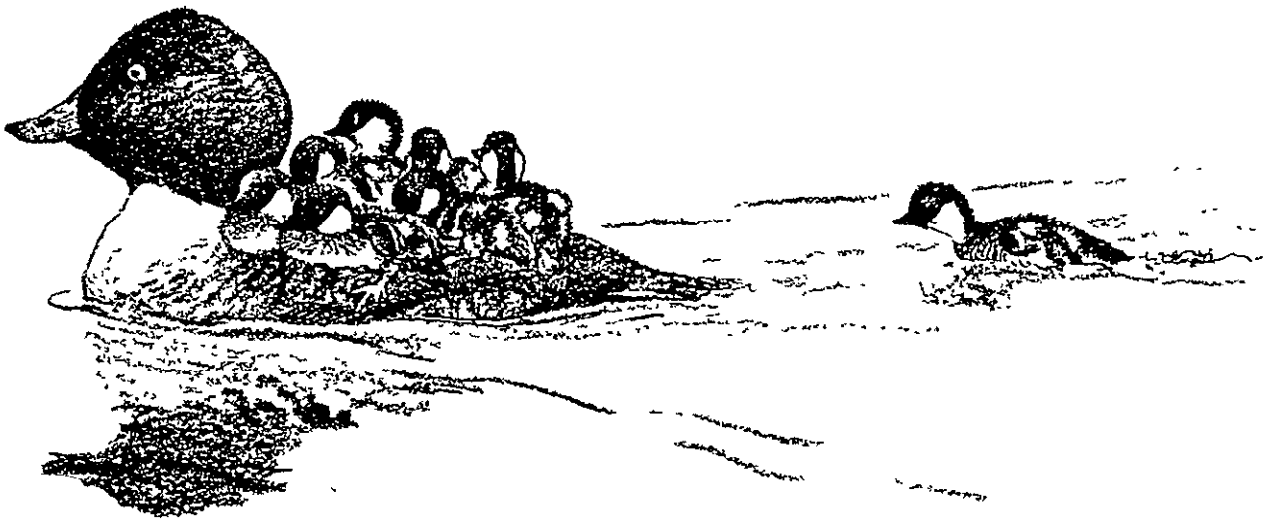

COMMON GOLDENEYE
HEN AND BROOD

VI. CONSULTATION WITH OTHERS

A. Introduction

This chapter discusses efforts to involve and consult with a variety of publics during formulation of the Forest Plan and Final Environmental Impact Statement (FEIS). It also lists, and responds to comments received during the public comment period for the proposed Plan and Draft EIS.

The Bitterroot Forest has conducted an active public involvement program throughout the Forest planning process. Federal, State, and local government agencies have been informed and consulted. Individual Forest users and interest groups have also had an opportunity to participate.

The first section of this chapter, CONSULTATION WITH OTHERS BETWEEN THE DRAFT AND FINAL, summarizes public participation activities, summarizes public comments received, explains how public comments were used in preparing the final document, and summarizes the collective response by the public by resource or issue area.

The second section contains COMMENTS FROM OTHER AGENCIES, ELECTED OFFICIALS AND INDIAN TRIBES AND THE FOREST SERVICE RESPONSES.

The third section includes a listing of all commenters that submitted written comments during the formal public comment period that followed publication of the DEIS and proposed Forest Plan.

The fourth section provides a list of AGENCIES, ORGANIZATIONS, GROUPS, AND OTHERS TO WHOM THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED FOREST PLAN WAS SENT, and all those to whom copies of this statement have been sent.

B. Consultation With Others Between the Draft and Final

1. Summary of Public Participation Activities

Upon issuance of the Draft Environmental Impact Statement and proposed Forest Plan, there was a public review period from March 25 to August 15, 1985, including one extension. Approximately 600 copies of the documents were sent to interested parties. Responses to the drafts were solicited through:

- Response forms mailed with the document.
- Informational open houses in Ranger District Offices in Stevensville and Darby, and Supervisor's Office in Hamilton.
- Presentations to interest groups.
- News releases featured by newspapers, television, and radio stations encouraged participation from the general public.

In-Service meetings were held with District, Supervisor's Office and Regional Office personnel to obtain employee input on the DEIS and proposed Forest Plan supplements.

2. Summary of Public Comments Received

Responses were tabulated by demographic data for respondents. The data is summarized by origin and affiliation and is presented as follows:

Total Comments:	961
Number of Signatures:	1,064
Origin:	
Ravalli County	601
Montana Counties other than Ravalli or Missoula	135
Other States	115
Missoula County	98
No Address	12
Affiliation:	
Individual	861
Industry	42
Organization	36
Federal Agency	8
State Agency	5
Elected Official/Local Agency	3
Indian Tribe	1
Other	5

During the formal public review period for the DEIS and Proposed Forest Plan, a total of 961 written communications (cards, letters, petitions, etc.) were received. These ranged from single page cards and letters to documents 160 pages or more in length. Separate issues and concerns recorded during the Forest Service review of these comments exceeds 9,000. All public comments were read and considered in developing the Final Forest Plan and EIS. Following is a summary of the comments by issues, alternatives, and roadless areas.

Issue	Number of Comments
Wilderness Designation	618
Timber Harvest Levels and Local Economy	456
Economics - Resource Values and Budget	418
Roadless Allocation	307
Recreation Values - Dispersed and Developed	274
Wildlife - Big Game and General	250
Soil/Water - Water Quality and Monitoring	246
Roads - Amount Existing and Proposed - Standards	245
Fisheries Habitat and Populations	195
Visual Quality	119
Minerals	25

Alternative	Number of Comments
A	335
J	166
E	20
G	6
B	3
C	2
H	2
F	1
E1	0

Roadless Area	Number of Comments
Blue Joint	202
Sapphire	177
Selway-Bitterroot	156
Stony Mountain	147
North Big Hole	135
Allan Mountain	121
Lolo Creek	110
Needle Creek	74
Swift Creek	69
Sleeping Child	68
Tolan Creek	63

3. How Public Comments were used in Preparing the Final Environmental Impact Statement and Forest Plan

Within the broad framework of Forest planning, public input is one of five considerations in the decision-making process. Forest Service decisions are based on five factors: 1) the law, 2) technical information, 3) resource capability, 4) professional judgment, and 5) public input.

In accord with 40 CFR 1503.4, the comments about the Proposed Plan or Draft EIS were treated in the following ways:

- Comments offering technical corrections or pointing out inconsistencies have been used to revise the final documents.

- Comments requesting clarification or comments resulting from misunderstanding of what was meant in the documents indicate areas where the Proposed Plan or EIS needed clarification. Corrections were made, or the reason a correction was not made is explained in the response to the comment.

- Another type of comment questioned some part of the analysis. In some cases the analysis was clarified, supplemented, or modified. Where further analysis was not done, the reason was explained in the response to the comment.

- A majority of comments suggested changes in the Proposed Forest Plan direction, outputs, and land use assignments. These comments expressing a differing preference for Forest Service management required careful consideration both from individual and collective standpoints. Where feasible and appropriate, management area direction in specific areas was changed in response to comments. However, some comments requesting changes in the Proposed Plan did not result in any change. Responses to individual comments are documented in this chapter or documented in Appendix D, available upon request.

The Forest Service use of public comments is documented throughout the Final EIS and Forest Plan. A summary of this documentation is as follows:

- The Forest Service response to agencies, elected officials, and Indian Tribe comments are displayed in this chapter while responses to individual public, organizations, groups, industry and business are responded to in Appendix D.

  This Appendix D to the Final EIS is located in the Forest Supervisor's Office. Any individual or group may request to view that file or secure a copy on loan. All such requests will be accommodated. Contact the Forest Supervisor, Bitterroot National Forest, 316 North Third Street, Hamilton, MT 59840. Since Appendix D contains several thousand pages, copies are not readily available for public distribution.

- A summary of substantial changes between the Draft and Final statement is given in Chapter I. In Chapter II (Alternatives) and IV (Environmental Consequences), changes are summarized at the beginning of each chapter. A summary of changes to the affected environment, Chapter III, is discussed in the Introduction.

- The consideration of comments collectively are addressed in this chapter and Chapter I. In this chapter, a summary of public comments are discussed by major resource categories. In Chapter I, public comments are also summarized by Forest issues, concerns, and opportunities.

4. Summary of Collective Response by the Public by Resource or Issue Area

The content analysis which follows is a brief summary of public and other agency comments on the major Forest issues or resource area. These summary comments are derived from public review of the proposed Forest Plan and the DEIS. The purpose of the summary is to give the reader a "sense" of what the public said. For detail, the reader should review the individual comments.

The most frequently discussed issues were: wilderness designation, timber harvesting levels, economic impacts of management proposals and values assigned, wildlife (elk) management, water quality and quantity, sedimentation, and fisheries.

The vast majority of letters strongly supported either end of the wide range of Forest management options available. Letters either were strongly prodevelopment or strongly anti-development. Few letters supported the preferred alternative. Most letters supported the alternative which best supported their own special interest.

A summary of those comments follows:

Social and Economic

Public comments received on the Draft EIS reflected a major concern among local residents that timber volume must be at a level that would allow survival of the timber industry at current or higher levels in the Bitterroot Valley. Many respondents questioned the assumptions and values used in economic analyses, specifically the values for timber, recreation and grazing, and the trends that these values were assumed to take in the future. Some respondents indicated that the net loss of $1.2 million/year in the first decade from the timber program means that the timber program and road construction associated with it are not economically viable on the Bitterroot Forest. Other respondents point out that the jobs related to recreation, tourism, hunting and wilderness are very low-paying and seasonal, and that a low timber cut will have an effect on the valley's economy. Much the opposite feeling was expressed by those who felt that a continuation of historic timber harvest levels, while beneficial in the short run to the local economy, would be detrimental in the long run because of greater employment and income potential related to environmental amenities which would attract tourists, retirees, and service sector industries to the valley.

Wildlife

Public comments stated that a reduction in hunting opportunity is not acceptable, and that economic values for hunting are too low. The cumulative effects of development and timber harvest on private lands should be considered when programming timber harvest on forest winter range.

Several comments on winter range management suggested we adopt the elk-logging guidelines, that harvesting does not increase forage, and that road density standards allow too much roading. Others mentioned an increase in timber harvest would increase elk populations. One respondent indicated elk herds have increased since 1930's.

Old growth was mentioned in regard to its ecological importance, that we are providing too little, or that none was needed on suitable timberlands.

One respondent opposed the introduction of grizzlies and wolves.

Range

Public comments were concerned with big game/cattle conflicts on winter range. Others were concerned with the adverse impacts of cattle in riparian areas suggesting we need to manage riparian areas to maintain or improve water quality, fisheries and wildlife habitat within range allotments. Some pointed out the benefits of range to the local economy.

Fisheries

The majority of comments stated that a decrease in fish population and/or increase in sediment is not acceptable, that fish population estimates are in error, and that proposed water quality monitoring is inadequate. The cumulative effects of sediment on fish from private and Forest management activities should be addressed.

This issue is closely related to the water issue that we should not harvest timber unless funds are provided for an adequate monitoring program. Some felt the Forest was not giving adequate recognition to the fisheries resource as evidenced by only having a part-time specialist available, and that greater emphasis is needed in fisheries research.

One commenter opposed dropping trees into streams to create fish habitat.

Water and Soil

Comments ranged from strong opposition to any acitivity that would degrade water quality to those indicating water quality is excellent, compared to what it was in the past. Respondents stated that the sediment model needs improvement, we should measure impacts of clearcutting and logging, identify economic impacts of adverse water quality on recreation, meet state water quality standards, and show the effects of timber harvest and roads on timing of runoff, ground water, and irrigation ditches.

The cumulative impacts of activities on the Bitterroot River are a major concern and must be addressed. Several comments suggested a conservative approach to road building and harvest activities.

Several comments, in addition to those for Alternative J, are opposed to harvest in riparian areas.

This issue is closely related to the fish issue and to comments on monitoring--that we should not harvest timber unless funds are provided for monitoring.

A few commenters questioned whether management activities should occur on steep slopes, soils low in nutrients and water retention capabilities, and whether the use of tractors for logging on erodible soils with slopes under 40 percent should be allowed.

Monitoring

Comments centered on the need to monitor so we can accurately and statistically account for and predict the results of management activities on Forest and downstream in the Bitterroot River. Some commented that we should avoid causing adverse impacts rather than requiring monitoring and mitigating measures. It was stated that wetland and flood plains should be added to the monitoring plan.

Timber

Public comments suggested that the Forest should provide enough timber to supply the needs of the local mills, a level of about 45 MMBF/year. People were polarized in their preference for allowable sale quantity as reflected through their desire for a certain alternative. The majority desired either Alternative A or J, with harvest of 49 MMBF or 15 MMBF per year in the first decade, respectively. Some thought no more logging should be allowed. Some commented that the Forest should take up the slack from the reduced sale quantities on neighboring Forests. Others addressed economics or value of timber harvest, productivity of the Forest, and some suggested deficit or below cost timber sales should not be allowed. A few people commented on amounts of roads, logging systems, utilization standards, determination of suitable timberlands, local economy and the 25 percent fund, and questioned the timber values used in the economic analysis.

Silviculture

Public comments on the Draft EIS expressed a variety of concerns with emphasis on uneven-aged versus even-aged management (particularly clearcutting) and our ability to reforest sites. Some expressed a strong dislike for clearcutting or a desire to see the Forest managed with a "light touch" and prescribe uneven-age management. Others questioned the Forest's ability to reestablish trees on areas which have received regeneration harvest. A few people recommended more intensive management on good sites and two expressed a concern for our ability to maintain a sustained harvest. Other commenters were concerned with spread and control of insects and disease, the use of herbicides, and the spread of noxious weeds into the Forest. Some expressed a need for the Forest to increase weed control efforts.

Visual Quality

Public comments received on the Draft EIS reflected a strong desire to protect visual quality throughout the Forest, but especially on the west face of the Bitterroot Mountain range. It was requested that a special scenic management area be set up on a west side area between Mill Creek on the north and Camas Creek on the south. Several commenters requested that there be no further roading or clearcutting on the Bitterroot face. It was suggested that there would be an unacceptable amount of unrecovered acres (regeneration cuts) and road miles proposed by the Plan over the next 5 decades in visually sensitive areas such as this. Other comments did not favor a reduction in visual quality standards Forest-wide. An appropriate distribution of clearcuts Forest-wide and recovery of regeneration cuts before reentering areas for further management were also expressed as concerns. A comment was made that Forest planners had not given proper weight to the west face of the Sapphires, by lowering visual quality objectives. Some felt that aesthetics do not bear a price tag.

Some commenters felt that there was an overemphasis on the visual resources; that there is a preoccupation with the ill-effects of roading and timber harvest; that visual constraints are excessive as proposed by the Forest Plan; that costs would increase, there would be a timber volume reduction which would be detrimental to the economy, and an increased incidence of unsold sales. It was further suggested by one responder that visual quality management should be limited only to retention prescriptions; too much made of visuals; public needs education in resource management which will permit their (public) visual appreciation to accommodate management activities.

Wilderness

Comments ranged from declassification to recommending all qualifying areas for inclusion in the wilderness system. One group of commenters was concerned about the loss of forest products, limitations on various uses in wilderness, and the loss of trees to insects, disease and fire in wilderness. Another group felt that wilderness was of greater economic value to the Bitterroot Valley than timber harvest and was concerned about erosion, sediment, water quality, and fisheries if these lands were developed, and felt that the only way to preserve existing roadless areas was to have them classified as wilderness.

The opposing points of view were emphasized by those who felt that existing wilderness areas were not being used to their full potential and that use was light and seasonal in nature and those who felt that overuse of wilderness would occur in the near future. Use projections were questioned by wilderness proponents and opponents.

Roadless

Comments ranged from protecting all roadless areas through wilderness classification to total development. Those respondents who advocated putting all roadless areas in wilderness cited a lack of statutory protection for roadless areas and a fear that the next planning cycle will change the management direction. There was expressed support for keeping areas roadless for semiprimitive recreation opportunities. Some people suggested that logging was okay, but no more roads. The projected demand for these areas was questioned, as well as the rationale for placing any suitable timber producing lands in this category.

Recreation

Recreation comments centered on the economic importance of the local recreation industry, the need to maintain the fishing and hunting opportunities, and that the willingness to pay values used in the Forest Plan are too low.

Other comments indicated a need for developed sites for handicapped and senior citizens, that fees should be charged for recreation uses, that there is either too much or too little motorized use, and that user education should be a primary management tool.

Water quality was emphasized as having a major impact on the recreation industry, particularly river and fishing guides.

Several responses indicated a need for more emphasis on additions to, retention of, and upgrading of the trail system. There were comments against allowing motorized use on the system outside wilderness, and those that felt that motorized use should not be further restricted due to the amount of the system closed by wilderness and the limited area currently open to motorized use.

Roads

Public comments centered on the amount of existing and proposed roads, road design standards and road closures. Road density comments ranged from no more roads to no restrictions on road building, and included the adverse effects of roads on wildlife, especially elk and increased sedimentation in creeks. The road design comments varied from several supporting minimum size and expense with mitigation measures and screening, to one stating that wider roads are needed for logging equipment. Road closure comments ranged from closing roads yearlong to opening roads yearlong. Some suggested 1 mile of open road per section was adequate.

Minerals

Most of the comments relating to minerals focused on the need to improve the analysis of tradeoffs between surface and subsurface resource development in the EIS.

Some public comments suggested that minerals did not receive adequate treatment. There was concern for more stringent controls by some while others wanted less. Mineral potential ratings were questioned and there were opposing views on whether there should be more wilderness. Few people commented that known mineral potential areas should not be recommended for wilderness, and some suggested no exploration be allowed in wilderness. Also, there were a few opposing comments on whether roadless areas should be open to minerals entry. Mining effects on water quality were also questioned.

Fire

A few public comments were against management fires in wilderness and one proposed more use of planned ignition prescribed burning. Some commented that increase in access provided by new roads would increase the number of person-caused fires and suppression costs. Two comments were pro-underburning.

One person was concerned with high fire suppression costs versus low timber values, while another questioned our suppression strategies in some areas.

C. Comments from Other Agencies, Elected Officials and Indian Tribes with Forest Service Response

1. Indian Tribes and Federal Agencies

	Comments and Responses on Page
Columbia River Inter-Tribal Fish Commission	10
U.S. Department of Agriculture, Extension Service	17
U.S. Department of Agriculture, Soil Conservation Service	18
U.S. Department of Commerce, National Marine Fisheries Service	19
U.S. Department of Defense, Department of the Army	20
U.S. Department of Energy, Bonneville Power Administration	21
U.S. Department of the Interior, Fish and Wildlife Service	27
U.S. Department of the Interior, Office of the Secretary	32
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COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
2705 East Burnside Street Suite 114 Portland Oregon 97214 Telephone (503) 238 0667

August 8, 1985

Mr Tom Coston
Regional Forester
Northern Region
USDA Forest Service
PO Box 7669
Missoula, MT 59807

RECEIVED
AUG 15 1985
Bitterroot National Forest

Dear Mr. Coston:

The Columbia River Inter-Tribal Fish Commission appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and the proposed Bitterroot National Forest Plan. The Commission is composed of the Fish and Wildlife Committees of the Confederated Tribes of the Umatilla Reservation, the Confederated Tribes and Bands of the Yakima Indian Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe These four tribes have rights reserved by treaty to take fish that pass their usual and accustomed fishing places. Among these fish are the anadromous species that originate in the Bitterroot National Forest

The tribes' right to take fish that pass their usual and accustomed places is a right confirmed by numerous court decisions, See e g Sohappy v. Smith, 302 F Supp 899 (D Or 1969), aff'd, 529 F 2d 570 (9th Cir 1976), Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979) (Passenger Fishing Vessel), and is binding on state governments. See Passenger Fishing Vessel, 443 U.S at 682 and n.25. The treaties are also binding on private citizens, See e.g United States v Winans, 198 U S. 371 (1905), and of course on the federal government Passenger Fishing Vessel, 443 U.S. at 677, See also Confederated Tribes of the Umatilla Reservation v Alexander, 440 F. Supp. 553 (D Or 1977) ("The right to destroy Indian rights will not be inferred from a general project authorization such as that for this [Catherine Creek] dam Id at 555. Absent specific authorization by Congress, Indian treaty rights cannot be abrogated Id , citing Menominee Tribe v United States, 391 U S 404, 413 (1968).).

Federal courts have also examined the nature of the treaty secured duties imposed on the federal government. Not only may

federal agencies not destroy Indian treaty rights without specific Congressional action, federal agencies must use their authority to safeguard that which is the subject matter of federal treaties. In Kittitas Reclamation District v. Sunnyside Valley Irrigation District, Nos. 80-3505, 81-3002, 81-3068, 81-3069 (9th Cir June 14, 1985), the Ninth Circuit affirmed a district court order to operate a Yakima water project in a manner that would preserve spring chinook salmon redds. Federal project operators had originally sought to reduce water releases in order to store water for the next irrigation season The proposed flow reductions would have left the redds high and dry Testimony at the district court hearing indicated that the proposed water storage would be possible if twelve redds were transplanted or if berms were constructed Id Slip op. at 7 However, he district court judge was "unsure of the effect of these measures, so he continued the watermaster's authority to release water as necessary" Id Expressly declining to decide the scope of the Yakima Indian Nation's treaty fishing rights, Id at n 5, the Ninth Circuit found that the district court judge had fashioned a reasonable remedy Id

The message in Kittitas is clear. Federal agencies are obligated to exercise their authorities in a manner that will protect -- not degrade -- the habitat needed to support anadromous fish In addition, when addressing anadromous fish habitat needs, various measures may be utilized, but the final choice turns not on traditional notions of agency expertise, but on the biological needs of the fish.

As an arm of the federal government that manages lands containing anadromous fish habitat, the United States Forest Service owes a duty to protect -- not degrade -- the habitat needed to support the fish.1/ Moreover, this duty cannot be fulfilled by engaging in an "accomodation" or "balancing" process

1/ The trust or fiduciary responsibilities of the Forest Service are separate and distinct in character from the express obligations that arise from the tribes' treaties with the United States. These treaty duties are in the nature of constitutionally based contract obligations See Passenger Fishing Vessel, 443 U.S at 675 ("A treaty, including the one between the United States and an Indian tribe, is essentially a contract between two sovereign nations."). The fiduciary responsibilities are in the nature of judicially recognized ethical obligations, deriving from the peculiar relationship between the United States and the Indians See United States v Kagama, 118 U.S 375, 383-384 (1866) ("From their very weakness and helplessness . . there arises the duty of protection, and with it the power."); cf. No Oil Port! v Carter, 520 F. Supp 334, 373 (W D. Wash. 1981) In the context of the Steven's treaties, trust duties have been held to arise from the United States solemn vow to protect the Indians right to take fish, but these trust responsibilities should not be confused with the express treaty reserved and secured right to take fish. Id

FOREST SERVICE RESPONSE

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1 We have included management standards in the Final Plan that will assure the protection of fish habitat Sediment delivery to streams on the nonwilderness portion of the Forest will be below the threshold of effect on fish habitat potential All anadromous fisheries on the Forest are within classified wilderness

between Indian treaty rights and a competing economic interest such as timber harvest. See Pyramid Lake Band of Paiute v Morton, 354 F Supp 352,356 (D.D C 1972). Any such "accomodation" reached by the Forest Service would amount to a de facto abrogation of Indian treaty rights.

Magnitude of Fisheries Reserved by Treaty

The Forest Service's duty to protect and enhance anadromous fish habitat does not cease once a fish run becomes viable.2/ The tribes did not reserve a right to take a few fish from a meager run struggling for survival. Although the extent of fisheries reserved by the treaties has not been determined, arguably, the Columbia River treaty tribes reserved the right to continue harvesting that number of fish that they traditionally harvested. Obviously, that is impossible given the contemporary depleted fisheries. The Supreme Court has held that both Indian and non-Indian fishermen possess a right, "secured by treaty, to take a fair share of the available fish." Passenger Fishing Vessel, 443 U S. at 684-85 The Court determined that Indian harvest allocation should not exceed 50% of the harvestable fish. Id at 685-86. The Court then declared.

> It bears repeating, however that the 50% figure imposes a maximum but not a minimum allocation. . . [T]he central principle here must be that Indian treaty rights to a natural resource that once was thoroughly exclusively exploited by the Indians secures so much as, but no more than, is necessary to provide the Indians with a livelihood -- that is to say, a moderate living. Accordingly, while the maximum possible allocation to the Indians is fixed at 50%, the minimum is not, the latter will, upon proper submissions to the district court, be modified in response to changing circumstances. Id. at 686-87.

Perhaps the reason why this "moderate living standard" unearthed by the Supreme Court has not proven to be a truly

---

2/ Forest Service regulations require that "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." See 36 C F R § 219 19 (1983). Neither the DEIS nor the proposed plan indicate whether Bitterroot National Forest anadromous fish runs are viable. Nor do the documents indicate any numerical goals for anadromous fish populations. To comply with its own regulations, the Forest Service must disclose this information.

2

FOREST SERVICE RESPONSE Continued

2 All populations of vertebrates, including fish, will be maintained at viable population levels In the case of anadromous fish, this assumes that downriver conditions will not prevent the adequate escapement of returning adults Due to the wilderness designation for all the Forest within anadromous drainages, we would expect the population of anadromous fish at near 100 percent of habitat potential, assuming adequate escapement of adults

thorny problem in Pacific Northwest fisheries management is because no one can reasonably contend that the Indians' harvest presently yields a moderate living. This fact was implicitly acknowledged by the Supreme Court in Passenger Fishing Vessel when it stated that the 50% ceiling on the Indians' harvest allocation was necessary "to prevent their needs from exhausting the entire resource and thereby frustrating the treaty right of 'all [other] citizens of the territory.'" Id. at 686.

Regardless of what the term "moderate living standard" means, it will eventually be defined by the judiciary -- not a federal agency. See Id. at 687. As discussed earlier, the Ninth Circuit has already determined that federal agencies must refrain from taking actions that will reduce the number of fish in a depleted run. See Kittitas, slip op. at 7. Nor does this duty cease when an anadromous fish run manages to increase its numbers beyond the dangerous level of minimum viability. In United States v. Adair, 723 F.2d 1394 (9th Cir. 1984), the Ninth Circuit stated that:

> Implicit in this "moderate living" standard is the conclusion that Indian tribes are not generally entitled to the same level of exclusive use and exploitation of a natural resource that they enjoyed at the time that they entered into the treaty reserving their interest in the resource, unless, of course, no lesser level will supply them with a moderate living. Id. at 1415 (emphasis added).

Here the Ninth Circuit has indicated that the Klamaths must be allowed to achieve their "moderate living." No one knows what that is. The court explicitly stated the possibility that the "moderate living standard" may only be achieved by allowing the tribe to enjoy the "same level of exclusive use and exploitation" it had at the time the treaty was concluded. Id. The purport of this holding is clear. Federal agencies owe a duty to refrain from activities that will interfere with the fulfillment of treaty rights. The non-interference duty does not only apply when fish runs are at or near minimum viable status. In the context of the Bitterroot National Forest, unless the Forest Service can demonstrate that the tribes' treaty rights are presently being fulfilled, the Forest Service cannot justify approving activities in the forest that will cause further degradation of anadromous fish habitat.

The preceding discussion of the nature and extent of the Columbia River tribes' treaty fishing rights demonstrates that preservation and enhancement of anadromous fish habitat is one of the United States Forest Service's primary legally-imposed goals. Unfortunately, neither the DEIS nor the proposed plan reflect this fact.

3

FOREST SERVICE RESPONSE Continued

3. Since all the anadromous fisheries are within classified wilderness, the only activities proposed are those associated with maintaining near pristine conditions. We believe none of these proposed activities will degrade anadromous fisheries.

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The DEIS never states how much anadromous fish habitat is contained within the Bitterroot National Forest other than to state that this habitat exists within "the Idaho portion." See DEIS at II-10 and III-18. The allegedly more detailed proposed plan suffers from the same defect. See Bitterroot Naitonal Forest Proposed Forest Plan (March 1985) at V-9. Neither the DEIS nor the proposed plan ever state how many anadromous fish are supported by the National Forest. The DEIS and the proposed plan do not set up anadromous fish protection objectives. Given the lack of necessary information, a decision-maker would be unable to make a reasoned choice relating to anadromous fish in the National Forest.

4

The Forest Service maintains that since the only rivers and streams that support anadromous fish are all in the Idaho wilderness areas of the Bitterroot National Forest, then this habitat will be "affected little by Forest management activities." See Proposed Plan at V-9. (emphasis added); See also DEIS at II-47 ("Wilderness streams and lakes will not be significantly affected by management activities.") (emphasis added); See also DEIS at II-10 ("the rivers are in wilderness and affected little by Forest management activities.") (emphasis added). If all anadromous fish habitat is in wilderness, why would it be affected at all by Forest management activities? If there are some effects, then what are they? Are they significant? If not, then why not? Neither the DEIS nor the proposed plan addresses these questions.

5

The Forest Service states that anadromous fish runs have been diminished by "downstream activities, especially large hydroelectric dams." See DEIS at III-18. It then states that there are ongoing restoration measures (artificial hatching channels) occurring at Indian Creek on the Selway. Id. The Commission would be the first to applaud these efforts by the Forest Service. However, given the dearth of information on anadromous fish population and habitat production potential, it is impossible to determine whether these restoration measures are reasonable and adequate to fulfill the Forest Service's duties to the tribes.

The hydroelectric dams on the Columbia and Snake rivers have caused extensive damage to anadromous fish runs. So have timber harvesting activities and road-building. In dealing with anadromous fish, the Forest Service cannot limit itself to a "single forest" frame of reference. Anadromous fish migrate as far inland as the Bitterroot National Forest and as far north as Alaska. As the Pacific Northwest has come to realize, the anadromous fish runs can only be restored if state, federal and tribal land, water, and wildlife managers adopt a coordinated, "gravel-to-gravel" management approach to this valuable and mobile renewable resource. This approach is reflected by the

FOREST SERVICE RESPONSE Continued

4. The entire portion of the Forest within the State of Idaho is either anadromous fish habitat or contributes to anadromous fish habitat. The Final Plan recognizes the validity of the Wilderness Act, which includes goals for providing for native fish, as do Forest Service wilderness regulations.

5. To state that a resource would absolutely not be affected would perhaps mislead the public that we fully understand all the factors affecting the fisheries resource. Some subtle uses of the Wilderness, including human visitation, fishing or fire management decisions could have minor effects on the anadromous resource, but are not quantifiable nor expected to be significant.

746

Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program The Fish and Wildlife Program, mandated by the Pacific Northwest Electric Power Planning and Conservation Act, encompasses the Columbia River and its tributaries and will be financed by Pacific Northwest ratepayers. This comprehensive protection, mitigation and enhancement effort was not even mentioned in the DEIS or the proposed plan. Nor were the increased fish returns made possible by the recently concluded United States/Canada Salmon Interception Treaty mentioned in either document. These efforts, along with the Salmon and Steelhead Enhancement Act, have changed the complexion of fisheries management in the Columbia Basin. The success of both the Salmon Interception Treaty and the Fish and Wildlife Program turn upon maximizing utilization of the anadromous fish habitat in Columbia River tributaries. A large percentage of these tributaries run through national forests. The Forest Service must acknowledge its responsibilities in these areas. The Forest Service cannot make a reasoned decision with respect to anadromous fish habitat if it does not factor these activities into its decision-making process The Pacific Northwest cannot afford to spend money enhancing fisheries that are simultaneously being degraded by timber harvest and road-building. 6

Forest Service coordination with Pacific Northwest fisheries enhancement activities is not only sound policy, it is also mandated by law. Forest Service regulations declare that a review of state, federal, and tribal planning and land use activities shall be included in the forest plan EIS See 36 C F R § 219 7 (a)-(c) (1983) In addition the regulations provide that this review shall consider the objectives of federal, state, local, and tribal governments, inter-related impacts o these plans, and a decision by the Forest Service on how each forest plan shall address these inter-related impacts Id. at (c)(1)-(4). The Bitterroot National Forest DEIS and proposed plan do not reflect these considerations. 7

In conclusion, the Commission respectfully requests the Forest Service to re-examine the place of anadromous fish and Indian treaty rights in its planning process for the Bitterroot National Forest The cursory consideration given to anadromous fish and Indian treaty rights will not satisfy the strictures of the National Environmental Policy Act of 1969, the National Forest Management Act of 1976 or the Columbia River treaty tribes' treaty right. The final Bitterroot National Forest plan will have to coordinate with other ongoing fisheries activities in the Northwest along with the fisheries efforts of other national forests. The Commission would welcome the opportunity to meet with representatives of the Forest Service to address these concerns.

Once again, thank you for this opportunity to provide

FOREST SERVICE RESPONSE Continued

6 Because of the wilderness designation of the habitat, there are few decision choices to be made in anadromous habitat drainages No additional road building or timber harvest is proposed in anadromous drainages on the Forest

7 The maintenance of anadromous fisheries was not a public issue raised during the planning process The seemingly cursory treatment of the resource is justified by the wilderness classification of the habitat and the fact that no development will take place We have and will continue to cooperate with other agencies and the public to achieve their goals for restoration of anadromous fish runs within the constraints on manipulation of natural systems imposed by the Wilderness Act of 1964

comments. If you or your staff have any questions or would like to meet with us for further discussion, please contact Alex Heindl, Biologist, or Jim Weber, Policy Assistant, of my staff.

Sincerely,

S Timothy Wapato
Executive Director

STW JW pm

United States Department of Agriculture | Extension Service | Natural Resources and Rural Development | Washington D C 20250

1471

April 16, 1985

NO RESPONSE REQUIRED

Mr Robert S Morgan
Forest Supervisor
USDA - Forest Service
Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

Dear Mr Morgan

Thank you for providing us the opportunity to review and comment on your proposed Forest Plan

Since the Extension Service-USDA's primary mission is to provide leadership to State Extension Services, we do not attempt to maintain the expertise at the federal level that would be needed in order to provide a critical analysis of management alternatives for the Bitterroot

We noted in Chapter VI that you have asked the Montana Cooperative Extension Service for comments They are in an excellent position to provide comments, as are the County Cooperative Extension agents in those counties which contain forest

Sincerely,

RECEIVED
APR 19 1985
Bitterroot National Forest

for DONALD E NELSON
Acting Deputy Administrator

cc Dr C J Hoffman
Dr Frederick J Deneke
Dr Mary Nell Greenwood

380

United States Department of Agriculture
Soil Conservation Service
Federal Building-Room 443
10 East Babcock
Bozeman, MT 59715

RECEIVED
JUL 24 1985
Bitterroot National Forest

July 23, 1985

Robert Morgan
Forest Supervisor
316 North 3rd Street
Hamilton, MT 59840

Dear Mr Morgan

We have reviewed your proposed Forest Plan and Draft EIS for Bitterroot National Forest and Report and Draft EIS for Blue Joint and Sapphire Montana Wilderness Study Act Areas

It appears you have given adequate consideration to most environmental aspects and we agree with your preferred alternative recommendations

Possibly, we overlooked the section that has reference to the existence of snow survey sites and electronic SNOTEL (snow survey telemetry) sites on the Bitterroot National Forest

Presently, there are 5 snow course and 5 snow survey telemetry (SNOTEL) sites on National Forest land for which we have land use authorization The SNOTEL sites have radio telemetry, instrument shelters and various climatic and snow sensors

These sites are in Management Areas 1, 3a, 5, 8a and 9 None of the sites are in roadless areas Our main concern is to keep from having these sites destroyed by logging or roadbuilding or have access restricted through road or area closures 1

Each of these sites should be authorized on a separate Supplemental Agreement to our overall Memorandum of Understanding and with a copy on file in your office

If possible, we would like to see the plan make reference to these locations and indicate the management action necessary to protect and preserve their integrity as data collection sites Each of these locations provides valuable data used for forecasting water supplies and for climatological information

Also, we would like to be advised of any activity that could affect either our present access or land use changes in the vicinity of these snow courses or SNOTEL sites

We appreciate the opportunity to comment on this plan

Sincerely,

Glen H Loomis
State Conservationist

cc Tor Shiflet, Ecological Sciencies, SCS, Washington, D.C

The Soil Conservation Service is an agency of the Department of Agriculture

FOREST SERVICE RESPONSE

380

1 The 10 sites have been identified in the Final Plan and a Forest-wide standard has been added to assure the protection of the sites.

Drainage	Section	Township	Range
Daly Creek	16	5N	18W
Twin Lakes	32	5N	17W
Twelve Mile	34	5N	23W
Lost Horse	5	4N	23W
East Fork R S	16	2N	17W
Nez Perce Camp	19	1S	23W
Nez Perce Pass	25	1S	24W
Saddle Mountain	5	2S	19W
Gibbons Pass	3	2S	19W
Kit Carson	3	27N	15E

386

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE, SUITE 350
PORTLAND, OREGON 97232 2279
(503) 230-5400

July 12, 1985 F/NWR5

Mr. Robert S. Morgan
Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton Montana 59840

RECEIVED
JUL 18 1985
Bitterroot National Forest

Re: DEIS No. 8504.03 - Bitterroot National Forest Plan

Dear Mr. Morgan:

Our review of the DEIS and subsequent contact with U.S. Forest Service personnel indicates all anadromous fish habitat is within wilderness or roadless area management units. These management designations are compatible with and support anadromous fish populations and habitat and thus we have no detailed comment on the DEIS. If our assumptions are in error please contact Rollie Montagne (503) 230-5425 of my staff. 1

Your coordination efforts are appreciated.

Sincerely yours,

Dale R. Evans
Division Chief

cc: USFWS - Roy Heberger, Boise

FOREST SERVICE RESPONSE

386

1. Your assumptions are correct. A road corridor through wilderness parallels a portion of the anadromous fisheries, but management direction, as detailed in MA 5, for the corridor will only maintain present developments and limit any future disturbance.

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT CORPS OF ENGINEERS
P O BOX C 3755
SEATTLE WASHINGTON 98124

145

Planning Branch

18 APR 1985

NO RESPONSE REQUIRED

Robert S Morgan, Forest Supervisor
Forest Plan, Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

Dear Mr. Morgan:

We have reviewed the draft environmental impact statement for the proposed Forest Plan, Bitterroot National Forest, Montana, with respect to the U.S Army Corps of Engineers' areas of special expertise and jurisdiction by law as designated by the President's Council on Environmental Quality on December 21, 1984. We have no comments

Thank you for the opportunity to review this statement

Sincerely,

DWAIN F HOGAN, P E
Chief, Planning Branch

RECEIVED
APR 17 1985
Bitterroot National Forest

944

Department of Energy
Bonneville Power Administration
P O Box 3621
Portland Oregon 97208

In reply refer to SJ

August 15, 1985

RECEIVED
AUG 21 1985
Bitterroot National Forest

Mr Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

Dear Mr Morgan

Our Office of Engineering and Construction offers the following comments on the Draft Environmental Impact Statement (EIS) on the Bitterroot National Forest Plan

We are concerned that the extensive system of wilderness and wilderness study areas which encircles the Bitterroot Valley could adversely affect future energy-transmission corridor development Please give your most serious consideration to the following comments

Forest Plan

1. *The Forest Plan does not* seem to provide direction on corridors or utility rights-of-way Neither could we find management direction given on microwave radio station and hydromet sites

2. A management area should be established for utility/transportation corridors and corridor windows The Forest should seriously consider giving such management direction on a corridor-specific basis

1

Overview Maps - Bitterroot National Forest Plan

1. We recommend that potential corridors (at a minimum, 600-foot-wide corridor windows) be shown on alternative maps along with existing utility corridors To assist, we have marked up the EIS's Alternative "E" map to highlight such corridor windows, based on the existing Bonneville Power Administration (BPA) and Montana Power Company lines as well as major East-West Corridors identified jointly by BPA and the Forest Service in the 1979 Pacific Northwest Long-Range East-West Energy Corridor Study and by the Western Utility Group in their "Western Regional Corridor Study " Other Montana Power Company (or other utility company) lines in the area, either proposed or existing, should also be shown These corridors may also be used for oil, gas, roads, railroads, and communication lines

2

FOREST SERVICE RESPONSE

944

1 We have added Appendix H, Corridor Planning, to the Final Plan, and added management standards to each Management Area in Chapter III of the Final Plan dealing with utility corridors The major east/west utility corridors formerly mapped have been effectively terminated by the creation of the Frank Church-River of No Return Wilderness Congress expressed intention to severely limit development in the road corridor through the wilderness We interpret their intent to preclude building powerlines through the corridor

Proposals for microwave or hydromet sites will be handled site-by-site We believe the management standards for each Management Area have sufficient criteria for evaluating how appropriate a proposal might be in that Management Area

2 Utility corridors affect management only site-by-site We do not believe their existence will alter management direction for a Management Area and will consider their presence as proposals for projects are analyzed

Draft EIS

1. We recommend that the comparison of alternatives discussion, pages II-37 to II-93, include a summary evaluation of the effect of various alternative plans on corridors (existing and potential) Enclosed is a brief summary evaluation table of the corridors referenced in the Pacific Northwest Long-Range East-West Energy Corridor Study which are located on or near the Bitterroot National Forest planning area The table identifies potential impacts of the proposed Forest Plan on the availability of East-West Corridors Please keep in mind the fact that the East-West Corridor Study looked only at major interties that would ultimately be needed to transfer energy from the eastern Montana area to the West. The study was based on construction of UHV transmission lines, oil, gas and coal slurry pipelines, unit coal train, physical/terrain limitations and effect of wilderness designation No social or environmental effects were included in the analysis There are local and regional energy needs that could also require use of these and, perhaps, other presently undefined corridors.

2. The EIS, page IV-24, states that a corridor analysis has been made Yet we did not find the results of this analysis in the EIS or Forest Plan. We would expect to find the designation of existing corridors, exclusion areas, avoidance areas and windows The effect of leaving a corridor window (R-27) open through a wilderness study area such as that found north of the Anaconda Pintlar Wilderness area should be addressed as well as what environmental impacts might be incurred if a window were closed and the next available corridor had to be used.

It is our understanding that the Forest Service planning process covers a 50-year time span This emphasizes the importance of addressing long-range corridors (windows, exclusion areas, and avoidance areas) much more thoroughly There will, no doubt, be the need for several corridors in the Bitterroot area within the next 50 years Corridors could be required for a variety of reasons, including the need to serve or provide better service to local loads.

The East-West Corridor Study identified only seven feasible East-West Corridors Since the study was made, four of these have been eliminated three of the four proceeded through areas that are now designated wilderness (including the Magruder and Great Bear Wilderness Corridors) and the other one proceeded through what is now the Salmon River Recreation Area. This leaves only three potential major corridors two through the Missoula area and one through the Snake River Basin area At $2 million a mile for a high-capacity transmission line, additional detours become extremely expensive and may have significant potential increases in environmental impacts

General Comments

1 We recommend that the existing high-voltage transmission lines that cross the Bitterroot National Forest be designated as utility right-of-way corridors. These existing right-of-way corridors should be designated even though a study has not been made of their suitability for joint use This will facilitate their consideration in the land management process

FOREST SERVICE RESPONSE Continued

3 Since corridor R-28 has been effectively blocked by classification of the Frank Church-River of No Return Wilderness, it appears that there is no future use for R-27 either All possible east-west corridors on the Forest are now blocked by classified wilderness The corridor analysis is a part of the Planning Record and has been included in the Final Plan

We are required to consider revision of the Forest Plan in 10 years and do a major revision in not longer than 15 years

4 There are no existing high-voltage transmission lines across the Forest

944

2 There seems to be a lack of treatment of potential energy resource development, particularly renewable resources such as small hydroelectric, hydroelectric, and biomass These resources should be addressed in the management plan. 5

Forest Plan Recommendation

1 From a corridor planning standpoint, we recommended that if Plan E is retained as a proposal it be revised to provide corridor windows through Lolo Creek Roadless Area 1-805, Roadless Areas 1-421, 1-425, 1-426, and Roadless Areas 1-845, 1-846, 1-941

2. We do not support Forest Plan alternatives C, G, H, and J unless they also provide corridor windows through proposed wilderness areas 6

If you would like assistance from BPA in analyzing and refining corridor windows for Forest Plan alternatives, we would be glad to help you. To request assistance or to obtain further information, please contact Timothy J Murray, Chief of the Environmental Analysis Branch, at this address or at 503-230-4528 (FTS 429-4528) Thank you for the opportunity to review the draft EIS

Sincerely,

for Nicholas J Stas
Anthony R Morrell
Environmental Manager

2 Enclosures
Map
Table

cc
R W. Couture, Manager
Real Estate Department
Montana Power Company

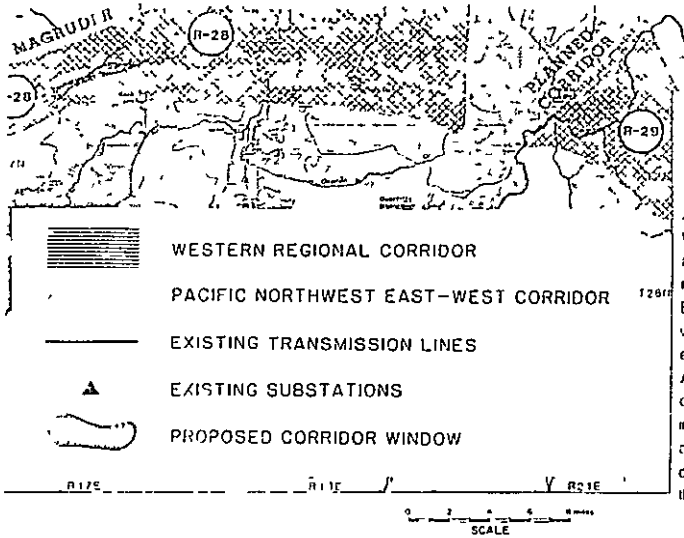
Earl Reinsel
USFS Region
Missoula, Montana

John Cheek
Pacific Power & Light Co

FOREST SERVICE RESPONSE Continued

5 There has been little interest in small hydroelectric, hydroelectric or biomass development on the Forest We believe the Forest-wide and Management Area standards for special-use developments are specific enough to meet the demand for these resource uses

6 See 3 above



Bitterroot National Forest

DEIS - FOREST PLAN

Alternative E - (Proposed Action) Was designed to resolve major issues and management concerns with a mix market and nonmarket uses and outputs. Emphasis is on roadless recreation wilderness elk habitat water quality series visual quality and timber issues.

Alternative E1 - Was designed to depart from the nondeclining flow in the proposed action. Prescription assignments and all other objectives and constraints are the same as Alternative E the Proposed Action.

LEGEND

Each management prescription provides for some or all of the various resource uses. Prescription goals, standards and guidelines standards and practices are described in detail in Appendix G of the Plan. Specific direction in the planning record. Prescription goals and objectives are shown in the following. Prescription areas are shown in Table II-1 of the Forest Plan DEIS.

Prescription Area	Management Goal
	Provide for cost efficiency of timber management with a high level of domestic livestock grazing. Provide for other resource uses including primitive recreation, elk habitat management on winter range, visual modification visual quality objectives and dispersed recreation. (Timber and Range Prescription)
	Provide elk habitat on winter range. Provide for other resource uses including timber management, roads, recreation, modification visual quality objective and domestic grazing. (Elk Habitat Management Prescription)
	Manage to meet the partial retention visual quality objective. Provide for compatible resource uses including timber management, range management, elk habitat management on winter range and roaded recreation. (Partial Retention Prescription)
	Manage riparian zones for native wildlife and aquatic. Provide for compatible resource uses including timber management, elk habitat management on winter range, roaded recreation, meeting the visual quality objective and fish habitat. The riparian prescription is not shown on the face of the small map scale but is assigned to the riparian zones that are associated with perennial streams within the partial retention prescription. (Riparian Prescription)
	Manage to meet the retention visual quality objective. Provide for compatible resource uses including timber management, range management, elk habitat management on winter range, and roaded recreation. (Modified Retention Prescription)

Prescription Area	Management Goals
	Manage to meet the retention visual quality objective. Provide for compatible resource uses including timber management, range management, elk habitat management on winter range, and unroaded or semi-primitive recreation. (Unroaded Retention Prescription)
	Manage undeveloped roadless areas for semi-primitive recreation. Provide for the management of resources compatible with roadless recreation including wildlife habitat improvement and timber management. (Semiprimitive Recreation Prescription)
	Recommend for wilderness. Manage to maintain wilderness attributes. Mechanized uses are allowed pending Congresssional action. Provide primitive recreation experiences. (Wilderness Prescription)
	Manage existing wilderness in accordance with the Wilderness Act of 1964. Provide primitive recreation experiences. (Wilderness Prescription)
	Generally unsuitable timberland. Provide for minimum level or custodial management where a small suitable timberland occurs within semi-primitive recreation and wilderness prescription areas. (Minimum Level Prescription)
	National Forest Boundary
	Adjacent National Forest Boundary
	Wilderness Boundary
	Non-National Forest Ownership

OCCUPIED CORRIDOR
PLANNED CORRIDOR
R-27
R-26
R-28
FLORENCE
STEVENSVILLE
VICTOR
HAMILTON
GRANTSVILLE
DARBY
LOLO
BEAVERHEAD

EVALUATION OF THE EFFECT OF FOREST PLAN ALTERNATIVES ON
EAST-WEST CORRIDORS
BITTERROOT NATIONAL FOREST

Corridor Segment	Evaluation
R-26	Lolo Creek (Bitterroot and Lolo NF) Corridor crosses north edge of Lolo Creek roadless area, (recommended for retention as roadless area) Good location for up to 3 UHV transmission lines 1 of 2 possible corridors through Bitterroot Range Next corridor 130 miles south (R-27) Alternative Forest Plans H or J block corridor
R-27	Blue Mountain - Sapphire Roadless Area Crosses USFS Rare II study areas 1-421, 1-425, 1-426 *Good connecting corridor to other* segments This is a planned utility corridor through 2020 Nearest E-W corridor through Bitterroot Range is 130 miles north at Lolo Alternate plans C, G, H, or J if selected would block this corridor. Proposed alternative would *retain roadless classification also affecting* corridor
R-28	Conner - Blue Joint Wilderness "Magruder Corridor" North of Blue Joint roadless area (being recommended for wilderness designation) Crosses FS RARE II study areas 1-845, 1-846, 1-941 Good connection to other corridor segments 1 of 2 potential corridors through Bitterroot Range The Nez Perce Fork of the Bitterroot River lies in the middle of this corridor, bounded north and south by proposed Blue Joint Wilderness Area From the Montana Border into Idaho this corridor *is adversely affected by the Idaho designation of* wilderness for the Frank Church River of No Return management area
R-29	Gibbons Pass - Lost Trail Pass Low elevation, good connecting corridor segment for segments R-27 and R-28 Could affect Sapphire roadless area, if connected to corridor segment R-27 Proposed alternative would retain roadless area designation adversely affecting corridor

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Endangered Species, Field Office
Federal Bldg , U S Courthouse
301 South Park
P O Box 10023
Helena, Montana 59626

IN REPLY REFER TO
6-1-85-F-008
Bitterroot NF Plan

June 17, 1985

RECEIVED
JUN 1 , 1985
Bitterroot National Forest

Mr Tom Coston
Regional Forester
U.S Forest Service
Region 1,
Federal Building
P.O. Box 7669
Missoula, MT 59807

Dear Mr Coston

This is the Fish and Wildlife Service's (FWS) biological opinion prepared in response to your March 29, 1985 request for formal consultation on the effects of the Bitterroot National Forest (NF) Proposed Forest Plan (Plan) on the peregrine falcon (Falco peregrinus), and bald eagle (Haliaeetus leucocephalus). The FWS has examined the Plan (preferred alternative) in accordance with the Section 7 Interagency Cooperative Regulations (50 CFR 402, 43 FR 870) and the Endangered Species Act of 1973, as amended (ESA). This biological opinion refers only to the potential effects of the Plan on threatened and endangered (T/E) species and not the overall environmental acceptability of the proposed action.

Project Description

The Plan sets forth Forest-wide goals and objectives, land use allocations, management area prescriptions, standards and guidelines, and monitoring and evaluation requirements to establish direction for management of the Bitterroot NF over the next 50 years. The plan will be revised on a 10-15 year cycle.

Biological Opinion

It is the FWS biological opinion that implementation of the Plan is not likely to jeopardize the continued existence of the endangered peregrine falcon or bald eagle.

Basis of Opinion

Due to the general nature of forest plans and the broad spectrum of activities such plans cover, it is impossible to identify site-specific and cumulative impacts of all programs and/or activities to T/E species Therefore, it is impossible through one consultation to render a biological opinion on all programs and activities identified in the Plan Thus, additional consultation will be required on each program activity or project that the Bitterroot NF determines may affect T/E species at the time such activity or project is designed.

The FWS has used this consultation to determine

1). If the allocation of land resources will preclude the survival and recovery of the endangered peregrine falcon and bald eagle,

2) If Bitterroot NF policies, management standards, guidelines and prescriptions are compatible with the intent of ESA, and

3). If oil and gas leasing on non-wilderness lands of the Bitterroot NF will preclude the survival and recovery of T/E species.

Our review of the Plan and draft Environmental Impact Statement (DEIS) indicate that implementation of the Plan will not jeopardize the continued existence of listed species. Our finding of a no jeopardy is based upon proposed land use allocations and prescriptions that are compatible with peregrine falcon and bald eagle conservation

The Forest planning process provides the opportunity for the Bitterroot NF to set a positive management direction that will promote conservation and recovery, should either of these species occupy Bitterroot NF lands in the future. We have used this consultation to address measures the Bitterroot NF can incorporate in the Forest planning process to help promote the conservation and recovery of T/E species

Peregrine Falcon

Although there are no known historic or active eyries on or adjacent to the Bitterroot NF at this time, the potential exists for peregrine falcons to occupy suitable sites on the forest Peregrine reintroduction efforts are currently underway in Montana, Idaho, Wyoming, Colorado, and Utah. In 1984, peregrines bred and fledged young at one site in southwest Montana

and one site in northwest Wyoming, and both sites appear to be occupied again this year These two pairs of peregrines represent the only known breeding peregrines in Montana and Wyoming since the late 1970's All four adults were captive bred and reintroduced birds Peregrines are extremely mobile birds a subadult female hacked in southern Colorado spent the next summer at a hack site in northwest Wyoming The possibility of peregrines occupying sites on the Bitterroot NF needs to be considered in project planning. Although peregrine falcon reintroduction plans for Montana do not include hacking birds on the Bitterroot NF during the next 5-10 years, we recommend that the Bitterroot NF develop a management/contingency plan so that you will be prepared to address peregrine recovery, should birds become established on the Bitterroot NF

The recovery plan for the Rocky Mountain Southwest population of the peregrine falcon is currently under revision and scheduled for completion in the next few months

1

Bald Eagle

Bald eagle populations have been increasing in western Montana since 1980 when intensive eagle nesting surveys were initiated. Coordinated winter trend surveys began in 1979. Although peak numbers of bald eagles occur in Montana during spring and fall migrations, winter distribution is not well understood, and specific winter roosts, feeding areas and migration corridors, are not well documented.

Because bald eagles are year-round residents along the Bitterroot River, activities on the Bitterroot NF have the potential to either beneficially or adversely affect the birds While human caused mortality factors such as shooting, poisoning, and electrocutions continue to threaten the bald eagle, the loss of habitat continues to be the most significant long term threat to the bald eagle, and should be carefully evaluated in long term forest management planning

2

The Pacific States Bald Eagle Recovery Plan is undergoing agency review. The final recovery plan is scheduled to be out in fiscal year 1985 The primary objective in the recovery plan is to provide secure habitat, both for breeding and wintering populations of bald eagles. Efforts have been underway since 1982 to develop the Montana Bald Eagle Management Plan (MBEMP) under the direction of the interagency Montana Bald Eagle Working Group The purpose of the MBEMP is to implement the recovery plan on a local basis in Montana The MBEMP is being prepared for agency review, and should be available as a working document for land management agencies in Montana within the next year We recommend that you consult the MBEMP and working group members when developing specific activities and programs under the Bitterroot NF Plan that have the potential to affect the eagle

3

FOREST SERVICE RESPONSE

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1 We have added a Forest-wide management standard that states we will cooperate with any recovery effort for a species which historically occurred on the Forest

2 Potential bald eagle habitat appears to be limited to the area along the main stem of the Bitterroot River The Bitterroot administers only two, 40-acre parcels along the river They are designated for management without roads in Management Areas (MA) 8a and 9 There will be essentially no development activities in either area If bald eagles begin to expand their range into areas we now think are submarginal, the expansion will probably be into riparian areas, MA 3b, 3c and 5, which will be managed primarily for wildlife and fish

3 We have consulted with the interagency Montana Bald Eagle working group and their working management plan and will continue to do so in areas where it is applicable We will consider potential effects to bald eagles for each project under the auspices of the Forest Plan

Identification of winter roosts, feeding areas, and spring and fall migration routes needs to be completed so that effects of Bitterroot NF activities and programs can be adequately evaluated in relation to the bald eagle. Without documentation of such areas, impacts of logging, recreational developments, etc cannot be fully evaluated The significance of Bitterroot NF resource allocations to protect and maintain habitat for wintering populations of eagles should not be understated A reasonable assumption and prediction can be made that the condition of bald eagles returning to breeding sites in the late winter or early spring will directly influence the birds breeding success. And obviously, eagles that die during the winter due to inadequate food and/or shelter will not contribute further to the recovery of the species.

Gray Wolf

There have been two probable wolf sightings on the Idaho portion of the Bitterroot NF in recent years a September 1981 sighting of a black wolf near Salmon Mountain Lookout, and a November 1983 sighting of a light gray wolf near Lunch Creek The paucity of wolf sighting reports may be related to the remoteness of the area and the relatively low numbers of people visiting the area Ungulate wintering areas along the Selway River drainage from Gardinar Creek to the upper Selway River near Wilkerson, Storm, and Lunch Creeks should be considered key to lone wolves, as well as packs (should packs become established) occupying lands on the Bitterroot NF or adjacent Nezperce NF, (Kaminski and Hansen, 1984) The headwaters area of the Selway River is suspected to be important to wolves traveling from north to south along the Montana-Idaho border. We support the Bitterroot NF's allocation of 28,500 acres of the Blue Joint Roadless Area to wilderness and the addition of 48,300 acres to the Selway Bitterroot Wilderness

The recovery plan for the gray wolf is currently undergoing revision and is scheduled for completion in FY 1985. If approved, this plan will provide direction for managing wolf recovery, based on a zone management concept.

Plants

The Lemhi penstemon (Penstemon lemhiensis), discussed on page III-16 of the DEIS is listed as a Category 2 species on the FWS Supplement to Review of Plant Taxa for Listing· Proposed Rule. (Federal Register 48 (229) 53640-53670. Monday, November 28, 1983). Category 2 comprises taxa for which information now in possession of the FWS indicates that proposing to list the taxa as an endangered or threatened species is possibly appropriate but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support proposed rules.

FOREST SERVICE RESPONSE Continued

4 We have recorded bald eagle use of the Bitterroot Forest since about 1980. To date, there has been only occasional use on the Forest, and no areas of high use Most use is in river bottom habitat outside the Forest boundary Our riparian prescription will maintain most of the habitats desired by eagles We will also continue to monitor eagle use on the Forest and identify important habitats so they can be provided additional protection if needed Winter use by bald eagles on the Forest is usually governed by the weather and not the habitat, more use occurs during mild winters with more open water We have established a Forest-wide management standard to assure cooperation in the recovery of any species which historically occupied the Forest.

5 Habitat management for gray wolves is limited by management direction for the Selway-Bitterroot Wilderness as shown in MA 7

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Recommendations

1 Although the DEIS states, "The Forest will cooperate with any interagency effort to restore a threatened or endangered species under any alternative.", there is not a Forest-wide goal or standard in the Plan discussing T/E species. The Forest-wide standards would be an appropriate place to address the Bitterroot NF commitment to T/E species. 6

2. We recommend the Bitterroot NF develop contingency/management plans for the peregrine falcon, bald eagle, and gray wolf, should any or all of these species occupy or reoccupy the Bitterroot NF. 7

3. Powerlines crossing the Bitterroot NF should be raptor-proofed according to the specifications provided in Raptor Research Report No. 4. 8

4 Stipulation requirements for oil and gas leasing on non-wilderness lands should incorporate MBEMP management guidelines upon completion of the MBEMP 9

This completes the FWS biological opinion on the Bitterroot NF Plan If the Plan should change significantly, resulting in impacts not considered in this biological opinion, consultation should be reinitiated Your cooperation and interest in meeting our joint responsibilities under the ESA is appreciated.

Sincerely,

Wayne G Brewster

Wayne G Brewster
Field Supervisor
Endangered Species

cc: Director, FWS, Washington, D C (OES)
Regional Director, FWS (FA/SE), Denver, CO
Grizzly Bear Recovery Coordinator
Field Supervisor, ES, FWS, Billings, MT.
Forest Supervisor, Bitterroot NF, Hamilton, MT
Field Supervisor, SE, Boise, ID

References

Kaminski, T and J. Hansen 1984. Wolves of Central Idaho Montana Cooperative Wildlife Research Unit University of Montana, Missoula, Montana. 197 pp.

FOREST SERVICE RESPONSE Continued

6 We have added a Forest-wide management standard in response to this concern

7 We are required to assure the protection of threatened or endangered species No threatened or endangered species occupy the Forest If a species should become established, or recovery of a resident species is required, we will follow the applicable recovery plan to assure their continued existence

8 The Final Plan establishes general management direction Forest-wide Individual projects will require individual evaluation If a problem develops, existing lines are replaced, or new construction is planned, we will consider the specifications of Raptor Research Report No 4

9 Appendix N of the Final Plan contains oil and gas leasing stipulations for bald eagle habitat

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United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D C 20240

ER-85/492

AUG 14 1985

Mr Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

RECEIVED
AUG 19 1985
Bitterroot National Forest

Dear Mr Morgan
We have reviewed the proposed Forest Plan and draft environmental impact statement (DEIS) regarding the Bitterroot National Forest Our comments are as follows

Hunting/Fishing Rights
The Confederated Salish and Kootenai Tribes have retained hunting and fishing rights for the tribal areas ceded to the United States Government including portions of the Bitterroot National Forest (Treaty with the Flatheads, 1855, copy enclosed) The free exercise of these rights can be a sensitive issue, consequently, it may be helpful to discuss the subject in the Affected Environment Chapter

1

Minerals
Several concerns were found with the discussion of mineral resources Particularly lacking in Chapter IV, Environmental Consequences, is a description and evaluation of the impacts of the various management alternatives on the mineral natural resource To help illustrate what is considered an appropriate evaluation for impacts to mineral resources, the Environmental Consequences Chapter from the revised Beaverhead National Forest DEIS is enclosed Tables II-12 and II-13, excellent summary tables from the Helena National Forest DEIS are also enclosed

Use of recently published reports by the U S Geological Survey which give mineral resource appraisals for some of the area discussed is suggested for improving the minerals discussion In particular the following two reports are pertinent

1) Wallace and others, 1984, Mineral resource potential map of the Sapphire Wilderness Study Area and contiguous roadless areas, Granite and Ravalli Counties, Montana U S Geological Survey Map MF-1469-B

2) Williams, C E , and Pearson, R C , 1984, Mineral resource potential of national forest RARE II and wilderness areas for Montana U S Geological Survey Open-File Report 84-637, 134 p

2

Several statements were noted in Chapter IV which could be considered to be unwarranted bias. For example, page 15, paragraph 4, lines 3, 4 and 5 state, "Vegetation and soils around mines would be drastically affected" "Water quality would be degraded" "Vegetation and soils would be removed at an actual excavation, but around the mines would likely be affected very little or not at all" Most new mining operations are able to avoid or mitigate significant water quality degradation and other production effects

3

FOREST SERVICE RESPONSE

930

1 We have added a short discussion of tribal hunting and fishing rights to Chapter III, Affected Environment

2 The Mineral section in Chapter IV has been rewritten to more fully analyze the environmental effects of mineral development

3 No bias is intended about mining The purpose of Chapter IV of the EIS is to document the potential environmental effects of activities We will add a statement, "Most new mining operations are able to avoid or mitigate significant water quality degradation and other production effects," to Chapter IV of EIS

930

Additionally, some statements on mineral resources in this report are misleading For example, the following statement appears on page III-16 and page C-81, "Silver and manganese operations generally follow veins exposed at the surface" This statement is misleading since most of the mining was actually done in underground operations and, furthermore, it implies that silver and manganese are the most important commodities in the area The area, essentially the Frog Pond mining district, produced significant quantities of silver and lead and minor amounts of gold and copper There are no reports of manganese production from the area

4

Recreation

On page III-7 of the DEIS, the references to "Continental Divide Scenic Trail" and "Lewis and Clark Historic Trail" need to have the word "National" inserted before "Scenic" and "Historic" The National trails have geen designated by the Congress Similarly, on page IV-9 of the DEIS, the "Lewis and Clark Trail" should be correctly named Also on that page, the Big Hole Battlefield Trail has been designated a national recreational trail, rather than an historic trail

5

The Forest Plan discusses management of trails in general, but fails to give specific emphasis on how the particular segments of the National Trails System will be managed within the forest. It is suggested that the plan and the DEIS recognize that development and use for both the national scenic and national historic trails within the forest will be managed in accord with the approved comprehensive management plans for each of those trails

6

No discussion was found in the subject documents which took into account the existence and/or the effect the proposed Forest Plan and DEIS would have upon National Natural Landmarks (NNLs) It is suggested therefore, that the Forest Service address these areas as part of their natural resource management activities

The following are seven (7) potential NNLs, listed by county, are located within the Bitterroot National Forest

Granite County
- Sapphire Divide (Ravalli)

Ravalli County
- Frontal Zone Gneiss
- Lost Horse Canyon Sites
- Nelson Lake Slide
- Rock Glacier and Orbicular Rocks - Trapper Creek
- Sawmill Creek
- Skolkaho Stock

Further planning for the Bitterroot National Forest should take into account these potential NNLs. Impacts that could adversely affect the outstanding ecological and geological features of these areas should be avoided.

7

FOREST SERVICE RESPONSE Continued

4 The statement on page C-81 of the DEIS has been rewritten for clarification

5 The names of the trails have been changed in the FEIS

6 Separate management direction for these trails has been added to the Final Plan

7 All National Natural Landmarks are in Management Areas (MA's) protected from development except the St Clair Creek portion of "Skalkaho Stock" The development will apparently not conflict with the purpose of this particular NNL The "Frontal Zone Gneiss" proposal in Sweathouse Creek is on private land

930

Mr Robert S Moxman 3

Lastly, it is suggested that the statement indicate whether or not drinking water is furnished at recreation sites and, if so, procedures for ensuring good quality water, including periodic monitoring, should be discussed Type(s) and adequacy of sanitary facilities should also be addressed 8

Wildlife

Threatened and endangered species are not adequately discussed in the proposed Forest Plan or accompanying DEIS As part of this discussion, it should be mentioned that Section 7 consultation between the Forest Service and the Fish and Wildlife Service has been initiated The results of this consultation should be included in the final environmental statement 9

It was noted with interest that riparian areas are being treated as a unique management zone on the forest The management goals and standards listed for the riparian ecosystem (Management Area 3b, on pages 2I-27 of Chapter III of the Forest Plan) are well organized The management direction and intent seem to be in keeping with Executive Order 11990 (Protection of Wetlands) and Forest Policy (2527 03), as written under Forest Service Manual Title 2500 - Watershed Management However, except for page N-2 of Appendix N (Stipulation Requirements of Oil and Gas Leasing on Non-Wilderness Lands) in the Forest Plan, no consolidated statement of intent with respect to the Executive Order was found It is suggested that discussion be included in the DEIS and the Forest Plan that would outline the circumstances that would be in compliance with both the Executive Order and Forest Policy, as well as those that would not be in compliance It is recommended that the wetlands (as defined by the Executive Order) be included in the DEIS as an "affected environment" and be discussed under Sections IID, IIIB and IV of the document Also, the glossary and indices should include the words "wetland" and "floodplain" They are currently omitted 10

It is suggested that emphasis be placed on the importance of monitoring the condition of the wetland and riparian zones by considering these zones as "outputs" Variables that could be measured to indicate change in condition could include the status of appropriate wildlife indicator species, grass and shrub utilization by cattle, a diversity of vegetation parameters, streambank stabilization, sediment trapping, and so on The establishment of permanent sampling plots may be required in order to detect changes over time As currently structured, the riparian area condition is a variable to be measured under the water, air and soil "output" heading It is not clear that this is sufficient in order to monitor the implementation of the Forest Plan. Because of the importance of these areas to wildlife, it is strongly felt that this monitoring effort should be sufficiently funded 11

It is suggested that the Plan provide that cattle be excluded from riparian areas, preferably by fencing, during seasons when soil moisture is high, until such time has elapsed that bank stability has been restored Recent research indicates that stream banks are most unstable when soil moisture is high, i e , in the spring 12

The recently completed "Elk Logging Study," which is a cooperative report signed by the Regional Forester, Northern Region of the US Forest Service, and others, provides recommendations for coordinating elk activities and logging management However, an acknowledgement of the study recommendations or a commitment to apply them 13

FOREST SERVICE RESPONSE Continued

8 We agree that safe drinking water is an important consideration We think the site-specific characteristics of recreation sites are more appropriately addressed in publications more generally available to the public like the Recreation Opportunity Guide than in the Forest Plan

9 Since no known populations of threatened or endangered species occur on the Forest, we feel the discussion is adequate Results of the formal consultation with the Fish and Wildlife Service have been included in the Final Forest Plan

10 Wetlands and floodplains are a part of the riparian area identified in the Final Plan in MA 3b We have added floodplain and wetland definitions and revised the riparian areas definition in the Glossary of the FEIS and Final Plan

11 Organization of the Forest Plan Monitoring Requirements may not be clear We think riparian area monitoring is appropriately placed in the Soil, Air and Water category The Final Forest Plan displays monitoring criteria we think will assure the continued protection of the Forest's stream courses and riparian areas. There are no guarantees for funding any part of the Plan We have provided for adjustments in outputs as a result of variation in funding

12 Given the topography of the Bitterroot and the level of livestock use on the Forest, it is far beyond the reality of economics to fence individual riparian areas We will deal with the concern in allotment management plans by considering riparian pastures, limiting use by season and stocking rate, and closely monitoring riparian areas for degradation as outlined in the Forest Plan Monitoring Requirements No cattle are permitted on the Forest after October 15 or before June 1, usually the wettest time of year

13 We have added a Forest-wide management standard to adopt the recommendations of the "Elk Logging Study"

cannot be found in the documents Since other Montana National Forests have included both in their respective Plans, we recommend that the Bitterroot Forest consider the inclusion of language that acknowledges the study findings and that will commit to considering them

14

The State of Montana has published a list of non-game species of special concern. It is recommended that this list of species be included in these documents, and that key habitats on the Forest for these species be identified and maintained.

It is suggested that the timing of human activity near these key habitats and all critical habitat areas be regulated so that 1) the habitat remains available to wildlife during those seasons when they are needed, and 2) the availability of the habitat via traditional trails is not blocked.

15

Lastly, as human population centers adjacent to the Bitterroot Forest continue to develop and private lands are subdivided, it is believed that the public value of some forest-based resources and opportunities will continue to increase as they become more scarce in the private domain Consequently, future forest management should center around watersheds, recreation and wildlife Activities like timber harvesting and grazing should be compatible and complementary It is vital to consider the effects of off-forest land-use practices and trends when setting on-forest management goals

16

Thank you for the opportunity to comment on the proposed Bitterroot Forest Plan and DEIS

Sincerely,

Terence M. Martin

for Bruce Blanchard, Director
Environmental Project Review

FOREST SERVICE RESPONSE Continued

14 We considered the Montana list of nongame species of special concern as a source document for constraints on Forest management direction We decided to use the indicator species process and to monitor habitat diversity to ensure we maintain at least viable populations of all vertebrate species

15 We know that whatever activity occurs on the Forest, some wildlife species habitat will be enhanced and some degraded Activity schedules will be adjusted during the project planning phase to ensure that sensitive wildlife species will not be unnecessarily disturbed during the activity period Maintenance of a diversity of habitats in the areas where activity occurs will ensure the perpetuation of populations of species now occupying the Forest The forces of nature will be allowed to play a major role in the shaping of the forest environment in the half of the Forest that is classified wilderness Nearly 15 percent more of the Forest will be excluded from nearly any vegetation management because it will be managed primarily for semiprimitive recreation

16 We are fully aware of the increasing public values of primitive and semiprimitive recreation opportunities We have also considered the supply of and demand for commodity outputs. The result of our deliberations is the management direction and land allocation that appears as the Final Forest Plan

TREATY WITH THE FLATHEADS ETC 1855

July 16, 1855.

12 Stats., 975.
Proclamation, April 18, 1859.

Articles of agreement and convention made and concluded at the treaty ground at Hell Gate, in the Bitter Root Valley this second (16th) day of July in the year one thousand eight hundred and fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington on the part of the United States, and the undersigned chiefs, headmen, and delegates of the confederated tribes of the Flathead, Kootenay, and Upper Pend d'Oreilles Indians on behalf of and acting for said confederated tribes, and being duly authorized thereto by them. It is understood and agreed that the said confederated tribes shall constitute a nation under the name of the Flathead Nation, with Victor the head chief of the Flathead tribe, as the head chief of the said nation, and that the several chiefs, head men, and delegates, whose names are named to this treaty, do hereby in behalf of their respective tribes recognize Victor as said head chief.

Cession of lands to the United States.

ARTICLE 1. The said confederated tribe of Indians hereby cede, relinquish, and convey to the United States all their right, title, and interest in and to the country occupied or claimed by them, bounded and described as follows, to wit:

Boundaries.

Commencing on the main ridge of the Rocky Mountains at the forty-ninth (49th) parallel of latitude, thence westwardly on that parallel to the divide between the Flat bow or Kootenay River and Clarke's Fork, thence southerly and southeasterly along said divide to the one hundred and fifteenth degree of longitude, (115°) thence in a southwesterly direction to the divide between the sources of the St. Regis Borgia and the Cœur d'Alene Rivers, thence southeasterly and southerly along the main ridge of the Bitter Root Mountains to the divide between the head waters of the Koos-koos-kee River and of the southwestern fork of the Bitter Root River, thence easterly along the divide separating the waters of the several tributaries of the Bitter Root River from the waters flowing into the Salmon and Snake Rivers to the main ridge of the Rocky Mountains, and thence northerly along said main ridge to the place of beginning.

Reservation.

ARTICLE 2. There is, however, reserved from the lands above ceded, for the use and occupation of the said confederated tribes and as a general Indian reservation, upon which may be placed other friendly tribes and bands of Indians of the Territory of Washington who may agree to be consolidated with the tribes parties to this treaty under the common designation of the Flathead Nation with Victor, head chief of the Flathead tribe as the head chief of the nation, the tract of land included within the following boundaries, to wit:

Boundaries.

Commencing at the source of the main branch of the Jocko River, thence along the divide separating the waters flowing into the Bitter Root River from those flowing into the Jocko to a point on Clarke's Fork between the Camash and Horse Prairies, thence northerly to and along the divide bounding on the west the Flathead River, to a point due west from the point half way in latitude between the northern and southern extremities of the Flathead Lake, thence on a due east course to the divide whence the Crow, the Prune, the Soo-ni-el-em and the Jocko Rivers take their rise, and thence southerly along said divide to the place of beginning.

Whites not to reside thereon unless, etc.

All which tract shall be set apart, and so far as necessary, surveyed and marked out for the exclusive use and benefit of said confederated tribes as an Indian reservation. Nor shall any white man, excepting those in the employment of the Indian department, be permitted to reside upon the said reservation without permission of the confederated

tribes and the superintendent and agent And the said confederated tribes agree to remove to and settle upon the same within one year after the ratification of this treaty In the meantime it shall be lawful for them to reside upon any ground not in the actual claim and occupation of citizens of the United States and upon any ground claimed or occupied if with the permission of the owner or claimant

Guaranteeing however the right to all citizens of the United States to enter upon and occupy as settlers any lands not actually occupied and cultivated by said Indians at this time, and not included in the reservation above named *And provided*, That any substantial improvements heretofore made by any Indian, such as fields enclosed and cultivated and houses erected upon the lands hereby ceded and which he may be compelled to abandon in consequence of this treaty shall be valued under the direction of the President of the United States and payment made therefor in money or improvements of an equal value be made for said Indian upon the reservation and no Indian will be required to abandon the improvements aforesaid now occupied by him until their value in money or improvements of an equal value shall be furnished him as aforesaid

Indians to be allowed for improvements on land ceded

ARTICLE 2 *And provided*, That it necessary for the public convenience roads may be run through the said reservation and on the other hand the right of way with free access from the same to the nearest public highways is secured to them as also the right in common with citizens of the United States to travel upon all public highways

How roads may be laid through reservation

The exclusive right of taking fish in all the streams running through or bordering said reservation is further secured to said Indians, as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory, and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries and pasturing their horses and cattle upon open and unclaimed land

Rights and privileges of Indians

ARTICLE 4 In consideration of the above cession the United States agree to pay to the said confederated tribes of Indians in addition to the goods and provisions distributed to them at the time of signing this treaty the sum of one hundred and twenty thousand dollars in the following manner—that is to say For the first year after the ratification hereof thirty six thousand dollars to be expended under the direction of the President in providing for their removal to the reservation breaking up and fencing farms, building houses for them and for such other objects as he may deem necessary For the next four years six thousand dollars each year for the next five years, five thousand dollars each year for the next five years four thousand dollars each year, and for the next five years three thousand dollars each year

Payment by the United States

How to be applied

All which said sums of money shall be applied to the use and benefit of the said Indians under the direction of the President of the United States who may from time to time determine at his discretion upon what beneficial objects to expend the same for them and the superintendent of Indian affairs or other proper officer shall each year inform the President of the wishes of the Indians in relation thereto

ARTICLE 5 The United States further agree to establish at suitable points within said reservation, within one year after the ratification hereof an agricultural and industrial school, erecting the necessary buildings keeping the same in repair, and providing it with furniture, books and stationery to be located at the agency and to be free to the children of the said tribes, and to employ a suitable instructor or instructors To furnish one blacksmith shop, to which shall be attached a tin and gun shop one carpenter's shop, one wagon and plough maker's shop and to keep the same in repair, and furnished with the

United States to establish schools

Mechanical shops

necessary tools To employ two farmers one blacksmith one tinner one gunsmith, one carpenter one wagon and plough maker, for the instruction of the Indians in trades and to assist them in the same To erect one saw mill and one flouring mill keeping the same in repair and furnished with the necessary tools and fixtures and to employ two millers To erect a hospital keeping the same in repair and provided with the necessary medicines and furniture and to employ a physician and to erect keep in repair, and provide the necessary furniture the buildings required for the accommodation of said employees The said buildings and establishments to be maintained and kept in repair as aforesaid and the employees to be kept in service for the period of twenty years

Hospital

To pay salary to head chiefs

And in view of the fact that the head chiefs of the said confederated tribes of Indians are expected and will be called upon to perform many services of a public character, occupying much of their time the United States further agree to pay to each of the Flathead Kootenay and Upper Pend d'Oreilles tribes five hundred dollars per year for the term of twenty years after the ratification hereof as a salary for such persons as the said confederated tribes may select to be their head chiefs and to build for them at suitable points on the reservation a comfortable house and properly furnish the same and to plough and fence for each of them ten acres of land The salary to be paid to and the said houses to be occupied by, such head chiefs so long as they may be elected to that position by their tribes and no longer

Certain expenses to be borne by the United States and not charged on annuities

And all the expenditures and expenses contemplated in this article of this treaty shall be defrayed by the United States, and shall not be deducted from the annuities agreed to be paid to said tribes Nor shall the cost of transporting the goods for the annuity payments be a charge upon the annuities but shall be defrayed by the United States

Land may be selected in lots in severalty

ARTICLE 6 The President may from time to time at his discretion cause the whole, or such portion or such reservation as he may think proper to be surveyed into lots and assign the same to such individuals or families of the said confederated tribes as are willing to avail themselves of the privilege, and will locate on the same as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be applicable

And to cit.

Annuities not to pay individuals' debts

ARTICLE 7 The annuities of the aforesaid confederated tribes of Indians shall not be taken to pay the debts of individuals

Indians to preserve friendly relations

ARTICLE 8 The aforesaid confederated tribes of Indians acknowledge their dependence upon the Government of the United States and promise to be friendly with all citizens thereof and pledge themselves to commit no depredations upon the property of such citizens And should any one or more of them violate this pledge and the fact be satisfactorily proved before the agent the property taken shall be returned, or, in default thereof or if injured or destroyed compensation may be made by the Government out of the annuities Nor will they make war on any other tribe except in self-defence but will submit all matters of difference between them and other Indians to the Government of the United States or its agent for decision and abide thereby And if any of the said Indians commit any depredations on any other Indians within the jurisdiction of the United States the same rule shall prevail as that prescribed in this article, in case of depredations against citizens And the said tribes agree not to shelter or conceal offenders against the laws of the United States but to deliver them up to the authorities for trial

Indians to pay for depredations and to make war except etc

To surrender offenders etc

Annuities to be withheld from those who drink ardent spirits

ARTICLE 9 The said confederated tribes desire to exclude from their reservation the use of ardent spirits and to prevent their people from drinking the same and therefore it is provided that any Indian belonging to said confederated tribes of Indians who is guilty of bringing

liquor into said reservation, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her for such time as the President may determine

Guaranty of reservation against certain claims of Hudson Bay Company

ARTICLE 10 The United States further agree to guaranty the exclusive use of the reservation provided for in this treaty as against any claims which may be urged by the Hudson Bay Company under the provisions of the treaty between the United States and Great Britain of the fifteenth of June, eighteen hundred and forty six, in consequence of the occupation of a trading post on the Pru-in River by the servants of that company

Bitter Root Valley to be surveyed and portions may be set apart for reservation

ARTICLE 11 It is, moreover provided that the Bitter Root Valley above the Loo-lo Fork, shall be carefully surveyed and examined and if it shall prove in the judgment of the President, to be better adapted to the wants of the Flathead tribe than the general reservation provided for in this treaty then such portions of it as may be necessary shall be set apart as a separate reservation for the said tribe No portion of the Bitter Root Valley, above the Loo lo Fork shall be opened to settlement until such examination is had and the decision of the President made known

Meanwhile not to be injured for settlement

When treaty to take effect

ARTICLE 12 This treaty shall be obligatory upon the contracting parties as soon as the same shall be ratified by the President and Senate of the United States

In testimony whereof, the said Isaac I Stevens governor and superintendent of Indian affairs for the Territory of Washington, and the undersigned head chiefs, chiefs and principal men of the Flathead, Kootenay, and Upper Pend d Oreilles tribes of Indians, have hereunto set their hands and seals, at the place and on the day and year herein before written

Isaac I Stevens, [L S]
Governor and Superintendent Indian Affairs W T

Victor head chief of the Flathead Nation, his x mark [L S]
Alexander chief of the Upper Pend d Oreilles his x mark [L S]
Michelle, chief of the Kootenays, his x mark [L S]
Ambrose, his x mark [L S]
Pah soh his x mark [L S]
Bear Track, his x mark [L S]
Adolphe, his x mark [L S]
Thunder, his x mark [L S]

Big Canoe, his x mark [L S]
Kootel Chah, his x mark [L S]
Paul, his x mark [L S]
Andrew his x mark [L S]
Michelle his x mark [L S]
Battiste, his x mark [L S]

Kootenays

Gun Flint, his x mark [L S]
Little Michelle, his x mark [L S]
Paul See, his x mark [L S]
Moses, his x mark [L S]

James Doty, secretary
R H Lansdale Indian Agent
W H Tappan, sub Indian Agent

Henry R Crosire,
Gustavus Sohon, Flathead Interpreter
A J Hoecken, sp ms
William Craig

TREATY WITH THE OTTAWA AND CHIPPEWA, 1855

July 31 1855

11 Stat 621
Ratified April 18 1856.
Proclaimed Sept 10 1856

Articles of agreement and convention made and concluded at the city of Detroit in the State of Michigan this the thirty-first day of July, one thousand eight hundred and fifty five, between George H Manypenny and Henry C Gilbert, commissioners on the part of the United States, and the Ottawa and Chippewa Indians of Michigan, parties to the treaty of Maren 28, 1836

In view of the existing condition of the Ottowas and Chippewas, and of their legal and equitable claims against the United States it is agreed between the contracting parties as follows

Certain lands in Michigan to be withdrawn from sale

ARTICLE 1 The United States will withdraw from sale for the benefit of said Indians as hereinafter provided, all the unsold public lands

Short-term Use vs Maintenence and Enhancement of Long-term Productivity - Implementation of grazing controls in pastures, retention of pool recruitment trees in riparian areas and installation of habitat improvement projects will maintain and improve the productivity of the existing fishery habitat

Irreversible and Irretrievable Commitment of Resources - The forage left unutilized by livestock in pastures containing fisheries streams is irretrievable Trees retained in riparian areas for future pool development will not be harvested and the associated volume lost There are few irreversible or irretrievable commitments of resources associated with fish habitat improvement projects because so little area is involved

Adverse Effects Which Cannot be Avoided - Stream bottoms will be disturbed when fish barriers are removed and when other instream fishery improvement projects are constructed This may have minor short-term effects on the fish and insects which occupy these areas

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - The objectives of the State wildlife agencies and the National Forests are different Therefore, plans for the management of the fish occupying Forest may conflict and special efforts to reconcile differences may be necessary

Energy Requirements - Some energy will be required in removal of barriers and construction and maintenence of the fish hatching channel This will be only a small portion of the total energy use of the Forest

I. Minerals

During the 10 years, the Forest's accomplishments in minerals and energy related resource activities are expected to range between 325-375 cases until large numbers of oil and gas leases begin expiring in 1987 and beyond Accomplishments could increase by 50-75 percent in the late 1980's as last minute oil and gas exploration prior to lease expiration increases and lease reissuance after expiration proceeds At the present time, approximately 45 percent of case accomplishments are related to locatable minerals, 45 percent are related to leasable minerals and 10 percent are related to salable minerals The magnitude of the different workloads can be inferred from funding allocations Currently 60-70 percent of the Forest's workload is related to nonenergy minerals (locatables and salables) and 30-40 percent of the workload is related to energy minerals (leasables) These percentages would be expected to change in the late 1980's, as oil and gas related activities increase dramatically

1. Locatable Minerals

The 1872 Mining Act authorizes the public to go on National Forest System lands which are open to mineral location in order to prospect for, appropriate, develop and process locatable minerals Only valid existing rights may be exercised in areas withdrawn from mineral entry, such as designated wilderness areas After withdrawal, no new mining claims may be staked The law not only gives the right to the mineral resource, but also

to the use of the surface and surface resources so long as that use is reasonable and necessary for exploration and mining activities

The Forest Service is responsible for the management of the surface resources of National Forests, acting in cooperation with the operators to minimize the surface disturbances of mining activities Authority to mitigate surface disturbances must not be used to unreasonably impede mining, the Forest Service is required by the 1970 Mining and Minerals Policy Act to foster and encourage private enterprise in mining and in the development of a sound mineral industry Mitigation of impacts to other resources must meet the intent of statutes covering air and water quality standards, protection of threatened and endangered species and cultural resources.

Mineral related activities include prospecting, exploration, development and production These activities are described below

Prospecting involves the search for outcrops or surface exposures of mineral deposits It also involves the preliminary exploration to test values of lodes or placers already known to exist and to determine the approximate extent of the payable ground (Thrush, 1968) The intent of prospecting is to find a target area suitable for future exploration

Impacts to the ground from prospecting would be extremely light or nonexistent, as the methods are surficial in nature Specific activities might include surficial examination of accessible rock outcrops or talus slopes for evidences of minerals, large-scale reconnaissance geologic mapping, collection and analysis of hand specimens, reconnaissance stream sediment sampling at the mouths of major streams, collection of geophysical data over large areas (aeromagnetic or gravity surveys) and collection of data utilizing remote sensing techniques (multispectural scanners or side-looking radar)

Exploration is the search for ore by 1) geological surveys, 2) geophysical surveys, 3) bore holes and test pits, or 4) surface or underground headings, drifts, or tunnels It aims at locating economic deposits and establishing their nature, shape and grade Investigation can involve either the preliminary or final work needed to determine the size, shape position and value of an ore body (Thrush, 1968)

Surface impacts caused by exploration vary, depending on the method used to explore, the size of the target area and funds available for the project Exploration is a continuation of some prospecting activities, but the area of interest usually is smaller Generally, scattered minor surface impacts may occur during initial exploration activities because the target area is not yet clearly defined Later activities may include an exploratory drilling program necessitating access roads, drill sites and open cutting or trenching to expose bedrock Detailed geologic mapping, soil sampling on a closely spaced (50 to 100 feet) grid pattern for geochemical analysis and seismic, resistivity, or induced polarization surveys may also be used

Development involves opening up an ore body by sinking shafts, driving drifts and installing requisite equipment It prepares a proven ore body for mining and transporting ore (Thrush, 1968)

Development causes the greatest intensity of surface disturbance of all mineral and energy-related activites, however, the working area is fairly well defined and generally limited to the area of future operations Drilling begun during exploration may continue, but the holes will be more closely spaced and most drilling can be done from existing roads Other activities would include preparation and development of the actual operation site, construction of ore bins, stockpile areas and dump space for mine waste, improvement of road system to and within the operating area, and, possibly, preparatory work for mill construction In most cases, this work may be done from existing roads

Production involves mining and transporting ore from a mine to the mill or market Little additional surface disturbance will result from production except within the mining operation area or, in the case of onsite concentration, from disposal of mill tailings To maintain ore reserves, limited surface drilling may be continued to find new extensions of the ore body Minor adjustment of the road systems or movement of facilities may be necessary to fit changing needs or conditions of the operation

Any mining activity on unpatented Forest land is only a temporary use of the land and restoration is possible after mining activities cease. Reclamation activities are carefully supervised and controlled to minimize permanent surface impacts.

Short-term Use vs Maintenance and Enhancement of Long Term Productivity- Activities associated with exploration and development of mineral resources will have the numerous effects on other resource values and uses Although environmental effects can be minimized through existing regulations, the long-term effect will be an overall decline in the quality of the environment

1) Much activity will be concentrated in areas that offer outstanding recreation opportunities This will result in conflicts with recreation users Even though visual screening, noise abatement and timing of activities will lessen conflicts, the quality of the recreation experience will decrease

2) Continued activity will result in an increased number of roads and developed areas on the Forest. This will reduce the Forest's unroaded recreation resource Effective transportation planning can minimize the number of miles of roads necessary Additional roads in previously unroaded areas may benefit the development of other Forest resources, such as marginally commercial timber

3) Surface-disturbing activities adversely affect water quality and fisheries habitat through increased bed load and suspended sediment production and increased chemical and heavy metals contamination Establishing vegetative cover on disturbed areas, minimizing the area of disturbance, controlling erosion and runoff and containing contaminants, can minimize adverse effects on water quality and fisheries habitat Soil characteristics will not be adversely affected if topsoil conservation and adequate design of developments avoid impacts to soil productivity

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4) Visual quality will be decreased, although screening can lessen the visual impact of developments Although environmental effects can be minimized through existing regulations, the long-term effect will be an overall decline in the quality of the environment

5) Activities will cause an undesirable increase in human/wildlife encounters and increased disturbance of wildlife habitat Seasonal restrictions on activities, screening of operations and measures to minimize noise and emissions, will help mitigate these impacts

6) Air quality may be reduced during activities, but can be mitigated through dust abatement and emissions control measures

7) Continued activity will result in increased pressures on cultural and historical values that exist An increased number of mitigation measures will be required to protect these properties. More old mining properties that have historic significance will be reopened Although mitigation procedures will be followed, these areas will no longer be preserved in the same manner they are today

8) Even though a relatively small acreage will be involved Forest-wide, the number of severely disturbed acres that can no longer be reclaimed to a condition where the imprint of man's activity is not noticible, will increase Well designed operations and thorough reclamation will minimize this acreage

9) Development and production can change the social and economic structure of local communities and can result in a population influx that will put a strain on local resources These social and economic impacts from (temporary) increases in population will be long-term effects, but are reversible Mitigation through community planning is possible

Activities associated with exploration, development and production of mineral resources will assist the nation's effort lessen the existing shortage of critical minerals decrease dependence on foreign mineral imports from politically unstable countries and reduce the balance of payments deficit

Withdrawals from mineral entry and significant access restrictions have a long-term effect on minerals discovery, development and production Mines may require a lead time of 20 years or more from the beginning of the exploration project to the delineation of an economic mineral deposit Several more years may be required for that deposit to be brought into production If discoveries are impeded for a period of time through restricted access or withdrawal, a relaxation of restrictions will not have an immediate effect on production There will be a significant delay before a production increase from new discoveries is realized Withdrawals and significant access restrictions will result in some mineral deposits not being found or not being developed This will increase existing and future minerals shortages increase dependence on foreign imports and increase the nation's balance of payments deficit This effect will be the greatest where there is significant mineral potential or high/very high geologic favorability The amount of area exhibiting restrictions to mineral

development varies by alternative particularly by the amount of proposed roadless and wilderness classifications These restrictions and area assignments are shown in Chapter II Table II-11

Irreversible and Irretrievable Commitment of Resources - The removal of mineral resources is an irreversible and irretrievable commitment of the resource A reduction in the Forest's unroaded lands (including those acres in inventoried roadless areas) will result from exploration and development. There will be some irreversible and irretrievable commitment of cultural and historical resources

Adverse Effects Which Cannot Be Avoided - The following adverse effects (described above) cannot be avoided surface disturbance and overall decline in the quality of the environment, disruptions to wildlife and its habitat, conflicts with other Forest users, and social and economic impacts on local communities

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - No conflicts have been identified

Energy Requirements - Energy would be used to explore for, develop and produce mineral resources It also would be used by the Forest Service to monitor the surface disturbance produced by these activities Severely restricted access for exploration would greatly increase energy consumption for this activity

2. Common Variety Minerals

Mineral deposits outside the scope of the 1872 Mining Act because of widespread occurrence and "common" nature are disposed of under the Materials Act of 1947 (as amended) The Forest Service has discretionary authority to sell these common variety mineral materials under mineral material sale permits, where extraction of these materials is compatible with other land management activities

Short-term Use vs Maintenance and Enhancement of Long Term Productivity - Decorative stone (used for fireplaces walls, etc) is removed from existing talus exposures Little to no reclamation is required to mitigate the impacts of removal Remaining rock has less lichen cover than the rock removed from the surface of the talus exposure, which will be a long-term effect

Gravel, riprap and a variety of road surfacing materials are removed from pits and cut slopes. The vegetation on pit sites would be destroyed The pits would be reshaped and rehabilitated when depleted or no longer needed The long-term productivity of the site after rehabilitation may be reduced The visual quality will be reduced while the pit is operating While a pit is being operated air quality may be reduced by dust generated by heavy equipment Surfaced roads require less maintenance and allow travel over a longer season.

Irreversible and Irretrievable Commitment of Resources - The removal of common variety mineral materials is an irreversible and irretrievable commitment of resources

Adverse Effects Which Cannot Be Avoided - Surface disturbance associated with the removal of common variety mineral materials and impacts on other resources and uses cannot be avoided, although these effects can be mitigated

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - No conflicts have been identified

Energy Requirements - Energy would be used to remove common variety mineral materials It also would be used by the Forest Service to monitor mineral material sale permits If decorative stone or road surfacing is provided in the vicinity of construction, less energy will be utilized hauling materials from other areas Efficient travel and low maintenance on surfaced roads also will reduce energy consumption

3. Oil and Gas

Oil and gas is specifically exempted from the 1872 Mining Act by Congress The Mineral Lands Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947 establish a permit/lease system to authorize exploration and development of oil and gas on public domain and acquired lands.

This section displays impacts that occur throughout various stages in the exploration for and development of oil and gas The stages are leasing geophysical prospecting, exploration drilling and field development (production) Each of these stages has its own un-que impacts, which are discussed in the following sections Even though an area is leased, there is no assurance that any of the following activities will occur on any one parcel of land. The lease gives the leaseholder or assignee the right to explore and develop, but it does not obligate him to do anything

a. Leasing

Oil and gas related activities begin with lease applications and the issuance of leases by the BLM with the consent or recommendation of the Forest Service. The issuance of a lease does not have a direct effect on other resources, but is a commitment of resources for the term of the lease (usually 10 years) The potential effects of this commitment are controlled by attaching stipulations to the lease Leasing grants the lessee or assignee the right to explore and develop his lease, within the terms of the lease

Short-term Use vs Maintenance and Enhancement of Long-term Productivity - Leasing allows a short-term opportunity to explore for and develop the non-renewable oil and gas resource There are no direct effects of leasing on other resources, just a commitment to allow exploration and development

Irreversible and Irretrievable Commitment of Resources - The act of leasing is considered an irreversible action for the life of the lease The oil and gas resource is irretrievably commited to exploration and development, within the terms of the lease for the life of the lease

Adverse Effects Which Cannot Be Avoided - The potential adverse environmental effects that may occur as a result of oil and gas development are mitigated by lease stipulations that control on-lease activities New lease stipulations can be added only after a lease expires, before a new lease is issued

Conflicts With the Objectives of Other Agencies, Land Management Plans, Policies or Controls - The guidelines of other land management plans are incorporated into lease stipulations A Forest-wide Oil and Gas Leasing Process Environmental Assessment was implemented on 3/14/79 No conflicts have been identified

Energy Requirements - Leasing does not require the use of energy unless an on-the-ground inspection of the area is needed to help determine what stipulations should be included in the lease

b Geophysical Prospecting

The next step in oil and gas development is geophysical prospecting Which includes seismic (shaking the earth) and non-seismic methods Activities may take place over the same area many times and continue over a number of years An area of interest usually is identified by preliminary seismic lines run at relatively wide spacing intervals This spacing is narrowed as the target area becomes better defined

The environmental effects of geophysical prospecting are discussed after various methods are listed and described

Gravity and magnetic surveys involve taking instrument readings at fairly regular intervals or spacings No actual surface disturbance is involved unless off-road vehicle travel is utilized to access the survey points Some of these surveys can be done using airborne equipment which has no environmental effect Magnetotelluric surveys are similar, but require shallow burial of some cables and recording devices by hand

Vibroseis exploration usually is limited to existing roads and gentle terrain Three to four large trucks travel in line and generate vibrations when large hydraulic pads mounted between the front and back wheels are lowered to the ground Geophones (listening devices) placed along the line pick up vibrations and transmit them to a recording truck via cables

Conventional seismic exploration involves the use of truck-mounted drills and vehicle-supported crews and generally requires off-road vehicle travel Holes are drilled to a depth of 50-200 feet Explosives are detonated at depth and shock waves are received and transmitted via cable and geophones to a truck-mounted recording device

Where access limitations, topography, or other constraints prevent the use of truck mounted equipment helicopter portable operations can be performed. Two portable techniques exist for collecting data

1) Surface charge programs involve the simultaneous detonation of a series of individual 2 5 to 10 lb explosive charges The group of charges detonated together commonly totals 25 to 50 lbs and is called a shot Shotpoints are located at intervals along the seismic line Surface charges can be placed directly on the ground, on snow, or on a variety of stakes or platforms above the ground All necessary equipment to conduct the operation can be transported by helicopters and then conveyed by foot travel

2) Various kinds of portable drills can be backpacked or delivered by helicopter to the area being explored A deep subsurface portable program would involve drilling a pattern of approximately 16 holes up to 50 feet deep, per mile of line At this depth 10-40 lbs of explosives are detonated Recording cables and geophones are laid out by foot travel.

With both of these portable techniques, shock waves generated are received and transmitted via geophones and cable to a recording device Magnetotelluric surveys (described above) also can be conducted by helicopter. Portable methods generally are used on the Forest

Short-term Use vs. Maintenance and Enhancement of long-term Productivity - Although geophysical prospecting activities themselves generally do not cause significant surface disturbance the disruption to wildlife and other Forest users can be significant Compaction and surface erosion caused by vehicles can be minimized by avoiding steep slopes controlling off-road vehicle travel and controlling activities during wet seasons Vegetative disturbance can be minimized by elevating explosive charges and controlling the locations of shotpoints in timber Soil productivity can be maintained by reducing compaction and vegetative disturbance and by controlling the rehabilitation of drillsites and the disposal of drill cuttings. Restricting stream crossings and the use of explosives near springs, seeps and streambanks, will minimize impacts to the watershed The effects of short-term dispersal of wildlife are minimized if activity is curtailed in big game winter ranges and calving/fawning areas during periods of big game use Hunting quality is maintained adequately if activity is restricted the week before and during big game hunting season for some important elk herd areas Curtailing geophysical operations in the vicinity of active bald eagle nests and habitat during periods of conflict, will mitigate impacts on this endangered species Conflicts with other forest users can be minimized through scheduling of operations when necessary

Irreversible and Irretrievable Commitment of Resources - The explosives and energy fuels consumed in conducting and monitoring seismic activities are irretrievable commitments of resources

Adverse Effects which Cannot Be Avoided - The explosion of seismic charges results in noise pollution as does the use of helicopters and trucks Increased human activity in an area results in the disturbance of wildlife, recreationists, residents and domestic livestock Some of these effects are mitigated by controlling the time and locations and types of activities permitted

Short-term visual impacts cannot be avoided

There is some risk to other Forest users in the immediate area when seismic charges are detonated

Portable methods supported by helicopters cause slower, higher cost operations More men are in an area for a longer period of time, which may result in more disruptions to wildlife and other Forest users

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - No conflicts have been identified

A Forest-wide Environmental Assessment on geophysical prospecting activities was implemented on 9/2/82

Energy Requirements - Energy is consumed during geophysical prospecting activities and during Forest Service compliance monitoring of these activities Helicopters are not very energy efficient and often require a support team As a result, more fuel is consumed when conventional travel is limited

c Exploratory Drilling

The BLM approves and supervises oil and gas operations such as drilling and production However, through a cooperative agreement between the BLM and FS, the Forest Service provides surface resource information to the BLM for planning and administrative purposes The Forest Service also retains administrative authority in cases involving emergency situations endangering health, safety and other resources When a favorable site has been pinpointed, a drilling rig will be brought in (in many semi truck loads) to drill a "wildcat" well Approximately 2-4 acres are required to set up a drilling rig complete with pumps, tanks and mud pit Temporary access roads for transporting equipment and personnel also may be required A surface pipeline to a stream or well, or trucks may bring water needed to mix with drilling mud, clean equipment and cool engines to the site Energy requirements for drilling are furnished by gas or diesel-driven equipment In remote areas, well drilling may require the construction of temporary camps for workers or helipads in lieu of all-weather roads

Short-term Use vs Maintenance and Enhancement of Long-term Productivity - Drilling requires many support activities and once started, continues seven days a week for twenty-four hours a day Drilling equipment could remain onsite six months to a year or more for a deep well Vehicle traffic to and from the site is high during construction operation and reclamation Depending on the placement of the rig its visual impact can be substantial The leveling and grading of the drill pad and necessary road

construction may require the movement of a lot of earth, especially on steeper ground Surface disturbance, human activity and noise produced by the operation, all have a serious impact on wildlife, especially in key habitat areas such as winter range Animals could be displaced into areas of unsuitable or already occupied habitat, resulting in reduced populations Activities of other nearby Forest users will be disrupted If the well is not a producer and the site is reshaped and revegetated the productive potential of the disturbed area usually will be less than adjacent undisturbed areas If the well is a producer the portion of the drill pad needed to produce the well can be expected to remain in place for 50 years or more

Irreversible and Irretrievable Commitment of Resources - The energy fuels used to construct and rehabilitate drillsite facilities, drill wells and monitor these activities are irretrievable commitments of resources Drilling additives and cement used to set casings also are irretrievable commitments of resources Even though it will be plugged with cement if abandoned, the hole drilled is an irreversible action

Adverse Effects Which Cannot Be Avoided - The need for building access roads, leveling the drill pad and drilling the well are all required actions in the development of an exploratory well The ground disturbance and visual impact is an effect that cannot be avoided Noise, increased human activity, exhausts and emmissions all are unavoidable Some soil losses will occur due to erosion and dust dispersal Loss of vegetative production on the disturbed area until rehabilitation is completed is unavoidable Impacts to wildlife and conflicts with other Forest users, although they can be mitigated somewhat, cannot be avoided

Whenever a well is drilled, there exists the possibility of penetrating a formation that contains abnormally high pressures, or hydrogen sulfide gas Pressures could cause the well to "blow out" even though precautions are taken If this happens, salt water and gases are blown from the well, killing surrounding vegetation Hydrogen sulfide emissions from a well would be life threatening to people, wildlife and livestock in the immediate vicinity

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - Although an exploratory drilling project may be started during a noncritical time of the year for wildlife deep drilling projects could take longer than a year to complete causing drilling to continue into a critical time for wildlife the following year If production is established, year-round activity will occur

Energy Requirements - Drilling a well and the associated earth moving for roads and well pads require the consumption of large amounts of fuels Monitoring of these activities also consumes energy

d Field Development (Production)

If exploratory drilling results in the discovery of an oil and/or gas reservoir, field development occurs Roads are upgraded to permanent all-weather specifications and if needed, additional space is provided to place tank batteries to store oil and water on or near the drill pad

Temporary storage tanks are used until the volume of production is known Then liquids are trucked out at regular intervals or pipelines are installed to transport the production to refineries If an exploratory well is productive, additional wells normally will be drilled to define the limits of the field This would involve building additional roads, well pads and tank batteries and possibly installing additional pipelines and electrical powerlines

Short-term Use vs Maintenance and Enhancement of Long-term Productivity - When a well is brought into production, the area needed for production can be expected to be committed to that use for possibly 50 years or more The area of production drill pad and related access roads or processing plants will be out of vegetative production for a long time There also will be short-term losses of vegetation from installation of pipelines and other facilities

Continued occupancy of an area probably will result in a reduction of wildlife habitat capability, causing reduced wildlife populations There will be long-term changes in patterns of use of the area being produced by livestock and recreationists Decreases in fisheries populations are probable Environmental effects will produce a decline in the overall quality of the environment, including air and water quality Possible spillage of toxic materials during production activities will contribute to long-term adverse environmental effects The reduction in visual quality of the area will be a long-term effect Although mitigation procedures will preserve the artifacts themselves and the significance of the site where they were found cultural resources present in the area no longer will be preserved undisturbed as they were before activity began

The discovery and production of oil and gas will lessen the threat of a national energy shortage occurring again soon, decrease dependence on foreign imports from politically unstable or warring countries and reduce the balance of payments deficit

Irreversible and Irretrievable Commitment of Resources - The removal of oil, gas and other associated fluids is an irreversible and irretrievable commitment of these resources (Salt water produced with the oil and gas may be pumped back into the production zone to help reservoir pressure)

Irreversible commitments of wildlife and fisheries populations will occur

The overall decline in the quality of the environment to the extent that complete reclamation is no longer possible, represents an irreversible commitment of many resources

Reductions in the quality of the recreation (especially primitive and semi-primitive types) resource represents an irreversible commitment of this resource

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Adverse Effects Which Cannot Be Avoided - Surface disturbance, adverse effects on wildlife, fisheries, visual quality, recreation, soils, air water and forage, can be mitigated but not avoided

Hydrogen sulfide gas often is a by-product of oil and gas production It s very toxic and corrosive This gas is flared if a pipeline isn't available co transport it to a gas plant If the flare should malfunction, the gas would be vented into the air In sufficient concentrations it is fatal to animals or humans that come into contact with it

Accidental spills of other toxic materials also may occur during transportaion by truck or pipeline Soil sterilization may result

Conflicts With the Objectives of Other Agencies Land Management Plans, Policies or Controls - Production activities occur year-round and would be difficult to suspend even during critical periods for wildlife

Energy Requirements - The production of oil and gas resources, while producing a great amount of energy fuels, does consume a large amount of energy Use of pipelines for production rather than trucks is more energy efficient Energy also would be consumed by the Forest Service in monitoring production activities

J. Human and Community Development

A variety of programs provide employment for individuals in Forest activities Full time Forest Service employees live and work in and near the Forest. In summer, this number is supplemented by seasonal employees, usually from local communities

These programs have significant economic effect on the communities in and near the Forest but, of themselves have little effect on the physical and biological environment In some local communities, the job force of the Forest forms a significant portion of the economic base

The level and types of employment necessary to implement Forest management activities is dependent upon the intensity and emphasis of the scheduled programs The projected work force for each alternative is shown in Table IV-8

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10 Minerals

Geologic favorability and access categories for both energy and nonenergy resources have been evaluated for the Forest Energy and nonenergy resources are defined as

ENERGY - resources include oil & gas (OG), geothermal (GRM), uranium or thorium (U,Th), coal (COL), and oil shale (OS)

NONENERGY - resources include precious metals (PM), base metals (BM), nonenergy leaseables such as phosphates (NEL), nonmetallic locatables (NM) and common variety materials such as decorative building stone (CV)

The four categories of geologic favorability are

VERY HIGH FAVORABILITY - Areas where a number of geologic characteristics are present that indicate the occurrence of a given resource Unfavorable characteristics are few or absent. At least some characteristics are diagnostic of a particular mineral deposits model Information on past, present, and planned activity in the area supports or reinforces the areas geologic favorability

HIGH FAVORABILITY - Areas where a number of geologic charateristics are present that indicate the occurrence of a given structure.

MEDIUM FAVORABILITY - Areas where some geologic characteristics are present that are favorable for the occurrence of a given resource

LOW FAVORABILITY - Areas where a few geologic characteristics favorable for the occurrence of a given resource are present

Using the above information the Forest lands were placed in four categories

Category A — Withdrawn or proposed for withdrawal from mineral entry
1. Wilderness areas
2 Wild and scenic rivers
3. Sites for facilities
4 Historic and cultural sites
5. Developed recreation sites.

Category B — Statues or executive orders require specific protection or mitigation measures

1. Proposed wilderness areas
2 Congressionally mandated wilderness study areas
3 RARE II Further Planning areas
4 T&E Species
5 Roadless (Type I) dispersed recreation areas.
6 Culturally significant areas

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Category C — Special conditions exist on lands which require special lease stipulations or plan of operation conditions

1 Big game winter range
2 Elk calving area
3 Riparian area

Category D — Standard lease stipulations and plan of operation conditions apply

1 Timber production areas
2 Existing mineral processing areas

The land area available for mineral entry and the constraints imposed by each alternative is shown in Table II-11. The Forest road system will provide the best mineral access when it is completed in about 50 years The area of the Forest that will be roaded varies by alternative (Figure II-22) Almost eight percent of the Forest is curiently classified wilderness where no further mineral entry is allowed

Figure II - 22

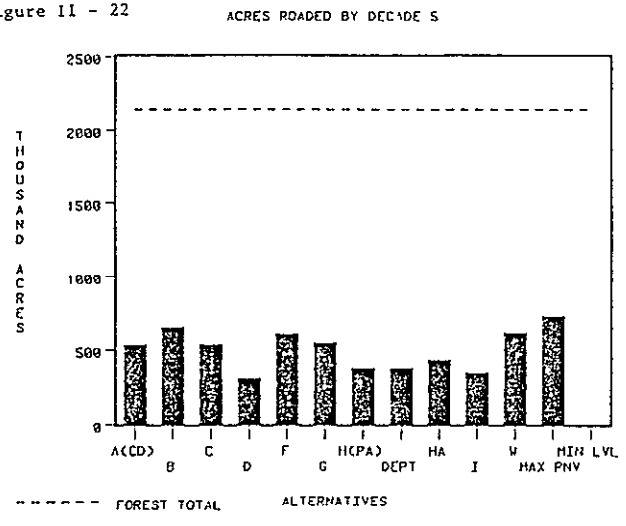

Table II-11

Mineral Evaluation Report

Alternative A

Energy					Non-Energy				
Access Category	Low	Mod	High	Very High	Access Category	Low	Mod	High	Very High
A	101,081	230,311	0	0	A	0	193,812	66,868	70,612
B	12,765	172,068	16,648	2,395	B	0	42,167	6,927	154,782
C	972	104,542	1,858	722	C	0	50,639	10,238	47,217
D	58,218	875,119	357,782	213,140	D	0	856,082	340,999	307,178

Alternative B

Energy					Non-Energy				
Access Category	Low	Mod	High	Very High	Access Category	Low	Mod	High	Very High
A	101,081	76,532	0	0	A	0	177,613	0	0
B	2,471	116,094	19,317	3,369	B	0	35,877	10,914	94,460
C	29,666	467,929	220,241	115,770	C	0	474,729	191,967	166,910
D	39,818	721,428	136,762	97,043	D	0	455,906	221,941	317,204

Alternative C

Energy					Non-Energy				
Access Category	Low	Mod	High	Very High	Access Category	Low	Mod	High	Very High
A	128,066	481,154	329,998	165,242	A	0	704,850	267,623	131,987
B	3,835	105,873	223	110,690	B	0	27,091	7,832	75,767
C	10,889	169,777	8,569	11,263	C	0	95,162	29,873	75,463
D	30,246	625,104	37,530	38,993	D	0	315,597	119,704	296,572

Alternative D

Energy					Non-Energy				
Access Category	Low	Mod	High	Very High	Access Category	Low	Mod	High	Very High
A	127,970	402,124	201,920	125,976	A	0	564,337	193,234	100,399
B	4,072	207,232	44,843	14,872	B	0	83,286	49,076	138,657
C	22,309	302,479	50,680	24,115	C	0	190,031	68,515	141,037
D	18,685	470,073	78,877	51,294	D	0	305,026	114,207	199,696

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Table II - 11 cont

Alternative F

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	112,520	326,993	40,857	125,976	A	0	433,889	98,997	73,460
B	5,277	112,218	29,458	12,822	B	0	46,025	23,517	90,233
C	38,575	560,449	151,230	36,396	C	0	370,867	180,352	235,431
D	16,664	405,538	123,090	49,458	D	0	291,919	122,166	180,665

Alternative G

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	85,511	40,857	0	A	0	225,309	2,140	0
B	3,004	139,404	0	0	B	0	18,517	12,730	111,161
C	33,572	459,851	188,390	97,431	C	0	446,052	178,442	154,740
D	35,379	697,507	147,083	118,461	D	0	454,037	231,720	312,673

Alternative H

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	152,261	12,907	0	A	0	126,769	68,868	70,612
B	95	185,669	13,068	0	B	0	42,368	63,272	93,192
C	27,092	466,101	226,368	132,792	C	0	503,529	197,358	151,466
D	44,768	566,754	135,220	83,345	D	0	397,530	154,971	277,586

Alternative I

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	128,405	809,421	330,757	168,615	A	0	848,419	329,759	259,020
B	1,750	66,933	636	943	B	0	6,136	1,462	62,664
C	9,885	116,556	3,679	9,090	C	0	80,952	11,709	46,549
D	32,996	388,998	41,248	37,609	D	0	207,193	82,102	211,556

Alternative W

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	118,629	355,544	32,039	0	A	0	304,971	106,567	94,674
B	1,561	91,450	1,966	3,225	B	0	21,094	8,748	68,360
C	38,655	506,842	170,956	119,536	C	0	437,432	176,320	222,237
D	14,191	428,072	171,359	93,496	D	0	379,203	133,397	194,518

Each alternative was evaluated to see what management prescriptions were applied to the various potential classes A total listing of this is found in Table II 19 at the end of this chapter The minerals industry has shown a particular interest in the management of those lands having a high potential for oil and gas or hard rock mineral production The following Tables II-12 and II-13 show how the lands with high and very high mineral potential are managed in each alternative. There are approximately 288,200 acres having high *or very high energy mineral potential (oil and gas) and 86,500 acres having* high or very high non-energy (hard rock) mineral potential. (This includes existing Wilderness areas)

TABLE II-12

Energy Minerals
(Percent of high and very high potential lands going to various management categories)

Alternative	Management Category*			
	A	B	C	D
A-current direction	16%	3%	9%	72%
B-RPA	16%	0%	9%	75%
C-high commodity	10%	0%	23%	66%
D-economic efficiency	16%	7%	11%	66%
E-preferred	13%	6%	17%	65%
E-departure	13%	6%	17%	65%
F-wilderness/ commodity	46%	6%	3%	46%
G-high amenity	16%	8%	24%	53%
H-wildlife	16%	6%	32%	47%
J-wilderness	67%	5%	1%	28%

Category A Wilderness

Category B Research Natural Areas Riparian and Roadless Management

Category C Wildlife Management

Category D Grazing, Timber and Minimum Management Emphasis

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The amount of the high and very high potential oil and gas lands available for development, with only standard Forest wide surface protection requirements varies from a low of 28% in the Wilderness Alternative J to a high of 75% in the RPA Alternative B The Preferred Alternative E has 64% of the high and very high potential oil and gas lands completely available for development with only standard restrictions

The amount of high potential lands that are completely unavailable for oil and gas development because of existing and proposed mineral withdrawal varies from a low of 10% in the Commodity Alternative C to a high of 67% in the Wilderness Alternative J The Preferred Alternative E would result in 13% of the high potential oil and gas lands being unavailable for development This includes portions of the existing Scapegoat Wilderness and the proposed Big Log addition to the Gates of the Mountains Wilderness that would be withdrawn from mineral entry.

TABLE II-13

Non-Energy Minerals
(Percent of high and very high potential
lands going to various management categories

Alternative	Management Category			
	A-totally restricted	B-highly restricted	C-moderately restricted	D-standard restrictions
A-current direction	0%	9%	9%	83%
E-RPA	0%	6%	14%	80%
C-high commodity	0%	6%	20%	74%
D-economic efficiency	0%	9%	18%	73%
E preferred	0%	4%	34%	62%
E-departure	0%	4%	34%	62%
F-wilderness/ commodity	10%	8%	14%	67%
G-high amenity	1%	1%	11%	61%
H-wildlife	0%	9%	40%	51%
J-wilderness	32%	7%	10%	51%

United States
Environmental Protection
Agency

Regional Montana Office
Federal Building
301 S Park Drawer 10096
Helena Montana 59626

EPA

Ref 8MO

Mr Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

Dear Mr. Morgan

This letter provides the U S Environmental Protection Agency's (EPA) concerns following its review of the Bitterroot National Forest Proposed Forest Plan and Draft Environmental Impact Statement (DEIS). The Agency welcomes the opportunity to review these documents

EPA understands the difficulty the Forest Service faces in being specific in documents that address possible modificational uses stretching out over several years The Forest Service, however, must realize that it is difficult for this agency to provide more than general concerns without knowing the specific uses for particular areas of the Bitterroot National Forest. To solve this issue, the Forest Service should give the public the opportunity to review specific proposed uses within parts of the national forest shortly before those uses are implemented You should be prepared to modify or change these proposed uses to prevent unacceptable environmental degradation

The DEIS states that State of Montana water quality standards will not be exceeded. The DEIS also indicates that water-related beneficial uses will be evaluated during project development Projects which cannot meet Montana water quality standards will be redesigned or dropped These are extremely worthwhile objectives Our concern is that your water quality monitoring and environmental impact evaluation budgets are, based on EPA monitoring experience, insufficient to determine if water quality standards are being violated The Forest Service must make resource commitments to insure that uses proposed and implemented within the Bitterroot National Forest are adequately assessed for adverse environmental impacts

Your DEIS proposes to monitor projects before and after implementation EPA was unsure whether the proposal would be undertaken for each project or a certain number of projects yearly If only certain projects will be monitored, what are the procedures for selecting these projects? All projects should be evaluated in some fashion. Monitoring should also take place when the project is ongoing That is the time frame when most disturbance will occur It is costly to correct a problem after it has occurred

FOREST SERVICE RESPONSE

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1 The Final Plan is specific about land use allocation, and project plan environmental assessments for such uses as timber management will specify in detail the manner of timber harvest according to the Forest Plan standards

2 Projects cannot be accomplished without environmental assessments, and monitoring will be a part of the assessment process (see 1 above)

3 All projects will have monitoring in the sense of interdisciplinary team assessment Instream monitoring is technically difficult, expensive, and, if a water quality problem is noted, too late to prevent the problem Thus, instream monitoring will be limited to a few projects on watersheds representative of the Forest. Most monitoring will be evaluation of watershed conditions relative to management practices in the sense of field inspections rather than water sample collection

EPA strongly endorses your proposal to monitor macro invertebrate communities at ten stations once each year This type of monitoring should be a requirement within all national forests Biological monitoring integrates all of the impacts of forest development activities

Your proposed alternative calls for an approximate ten percent increase in sediment production potential over baseline. Significant levels of timber harvesting and road construction will take place if this proposed alternative is implemented EPA is concerned that unacceptable water quality degradation and soil erosion may occur The Agency is this concerned because of the lack of monitoring resources to evaluate environmental impacts EPA fears that the Forest Service will not know that a significant problem exists and will not take action to correct the environmental problem because the needed information is not available Why can't a water quality monitoring and environmental impact evaluation effort be included as part of the cost of harvesting timber and/or road construction

The Agency is assigning a rating of EC-2 (Environmental Concerns-Insufficient Information) EPA is concerned with potential unacceptable water quality degradation and soil erosion There is insufficient information to evaluate the magnitude of these potential problems within the Bitterroot National Forest

If you have questions or concerns, please call me at 449-5432

Sincerely yours,

John F. Wardell

John F Wardell, Director
Montana Office

FOREST SERVICE RESPONSE Continued

4 The Draft Forest Plan showed a 41 percent increase in sediment over the natural level Changes for the Final Plan, such as reduction in allowable sale quantity to about 33 4 MMBF per year, reduction of road construction by about 35 percent in the first decade and assignment of all riparian areas to Management Area 3b, reduced the sediment yield to below the threshold of effect on fish habitat potential We plan to further reduce sediment production from existing roads by surfacing and drainage practices

5 A standard was added to the Forest Plan which provides for a reduced timber sale program if funds are not available to accomplish the practices necessary to reduce existing road sediment and/or studies and monitoring indicate that the level at which sediment degrades fisheries requires adjustment

6 The Forest Plan establishes general management direction for Forest-wide watershed protection Added standards including the one discussed in item 8 above, and changes discussed in item 7 above assure protection of beneficial resources including water quality and fisheries In addition, individual projects require an environmental analysis which recognize and mitigate specific potential soil and water impacts

2. State Agencies

Commenter	Comments and Responses on Page
Idaho Department of Fish and Game	61
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Idaho Transportation Department, Bureau of Aeronautics and Public Transportation	63
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Montana Department of Fish, Wildlife, and Parks	65
Montana Historical Society	99
State of Montana (Office of the Governor)	100

JI 1101

4

IDAHO DEPARTMENT OF FISH AND GAME
600 South Walnut • Box 25
Boise • Idaho • 83707

RECEIVED
APR 15 1985
Bitterroot National Forest

April 11, 1985

Forest Planner
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

Re 1920, Bitterroot DEIS and Proposed Plan

Gentlemen:

Thank you for the opportunity to comment on RARE II Areas 13946 (Allan Mtn.) and 13941 (Blue Joint) which are addressed in the referenced documents.

Neither of these areas are included in the Idaho Fish and Game Commission's wilderness recommendations. We will, therefore, defer comments until we can evaluate the nonwilderness management options proposed in the Salmon National Forest DEIS and RMP.

We look forward to reviewing the Salmon Forest documents this summer. Again, thank you for the opportunity to comment and for keeping the Department informed of progress on forest plans.

Sincerely,

Kenneth D. Norris
for Jerry M. Conley
Director

JMC.CHN·tlv

cc: Salmon National Forest
Tom Reinecker, Supr., Reg. 6, IDFG
Tom Parker, Wildlife Manager, Salmon, IDFG

NO RESPONSE REQUIRED

• EQUAL OPPORTUNITY EMPLOYER •

IDAHO DEPARTMENT of PARKS & RECREATION
2177 Warm Spring Ave Statehouse Mail Boise Idaho 83720 (208) 334 2154

Robert L Meinen Director

John V Evans Governor

April 4, 1985

Forest Planner
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

Dear Forest Planner

Enclosed in this leter are the comments that we would like to make regarding your latest roadless area evaluations

We recognize that compared to other roadless areas in or adjacent to Idaho, roadless areas 01941 and 01946 receive small amounts of Idaho recreation use, but we still feel that they are important to the overall picture.

Over the past few years the designation of large roadless areas to wilderness has displaced many ORV recreationists and, thus placed more importance on the remaining roadless areas for ORV use. We feel that dispersion of all recreational uses (especiallly ORV's) is a very important management tool that shouldn't be left out, and other closures will be putting more pressure on the remaining roadless areas.

We would ike to see areas 01941 and 01946 remain undeveloped and roadless without losing the opportunity for ORV recreation. The R. O. S. classification of semi-primitive motorized would accomplish what we would like to see. 1

Please contact me if you have any questions.

Sincerely,

Chuck Wells
ORIV Planner

RECEIVED
APR 17 1985
Bitterroot National Forest

jm-0731J
encl.

EQUAL OPPORTUNITY EMPLOYER

FOREST SERVICE RESPONSE

2

1 About 72,500 acres of the 102,300 acre Allan Mountain roadless area 01946 has been assigned to Management Area (MA) 5 for management for semiprimitive recreation About 11,100 acres have been assigned to MA 8 which is unsuitable for timber management None of the area will be managed for wilderness We think the area to be developed best meets public needs for production of commodity outputs while protecting the basic soil and water resources

About 28,500 acres of the Blue Joint drainage of roadless area 01941 have been recommended to Congress for classification as wilderness We think the area has a unique meadow system that is best protected by wilderness classification About 19,300 acres of the 65,400 acre area will be managed for semiprimitive recreation without roads and 11,300 acres have been assigned to MA 8 which is unsuitable for timber management

We think the resource uses and land assignments of the Final Plan will meet public needs and desires for the future

13

STATE OF IDAHO

JOHN V EVANS
GOVERNOR
IDAHO TRANSPORTATION BOARD
CARL C MOORE—CHAIRMAN
LLOYD F BARRON—VICE CHAIRMAN
JOHN M OHMAN—MEMBER
E DEAN TISDALE
DIRECTOR

TRANSPORTATION DEPARTMENT

BUREAU OF AERONAUTICS AND PUBLIC TRANSPORTATION
3483 RICKENBACKER ST BOISE IDAHO 83705
PHONE (208)334 3183

April 8, 1985

Robert S. Morgan, Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

Dear Mr Morgan

Thank you for the opportunity to review the proposed Bitterroot National Forest Plan.

Our only area of concern is the "Lands" Section, Chapter III, Page III -45 The plan states "Acquire Running Creek and North Star Ranches ------ if they become available"

We would hope that if these ranches are acquired, careful consideration will be given to the need for public use airports in this part of the wilderness area.

As you are aware, the use of Shearer Airport has become somewhat controversial because of the adjacent Selway Lodge. The designation of Running Creek (if acquired) as a public use airport would help alleviate the current problem

At this time we are requesting some additional information on the future designation of the airports at Running Creek and North Star, if you acquire them.

We would like to have the opportunity to provide input into the future of these airports

Sincerely,

WORTHIE M RAUSCHER
Chief A&PT

LARRY A. HIPPLER
Airport Development

WMR/LAH/vp
cc L.H.

FOREST SERVICE
Bitterroot National Forest
Hamilton, Montana
APR 10 1985
RECEIVED

SAFE TRANSPORTATION MEANS PROGRESS
EQUAL OPPORTUNITY EMPLOYER

FOREST SERVICE RESPONSE

13

1 *It is our intention* to acquire private inholdings in wilderness areas If the land is acquired the public will be consulted about its future use Be assured that the Idaho Transportation Department will be asked to comment on the future use of any airports acquired by the Forest

18

IDAHO STATE HISTORICAL SOCIETY
610 NORTH JULIA DAVIS DRIVE BOISE 83702

April 22, 1985

RECEIVED
APR 25 1985
Bitterroot National Forest

Forest Plan
Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

ATTN Mr. Robert S. Morgan, Forest Supervisor

Dear Mr. Morgan

Thank you for forwarding to us copies of the Bitterroot National Forest proposed forest plan, overview and maps, and draft environmental impact statement.

We reviewed the reports, and we wish to make some brief comments As the plan indicates cultural resource inventory surveys will be conducted "for most (emphasis added) surface-disturbing activities," we would like to point out that impacts to cultural resources need to be assessed for all forest service undertakings, not just for ground-disturbing activities Assessment of resources early in the project planning stages will avoid unnecessary delays in project implementation 1

Too, we wish to emphasize the historic significance of the Lewis and Clark Trail and the Southern Nez Perce Trail which traverse the forest and, we reiterate the importance of protecting them. 2

Thank you, again, for affording us the opportunity to comment on the forest plan.

Sincerely,

Thomas J. Green
State Archaeologist
State Historic Preservation Office

TJG/bhd

FOREST SERVICE RESPONSE

18

1 We believe the Forest-wide management standards for cultural resources documented in Chapter II of the Final Plan are adequate to protect the cultural resources of the Forest and have elected not to change them for the Final Plan Much of your concern about the need for inventory prior to all activities will be covered by the standard for systematic inventory, evaluation, and preservation of all the cultural resources of the Forest

2 We have added Forest-wide management standards to Chapter II of the Final Plan which will assure the protection of all National Recreation and Historic trails.

460

Montana Department of Fish, Wildlife & Parks

3201 Spurgin Road
Missoula, Montana 59801
June 20, 1985

RECEIVED
JUN 21 1985
Bitterroot National Frst.

r. Bob Morgan
Forest Supervisor
Bitterroot National Forest
316 N Third Street
Hamilton, MT 59840

Dear Mr. Morgan

Thank you for requesting a copy of our comments on the Bitterroot National Forest Plan Please find them enclosed.

As stated on page two, these are not the final comments from the State of Montana, and they are subject to review and change.

If you have any questions, please contact me.

Sincerely,

Jim Ford
Regional Supervisor

JF/BT/pm
enc.

COMMENTS ON BITTERROOT NATIONAL FOREST PLAN
DRAFT ENVIRONMENTAL IMPACT STATEMENT
and
THE PROPOSED BITTERROOT NATIONAL FOREST PLAN

by

REGION TWO - MONTANA DEPARTMENT
OF FISH, WILDLIFE AND PARKS

June 3, 1985

Prepared by

John Firebaugh - Region Wildlife Manager
Don Peters - Fisheries Biologist
Bill Thomas - Information Officer

As requested, the Department of Fish, Wildlife and Parks has reviewed the Draft Environmental Impact Statement and Forest Plan prepared by the Bitterroot National Forest. The following draft comments are submitted in compliance with Executive Order 6-84 for your consideration in the preparation of a coordinated draft executive branch response. Subject to further agency review, these comments may be modified during the preparation of a final executive branch response by the Governor's Planning Task Force

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960

Chapter VI

CHAPTER IV
REGION TWO-FWP-COMMENTS
BLUE JOINT AND SAPPHIRE WILDERNESS STUDY ACT

A Blue Joint W S A

Alternative E, the proposed action, recommends 43% of this study area as wilderness, 29% roadless and 28% roaded for timber management Our past comments on this area have supported the roadless concept for the entire area, but not necessarily wilderness However, when reviewing past roadless commitments, it becomes more apparent that the only way the majority of these areas will be protected from road development and timber harvest is to have them legally designated as wilderness For example, the Upper West Fork Planning Unit EIS, completed in 1974, committed in its preferred alternative that most of lower West Creek, Chicken Creek and Deer Creek would remain roadless Now, the selected alternative for the Forest Plan recommends that roughly 12,000 acres that in 1974 was committed to roadless management in these drainages be open to roaded development When this Forest Plan is up for revision in 10-15 years, there is no guarantee that the current roadless areas will remain as such Because of the poor track record of the Forest Service to protect roadless areas and the fact that 28% of the study area is proposed for development, Alternative E, the proposed action for the Blue Joint WSA is unacceptable For this area we recommend Alternative H, which has wilderness recommended for 90% of the area and roadless management for 8% This will be the only way to assure that this area remains roadless for the long term, something very important to the maintenance of hunting season length, hunter opportunity, and quality elk habitat

b Sapphire Area W S A

The proposal for the Sapphire area is to maintain 70% as roadless and 30% will be scheduled for roaded development The preferred alternative does not include wilderness for this area The same philosophy applies here as to the Blue Joint Past recommendations by FWP were for roadless management with no wilderness However, when comparing roadless allocations set forth in the Moose Creek and Skalkaho-Grid-Sleeping Child Management Plans prepared in 1973 and 1974 with roadless areas in the preferred alternative of the Forest Plan, it is obvious that a considerable amount of designated roadless country has been scheduled for roaded management To assure roadless designation for the long term and to protect big game security habitat, the majority of this area should be classified as wilderness as described in Alternative H To accommodate possible compromise with trail bike and snowmobile users, we suggest allowing a corridor up the Fish Lake Trail to the head of Moose Creek for their use

IV-1

VI-69

FOREST SERVICE RESPONSE

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1 We think you misinterpreted management direction for the lower Chicken and Deer Creeks area in the Upper West Fork Planning Unit Management direction for Management Unit 6, which comprises most of the area referred to, postpones development "until such time as advanced timber harvesting methods are designed which can be used in managing the unit extensively for timber production " Roading was prohibited only on land types 11 and 111, both of which are now included in land type group SS+60 which will not be roaded under management direction in the Final Plan Road construction was not prohibited in Management Units 2, 5, and 7, except for the Deer Creek portion of Unit 7 We believe the mix of resource values we have prescribed in the Final Plan will best suit the needs and desires of the public while protecting the basic resources

2 Management Area (MA) 5 (no timber harvest scheduled) of the Final Plan includes nearly 8,000 acres proposed for timber harvest in the Moose Creek Multiple Use Plan and about 3,000 acres proposed for timber harvest in the Skalkaho-Gird and Sleeping Child Planning Unit On the other hand, about 7,000 acres of the Skalkaho-Gird and Sleeping Child area which was to be managed in a roadless condition, has been designated for management for timber harvest with roads We believe the mix of resources within the boundaries we have established will meet the needs and desires of the public and protect the basic resources

APPENDIX

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Table 1. Peterson mark and recapture population estimates completed by the Montana Department of Fish, Wildlife and Parks in September of 1984 on selected Bitterroot drainage streams

Stream name	Length of Section (ft)	Species	Size class (in)	Marked	Captured	Re-captured	Number estimate	(80%) Confidence interval	Number per mile
Overwhich Creek	450	Cutthroat	3.0-5.9	62	41	27	96	± 13	1128
			6.0-8.9	18	10	8	23	± 6	270
			9.0	2	1	1	2	-	23
		Brook	3.0-5.9	1	2	0	3	-	35
			6.0-8.9	1	1	0	2	-	23
		Bull	6.0-9.5	2	2	1	3	-	35
		Mtn white-fish	3.0-8.2	6	2	0	8	-	94
Warm Springs Creek	300	Cutthroat	3.0-5.9	67	55	23	158	± 30	2780
			6.0-8.9	34	16	12	45	± 8	792
			9.0	4	1	0	5	-	88
		Rainbow	3.0-5.9	7	3	1	9	-	158
			6.0-8.9	5	5	5	5	-	88
			9.0	1	1	1	1	-	18
		Brook	3.0-5.9	7	13	3	28	± 14	492
			6.0-8.9	4	3	0	7	-	123
		Bull	3.0-5.9	6	2	0	8	-	141
			6.0-8.9	3	0	0	3	-	53
Burnt Fork	300	Cutthroat	3.0-5.9	33	20	5	119	± 49	2094
			6.0-8.9	31	17	7	72	± 23	1267
			9.0	1	0	0	1	-	18
		Brook, bull, hybrids	3.0-5.9	4	11	1	14	-	246
			6.0-8.9	15	14	5	40	± 5	704
Daly Creek	550	Cutthroat	3.0-5.9	8	16	4	30	± 14	288
			6.0-8.9	16	5	3	18	-	172
			9.0	6	4	3	7	-	67
		Bull	3.0-5.9	22	11	6	39	± 17	374
			6.0-8.9	9	8	2	15	-	144
			9.0	3	3	0	6	-	58

Table 2 Expansion of fish population estimates for estimating total population of gamefish in selected Bitterroot River drainage streams on the National Forest

Stream name	Species	Size class (in)	Number per mile	Estimated miles of stream on forest	Estimated population of trout on Nat'l Forest 3 0-5 9 in	Estimated population of trout on Nat'l Forest ≥6.0 inches
Overwhich Creek	Cutthroat	3 0-5 9	1126	14	15,764	
		6 0-8 9	270	14		3,780
		9 0	23	14		322
	Brook	3.0-5.9	35	14	490	
		6 0-8.9	23	14		322
	Bull	6 0-9.5	35	14		490
	Mountain whitefish	3 0-8 2	93	14		
Warm Springs Creek	Cutthroat	3 0-5 9	2780	10	27,800	
		6 0-8 9	792	10		7,920
		≥ 9.0	88	10		880
	Rainbow	3 0-5 9	158	10	1,580	
		6 0-8 9	88	10		880
		≥ 9.0	17	10		170
	Brook	3 0-5.9	482	10	4,820	
		6 0-8 9	123	10		1,230
	Bull	3.0-5.9	141	10	1,410	
		6.0-8 9	52	10		520
Burnt Fork Creek	Cutthroat	3 0-5 9	2094	12	25,128	
		6.0-8 9	1267	12		15 204
		≥ 9.0	17	12		204
	Brook, bull, hybrids	3 0-5 9	246	12	2,952	
		6 0-8 9	704	12		8,448
Daly Creek	Cutthroat	3 0-5 9	288	8	1,952	
		6 0-8 9	704	8		5,632
		≥ 9.0	67	8		536
	Bull	3.0-5 9	374	8	2,992	
		6 0-8 9	144	8		1,152
		≥ 9.0	58	8		464
				Total	84,888	48,184

960

Table 3 A partial list of streams on the Bitterroot National Forest and estimated stream mileage on each

WILDERNESS STREAMS			NON-WILDERNESS STREAMS		
Name	Estimated miles of fish stream on Natl Fst.	Estimated Mi.of fishable stream off National Forest	Name	Estimated miles of fish. stream on Natl. Fst	Estimated Mi.of fishable stream off National Forest
Sweeney Cr	6	1	Eightmile Cr	2	3
*Bass Cr	5	1	Ambrose Cr	0	3
*kootenai Cr	7	1	Threemile Cr	1	4
*Big Cr	10	1	*Burnt Fork Cr	12	4
Sweathouse Cr	5	2	Willow Cr	5	3
*Bear Cr	10	3			
Fred Burr Cr	7	2	Gird Cr	2	4
*Mill Cr	10	2	*Skalkaho Cr	12	7
			*Daly Cr	8	0
*Blodgett Cr	10	3	*Sleeping Child Cr	12	5
*Sawtooth Cr	11	1	*Rye Cr	11	7
*Roaring Lion Cr	6	1	Cameron Cr	6	5
*Lost Horse Cr	13	2	*E. Fork Bitterroot	15	20
Rock Cr	7	0	*W Fork Bitterroot	12	17
*Tin Cup Cr	12	3	*Martin Cr	12	6
Chaffin	5	2	*Moose Cr	8	4
Trapper	9	1	*Meadow Cr	7	0
*Boulder	8	0	Tolan Cr	8	2
			Camp Cr	3	6
Nelson Cr	8	0	*Warm Springs Cr	10	1
Watchtower Cr	8	0	*Piquett Cr	8	1
Sheepshead	8	0	*Overwhich Cr	14	
TOTALS	165	26	Hughes Cr	8	7
			Deer Cr	10	0
			*Blue Joint Cr	15	0
			*Nez Perce Fork	11	2
			TOTALS	212	111

* Larger more significant drainages and fisheries

CHAPTER I
REGION TWO-FWP-COMMENTS
THE BITTERROOT NATIONAL FOREST PLAN AND DRAFT
ENVIRONMENTAL IMPACT STATEMENT
AN OVERVIEW OF SPECIFIC ISSUES OF CONCERN

Because the Bitterroot National Forest offers fish and wildlife resources of national significance, the Forest Plan must recognize this importance and strive to protect, maintain, and enhance their resources We would prefer that the Plan express a commitment to the fish and wildlife resources by maintaining existing habitat The Forest Plan must emphasize the maintenance and protection of existing habitat Protecting the habitat that now exists on the Bitterroot is more effective than enhancing it with costly as well as questionably effective practices Habitat protection must not be underestimated for effectively insuring healthy fish and wildlife populations 3

A Management Goals

1 Fish and Wildlife - Recreation related to fish and wildlife should be addressed in this goal statement We suggest the addition of the following "The Forest will be managed to provide for at least a maintenance of the current elk hunter days " 4

2 Roadless - We recommend that the following be added to this goal "The distribution and amount of roadless areas on the forest will reflect the needs of the forest user and wildlife " 5

B Management Objectives

1 Recreation - We strongly support the following addition to the Forest-wide Management Objectives and recommend it be listed under the "Recreation" heading "Provide a variety of hunting recreation opportunities by using project planning and road management to assist the Montana Department of Fish, Wildlife and Parks (FWP) in meeting their goal of maintaining long hunting seasons with minimum restrictions " 6

2 Wilderness - We recommend the wilderness allocations in Alternative E the entire Stony Mountain and Sapphire WSA, and the allocations for the Blue Joint WSA in Alternative H 7

3 Roadless - We recommend the roadless allocations in Alternative F except for those lands that we have recommended for wilderness above

4 Roads - We recommend the following addition "It is our intent to provide public access to forest lands However, roads will be closed where adverse resource impact and/or the maintenance cost of leaving them open exceeds the benefits Adverse impacts to be considered are increased timber costs to the industry or the public, jeoparaizing big game production and protection, jeopardizing recreational hunting and fishing opportunities, and stream sediment or erosion problems Closures on collector roads will be made to avoid adverse impacts to 8

FOREST SERVICE RESPONSE Continued

3 We agree that the most cost effective way to maintain existing habitat for fish and wildlife is to protect it However, the most efficient way to manage forest resources may be to tradeoff a part of one resource in order to produce other resources We think the mix of land designations we intend to implement, with only about one-third of the Forest developed with roads, will protect wildlife habitat where it needs protection and create habitat useful to wildlife which needs seral or successional stages of vegetation to survive Management activities will be constrained so that sediment delivery to streams will be below the threshold of effect on fish habitat

4 We have a Forest-wide management objective to maintain current hunter opportunities

5 We think the goal statement as stated and in combination with Forest-wide management objectives gives adequate criteria to designate land to MA 5

6 See 4 above

7 All roadless areas on the Forest were reviewed for their wilderness potential and for designation to meet other resource needs The Final Plan identifies those areas we believe provide unique physical or biological additions to the wilderness system, or make logical additions from a management standpoint Those areas not recommended as wilderness have been recommended for other resource uses including retention as roadless areas to provide for that part of the Recreation Opportunity Spectrum between wilderness and roaded areas We believe the Final Plan provides the mix of uses that best meets public needs while protecting the basic resource

8 Most of the concerns stated in the recommended addition are addressed in Forest-wide management goals, Forest-wide management objectives, Forest-wide management standards and/or management area direction Others are adequately addressed in Forest Service Manuals and Handbooks and we think it would be redundant to restate them in the Forest Plan

960

the resource Most spur roads will be closed after special resource needs are satisfied

The criteria to be used to analyze the need for road use restrictions are

a Roads will be closed when necessary to protect the safety of forest users Examples include roads with hazards such as avalanches, landslides, forest fires, flooding, timber operations, etc

b Adverse resource impacts will be mitigated by the road closure, also, beneficial effects will be reviewed and considered Where roadway use increases soil movement and adversely affects water quality and vegetation, some types of closure will be considered In cases where fish and wildlife are affected, special emphasis will be placed on road closures Areas that are identified as opportunities for walk-in hunting o fishing experiences will be considered for closure Road closures will also be considered to help preserve known historic and prehistoric sites Temporary closures will be considered for fire damage, roadway erosion, and similar conditions Road closures may be used to maintain hunting opportunities and to preserve viable habitat, as well as to distribute big game harvest and provide for liberal, lengthy recreational hunting opportunities To maintain current hunting opportunities the Forest will cooperate in implementing the 'Montana Fish and Game Commission Road Management Policy' of October 13, 1982 Any wildlife closures will be coordinated with the Montana Department of Fish, Wildlife and Parks

c Road closures will reflect needs of the public in special circumstances and during the different seasons of the year Emergency events such as fire suppression and search and rescue activities shall be permitted on closed roads Activities such as firewood gathering, mining, and berrypicking could occur provided the objective of the closure is not compromised

d The need for protection of administrative or special use facilities will be a consideration for the closure of certain roads Lookouts, guard stations, and transmission sites are examples of such facilities

e Roads should be considered for closure when necessary to minimize conflicts between user groups Examples include conflicts between walk-in hunters and road hunters, cross-country skiers and snowmobilers, horseback riders and motorcyclists

f The quality of dispersed recreation opportunities will be a factor when considering a road closure (providing for four-wheeled motorized recreation in some areas and other forms of motorized recreation in others, where both uses in the same area may result in diminished quality of the recreation experience) "

8

If this kind of important detail is inappropriate under the "Management Objectives" section, then it is imperative that it be included under

4.0

the "Management Guidelines" Section of the Final Plan

C. Management Standards

1. Road System - We recommend the criteria used to analyze the need for road use restrictions as recommended in our comments under Management Objectives

2. Road Standards - We recommend that roads should be built to the minimum standard whenever possible to reduce public use and facilitate closures

3. Standards for Road Density - The road densities stated here are very high in terms of miles of road/square mile These densities will reduce elk habitat effectiveness considerably Most of these exceed the Fish and Game Commission's Management Policy densities The Forest Service should also obliterate some roads for the first 1/2 to 1/4 mile when closing them instead of just using gates This would discourage violations and maintain a more secure habitat for big game

D. Management Area Direction

1. Management Area 1

   a. Wildlife and Fish - Maintaining at least 40% elk habitat effectiveness is low and means there will be an average of three miles of open road per square mile This should be adjusted to at least 60% or not more than one mile of road per square mile

   b. Range - Wildlife forage needs to be added to the criteria used to consider livestock use and range improvements in these management areas

   c. Road System - Road densities used here are very high These should be reduced to comply with the Fish and Game Commission's Road Management Policy

2. Management Area 2

   a. Wildlife and Fish - Habitat effectiveness at a minimum of 60% is too low for winter range This should be a minimum of 80% for winter range

   b. Range - Allowing nearly half the winter range forage (40%) to livestock is too high 30% would be more compatible with wildlife and would reduce forage competition This applies to all Management Areas

   c. Lands - We appreciate the fact that the Forest has not reduced public ownership of its winter ranges and is considering adding additional important winter range

   d. Road System - These road densities, especially for winter range, are too high

FOREST SERVICE RESPONSE Continued

9 We have designed the road standards to require the minimum disturbance of soil considering the need for public safety and a useable transportation system.

8, 10 The road construction densities are the minimum necessary to access land for timber harvest We understand the Commission's Road Management Policy to apply only to open road density We will use road closures to reduce open road densities to levels specified in Forest-wide management standards All roads built will be system roads and as such will be used intermittently for administrative purposes We do not believe it is cost effective to obliterate portions of roads if we can achieve the objectives of road management by using gates and area closures

9, 10, 11 We have established Forest-wide management standards to maintain 50 percent elk habitat effectiveness in currently roaded third order drainages and 60 percent in currently unroaded drainages

10, 12 None of MA 1 is winter range and the objective for the area is to provide livestock forage Range allotment management plans will specify proper use for livestock and will leave ample forage for summer use by big game

13 Road construction densities are the minimum necessary to access land for timber harvest We will manage the road system to comply with the Fish and Game Commission's Road Management Policy for roads open to the public

11, 14 We have discussed this point with John Firebaugh, Regional Wildlife Manager, Department of Fish, Wildlife and Parks, and have his concurrence on the standards for elk habitat effectiveness in the Forest-wide management standards section of the Final Plan Currently, we have approximately 2 miles of open road per square mile in the developed portion of the Forest Our objective is to maintain approximately this level of access in the currently roaded area, but to maintain a slightly lower level in the area which will be developed We believe the public will accept these restrictions, but we must allow sufficient access to public land

12, 13, 15 We have changed the forage allocation to livestock on all winter range Management Areas to 35 percent

14, 16 These are the minimum road construction densities necessary to provide access for timber management We will manage the open road density to provide an acceptable level of elk habitat effectiveness

15

16

3 Management Area 3a

a Wildlife and Fish - 60% habitat effectiveness is too low for winter ranges We recommend at least 80% habitat effectiveness 17

b Road System - The road densities are too high 18

4 Management Area 8b

a Wildlife and Fish - Since these are sparsely forested, open winter ranges, 60% habitat effectiveness is not sufficient and will not result in optimum elk use of these critical areas They should be managed for at least 80% habitat effectiveness 19

Range - Livestock use should be limited to 30% of the available forage 40% is too high, particularly for winter range 20

L Monitoring

1 Hunter trends and season - We recommend adding the following when the bull elk harvest in any hunting district consistently (three years running) exceeds 40% during the first week of the hunting season, additional fall road closures will be considered 21

2 Roads - A new monitoring criterion is necessary Miles of road open to public use - measured and reported annually, variability of ±5% would initiate evaluation 22

3 Funding - It is extremely important that monitoring be adequately funded to insure the validity of the Plan's activities 23

4 Cutthroat Trout - The proposed plan monitoring calls for doing something on cutthroat trout with moderate precision and moderate reliability on six stream sections annually at a cost of $7,500 If numbers vary by 10% then the Plan calls for further evaluation A moderate level of sampling will not be able to detect a 10% variation, a high level of precision is necessary for that detection level Six sampling sections is not adequate to cover disturbed drainages or the long-term cumulative impacts 24

5 Water and Sediment Yields - Six sediment and flow monitoring stations per year with low precision and moderate reliability are to be used to validate the sediment model and assess land management effects on fisheries and other watershed considerations, with 150 days of effort and $2,500 in lab costs This low level of statistical accuracy should not be used for model validation, but as checks on whether drainages are close to a validated model value A significantly greater effort needs to be developed with better data accuracy for model validation 25

6. Water Quality and Fish - The Plan proposes to monitor ten macroinvertibrate sampling stations with low precision and moderate reliability per year costing 10 days time and $1,200 per year This level only covers the first year of development Each year thereafter this amount needs to be added to the previous year's budget because of the long-term nature of impacts associated with development and the multiplicity of factors which control watershed conditions 26

FOREST SERVICE RESPONSE Continued

17 See 14 above

18 See 16 above

19 See 14 above

20 See 15 above

21 We have added this statement to the Forest Plan Monitoring Requirements and as a Forest-wide management standard

22 In order to evaluate elk habitat effectiveness, we must monitor density of open roads, therefore, we do not need a monitoring item specifically for open roads

23 We agree and have included a statement in the Monitoring and Evaluation section to assure monitoring will be in balance with resource activities and outputs

24 After 5 years of data gathering to establish a baseline population, we believe we should evaluate our management direction or monitoring procedures if a 10 percent variation in population estimates occurs The sampling procedures will be state-of-the-art, but we do not think the best estimates are more than moderately precise, or moderately reliable We believe six sampling sites are sufficient to sample effects of disturbance on the major landtype groups

25 The Forest Plan Monitoring Requirements has been revised to include gathering information to adequately evaluate fish and sediment models

26 We intend to sample the effects of disturbance, not monitor every drainage that is developed Invertebrate sampling will occur at the same sites for a long time to aid in establishing long-term trends

7 Stream Channel Condition - Eight days of effort probably is adequate for the first year of development but the cumulative effect of each additional year's development makes this level of activity inadequate shortly after implementation of the Plan Watershed management is a long-term commitment and development impacts may not be detectable for many years

8. Hydrologic Recovery - This monitoring activity is designed to look at one project per district per year with low precision and moderate reliability This is inadequate This type of data needs to be upgraded to increase the quality of the results Each year should include a continuation of studies on existing projects as well as the new ones

9 Riparian Area Condition - This monitoring item is designed to look at one project per district per year This is inadequate this type of data needs to be upgraded to increase the quality of the results Each year should include a continuation of studies on existing projects as well as the new ones

F Economic Concerns

The low national "willingness to pay" figure of $21 was apparently used to standardize the values for hunting between forest regions This averaging of values between states and types of hunting (deer, elk, javelina, etc) tends to downplay the importance of hunting and fishing recreation to a state like Montana where it is a favored recreation of many residents and draws considerable nonresident use "Willingness to pay" values can and will differ between states and between forests We suggest a joint review project be developed between the U S Forest Service and the Montana Department of Fish, Wildlife and Parks to study and develop a realistic value for "willingness to pay" that would reflect Montana dollar values The $ 1 value used in the draft is unrealistically low for Montana's qual of hunting

G Fisheries, Water Quality and Water Yield

A significant threat to the fisheries resources of the Bitterroot River drainage has been proposed by the Bitterroot National Forest (BNF) The Proposed Plan for the BNF will promote degradation of water quality, increase high water peak flows, and fails to insure adequate funding for aquatic monitoring and research efforts associated with proposed land-disturbing development

The Proposed BNF Plan estimates a 41% increase in sediment yield as a result of planned development, a 78% increase in road mileage over the next 50 years, proposes managing 72% of the developable lands under even-aged management (clear-cut and shelterwood) and proposes the use of tractor skidding on 83% of the developed lands

The most recent research conducted by the USFS on impacts of new roads indicates a production of 67,500 tons of sediment per square mile per year the first year With maintenance and rehabilitation, annual sediment

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FOREST SERVICE RESPONSE Continued

27 Even though monitoring will occur on only a few projects, all projects will have interdisciplinary team evaluation as part of the environmental assessment process. Hillslope and riparian vegetation conditions, stream channel conditions, existing road and cutting unit conditions, estimates of precipitation, runoff, and sediment, and evaluation of soil conditions are a part of the usual assessment process on project evaluations for timber harvest and road construction

28 Willingness-to-pay (WTP) values used by the Forest Service are standardized for Regions Differences among Regions can be reflected in the Impact Analysis which would show the variation in income and employment impacts The research required to develop a set of Montana WTP values is beyond the capability and budget of most individual Forests, but a cooperative effort between the DFWP and the Regional Office of the Forest Service is currently underway

29 Fish and other beneficial water uses will not be degraded by the implementation of the Final Plan Monitoring activities will vary with resource outputs as stated in the Monitoring and Evaluation section in Chapter IV of the Final Plan We have revised the Forest Plan Monitoring Requirements to include gathering sufficient information to evaluate effects of disturbance on fish habitat and populations The mitigation of road sediment delivery to streams is mandatory, although the manager has the choice of techniques to use All riparian areas have been assigned to MA 3b so objectives for woody debris recruitment, channel stability and fish habitat maintenance can be achieved. As a result of reductions in the suitable timber base and allowable sale quantity between the Proposed and Final Plans, road construction needs were reduced from about 40 miles per year to about 25 miles per year in the first decade

30 The numbers you mentioned are correct for the Proposed Plan, except the amount of tractor logging would be 35 percent rather than 83 percent Revisions of the Proposed Plan resulted in new numbers We now estimate, the sediment increase will be under the threshold of effect on fish habitat, a 47 percent increase in road mileage over the next 50 years, 96 percent of the timber land under even-aged management and 47 percent tractor logging

production decreases to 5,000 tons per square mile after three years The study indicated that open roads that are maintained will continue to produce about 5,000 tons per square mile per year LOPLVLR because the disturbed area NEVER totally heals

Mitigation aimed at reducing the high sediment yields early in development can reduce sediment yields by up to 80% The Proposed BNF Plan includes these mitigation measures only as recommendations, NOT as required practices to be used The high sediment yields calculated in the Proposed Plan are developed from discounted sediment yield rates assuming the use of mitigation measures Therefore, the mitigation measures must be placed in the plan as absolute requirements not merely as recommendations

The program to monitor changes in the aquatic resources is underfunded and understaffed beyond the first year The monitoring of proposed development requires pre- and post-development data and after the first year, starts falling far behind new development The idea that the proposed monitoring program will fulfill the need of calibrating the sediment yield and fisheries response models is incorrect The monitoring program will tell us if we are in the "ballpark " The calibration studies are necessary to tell us which "ballpark" we belong in Calibration studies are necessary to provide the statistically reliable results not possible with monitoring

Additionally, it is imperative that there is adequate funding for model calibration and monitoring and that the implementation of the Plan be tied to the adequacy of that funding

We are very concerned about the adverse implications to an effective monitoring program by the following statement "If it is determined during project design that the best way to meet the goals of the Forest Plan conflicts with a Forest Plan Standard, the Forest Supervisor may approve an exception to that standard for that project "

The fisheries resource has not received adequate attention in the Proposed BNF Plan and deserves better consideration We suggest that the Proposed BNF Plan

1 Moderate the entire development plans significantly, to greatly reduce sediment yield hazards and truly accommodate the multiple-use goals the Forest is required to address

2 Develop a greatly improved monitoring and research (separate goals) effort on the watersheds and fisheries resources related to watershed development

H Hunter Opportunity

1. Lengthy hunting seasons are an important part of the big game hunting tradition in Montana Increases in forest road access along with reductions in cover will necessitate the need for shorter, more restrictive hunting seasons This reduction in hunting opportunity is in direct conflict with the management goals for big game hunting of the Department of Fish, Wildlife and Parks It is imperative that the Forest make every effort to reduce the adverse impacts on hunter opportunity

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FOREST SERVICE RESPONSE Continued

31 About 67,500 and 5,000 tons of sediment are produced on-site during the first and third years following construction per square mile of surface disturbance, not per linear mile of road Delivery to streams is reduced by the proportion of the area disturbed, slope coefficients, distance from streams, landform and soils of the area and vegetative buffers between the disturbance and the stream Research has shown that most of the erosion from new construction occurs in the first 2 years and a low level of sediment production continues essentially forever Proper maintenance of the road surface minimizes erosion

32 We have changed the language of the road standards to require the necessary mitigation measures be applied to reduce sediment yield from new roads by 75 percent

33 Water quality and quantity monitoring will be programmed with ties to outputs as described in the Monitoring and Evaluation section of the Final Plan Monitoring plans have been redesigned to include 1985 fish population and habitat study results and program needs Water yield, sediment, and fish habitat effects models will continue to improve as research and practical experience with monitoring improve understanding

34 We will request funding to fully implement the Forest Plan Monitoring Requirements We have attempted to tie outputs to monitoring as documented in the Monitoring and Evaluation section of the Final Plan, but since Congress has the prerogative to fund items as they see fit, no guarantees are possible

35 The land manager must have the prerogative to approve exceptions to rules The decision must be a justifiable way to meet goals of the Plan, and will involve public participation if the change is significant

36 See 29 and 34 above

37 We have established a Forest-wide management objective to maintain the current level of hunter opportunity We will use all reasonable means to maintain the levels of elk habitat effectiveness specified and to limit access sufficiently to limit bull elk harvest in the first week of the season to less than 40 percent of the total bull harvest One important component of hunting opportunity, hunter numbers, is not under the control of the Forest As hunter numbers, leisure time, and mobility increases, we will have a more and more difficult time maintaining season length and restrictions within parameters acceptable to the Department

2 The projected loss of elk hunter RVD's from the current level of 45,000 to 29,000-30,000 in the preferred alternative (a 36% loss) is unacceptable to the department and the elk-hunting public The final EIS and Plan need to explain how these figures were derived This predicted loss in elk hunter RVD's stresses the need to maintain as much roadless security habitat as possible

3 We strongly endorse the monitoring criteria for evaluating the impacts of the proposed plan on "Hunter trends and season " We recommend adding the following to the "Monitoring Action Plan" When the bull elk harvest in any hunting district consistently (three years running) exceeds 40% during the first week of the hunting season, additional fall road closures will be considered

These monitoring criteria are very important and will allow measurement of the impacts of the selected alternative's implementation

I. Land Allocations

The Forest is to be complimented on its stand to recommend roadless management in the Brooks Creek and Moose Creek areas. In addition to the scenic and recreational values, these ares are good elk security areas especially during the hunting season We are very supportive of the proposed roadless areas in the preferred alternative, however as outlined below, we feel some areas should be expanded and additional areas should be added for big game security habitat We also support the wilderness additions to the Bitterroot-Selway Wilderness These are natural additions and will certainly enhance the existing wilderness.

We have made a comparison with what was designated to be managed as roadless land in the Unit Plans prepared in the mid-1970's, with the proposed Forest Plan preferred alternative land allocations Approximately 71,000 acres of land proposed for roadless management in the old unit plans is being proposed for developed, roaded management under the Forst Plan preferred alternative Conversely, approximately 10,000 acres of land mainly in the Brooks Creek, Flat Rock Creek and Moose Creek drainages that was proposed for development in the old Unit Plans is recommended for roadless management under the Forest Plan, resulting in a net total of about 61,000 acres of land proposed for roads that previously had been allocated to roadless management This is a significant amount of land that has had a drastic change in its management direction and will certainly impact elk security habitat and hunting opportunity in the future This also makes one wonder just how firm the commitments for roadless areas under the proposed Forest Plan will be in the future when the plans come up for revision in 10-15 years It appears the only long-term permanent protection for the remaining roadless areas is wilderness designation

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FOREST SERVICE RESPONSE Continued

38 There will not be a 36 percent decline in elk hunter RVD's The 1980 baseline number was wrong There have never been 45,000 elk hunter RVD's on the Forest The correct number is 29,000 and we are committed to maintaining that number

39 We have added a Forest-wide management standard and a monitoring item to the Final Plan to respond to this concern

40 Since we do not have the rationale used to ascertain which 71,000 acres of roadless area in unit plans we now propose to road, it is difficult to respond The Final Plan has about the same area managed as roadless or wilderness as Alternative F (current direction) About 27,000 acres were recommended as additions to wilderness and 27,000 acres less assigned to semiprimitive recreation management About 35,000 acres of inventoried roadless area are assigned to the minimum level Management Area 8

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Proposed Bitterroot Forest Plan Land Allocations

General Area	Location	Management Emphasis Change from	to	
Little Threemile Cr	W-1/2 Sec 20, & the N A #1 portion of Sec 30, T8N, R18W	1	2	41a
Justification	This is elk and deer winter range and should be in M A #2 to optimize winter range habitat - not to emphasize timber management			
Gold Cr	Sec 12, 13, 14, 23, 24, 25, 26, T7N, R19W and Sec 7, 18, 19, T7N, R18W	1	6	41b
Burnt Fork, Flat Rock Cr, Skalkaho Game Preserve	T7N, R18W, & T6N, R18W	5	6	
Justification	This is the Stoney Mountain roadless area portion of the Bitterroot Some is proposed for intensive timber management and the remainder for roadless management It should all be recommended for wilderness to insure that big game security habitat is permanently provided in an area that is surrounded by some very high road densities			
Eastman Cr - St Clair Cr	Sec 10, 15, 22, 27, T6N, R19W	1	2	41c
Justification	This is elk (particularly bulls) and deer winter range and should be in M A #2 to optimize winter range habitat			
Beef Ridge - east	Sec 25, T5N, R20W	3a	4	41d
	Sec 31, 32, 33, T5N, R19W	3a	4	
Justification	These areas provide critical winter range cover and security during the hunting season These should remain roadless with little if any timber harvest			
Bear Gulch - Black Bear Pt	Sec 26, 27, 33, 34, 35, 36, T5N, R19W	3a	5	41e
	N-1/2 Sec 2, 3, & 4, T4N, R19W	1	5	
Justification	Radio-collared elk locations indicate these areas have high security values during the hunting season The surrounding country is heavily roaded, and this island of roadless security habitat should remain unroaded			

FOREST SERVICE RESPONSE Continued

41 Responses to the site-specific comments follow

a The area was changed from MA 1 to either MA 2 or 3a, both of which will protect winter range values

b We have decided to manage the riparian area of the Gold Creek drainage as MA 3b, the big game winter range portion as MA 2, and the rest of the drainage as MA 1. The area west of Gold Creek is suitable timberland and is already partially developed We think the other resource values of the portion of the Gold Creek drainage east of the creek can be protected while the area is managed for timber production or as big game winter range

c All of the area within the winter range boundary has been changed from MA 1 to MA 2 to protect winter range values

d We believe visual and access restrictions will adequately protect winter range values and will leave the area in MA 3a

e We believe elk values can be protected by assigning the area to MA 3a for the winter range portion of the area and MA 1 for the remainder

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General Area	Location	Management Emphasis Chng From	To	
Sapphire Roadless Area	Rock Creek divide from Reynolds Cr north to Skalkaho Pass	5	0	
	The Forest recommends a narrow belt along the divide as roadless management We recommend it be managed as wilderness with the following additions which are currently proposed for timber management			
Martin Cr	Sec 19, 28, 29, 30, T3N, R17W	1	0	
Martin Cr	Sec 11, 12, 13, 14, 23, 24, 25, T3N, R18W	1	0	
Mosquito Meadows	E-1/2 Sec 3, T3N, R18W	1	0	
S. Fk Skalkaho Cr	Sec 2, 3, 9, 10, 15, 16, W-1/2 Sec 22, T4N, R18W	1	0	
Head of Weasel, Hog Trough & Railroad Cr	Sec 14, E-1/2 Sec 15, 23, W-1/2 Sec 24, 26, W-1/2 Sec 25, E-1/2 Sec 35, W-1/2 Sec 36, T5N, R18W	1	0	41f
Daly Cr	Sec 10, E-1/2 Sec 3, T5N, R16W Sec 25, 26, 35, T6N, R16W	3a	0	
Justification	These areas all are currently roadless and provide extremely important summer-fall range for elk, mule deer, mountain goats and bighorn sheep High road densities exist along the south and west borders resulting in high security values within the roadless portions Much of the area proposed for timber management is high elevation, lodgepole pine, slow recovery sites that would be questionable to log These areas need to remain roadless, and the only permanent way is for wilderness management Changes in forest policy or direction when the plan is revised in 10-15 years could very likely result in additional erosion of the roadless base, as has happened in the past			
Bald Top - Sleeping Child Creek	E-1/2 Sec 6, Sec 9, 16, E-1/2 Sec 17, 21, W-1/2 Sec 22, 27, E-1/2 Sec 28, T4N, R19W	1	5	41g
Justification	These additions would expand the Bald Top - Divide Cr roadless area and provide additional security for elk in an area surrounded by high road densities			

FOREST SERVICE RESPONSE Continued

f Our land assignments for the Final Plan for this area remain essentially the same as the assignments for the Proposed Plan We believe the assignments reflect the needs and desires of the public and will maximize net public benefits. Our information indicates the land assigned to timber management prescriptions are economically efficient for timber harvest The Forest planning process provides mechanism to change management direction as social and economic conditions change. In 10 or 15 years, the Plan will be revised and recommendations for continuing or changing management direction made

g All of the area has been added to MA 5 in the Final Plan

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General Area	Location	Management Emphasis Change From	To	
Harlan-Roan Gulch	Portions of Sec 18, 17, 19, 20, T4N, R20W	1	2	41h
	Portion of Sec 24, T4N, R21W	1	2	
Justification	This is prime elk and deer winter range and should be managed with winter range considerations			
Burke Gulch	S-1/2 Sec 33, T4N, R20W	1	2	41i
	Sec 4, 13N, R20W	1	2	
Justification	This is elk winter range (often bulls winter in this area), and because of this and the heavy cutting on adjacent private land, this should be managed as winter range			
Lower Rye Cr Area				41j
1) Spring Gulch	Portions of Sec 20, 29, 20, T3N, R19W	1	2	
2) Bear Gulch - Rye Cr	Portions of Sec, 5, 6, T2N, R19W	1	2	
	Portions of Sec 28, 29, 32, T3N, R19W	1	2	
3) Benson Cr	Portions of Sec 34, 35, T3N, R20W	1	2	
	Sec 3, T2N, R20W	1	2	
Justification	This is elk winter range and should be managed as such			
Swift Cr	Sec 32, 33, T2N, R17W	1	5 or 6	41k
Justification	This is good fall elk security habitat and should be managed as roadless			
Balsam Cr & Bugle Cr	Sec 13, 23, 24, 26, T1N, R16W	1	5 or 6	41l
Upper Meadow Cr	Sec 19, T1N, R17W	1	5 or 6	
Justification	This is good fall elk security habitat and should be managed as roadless			
Polan Cr	Sec 3, 8, 9, T1S, R18W	1	5	41m
Reimil Cr	Sec 1, 2, T1S, R19W	1	5	
	Sec 6, T1S, R18W	1	5	
Justification	These are high elevation security areas that should be managed as roadless			

FOREST SERVICE RESPONSE Continued

h The area has been changed from MA 1 to MA 2 to better protect winter range values

i. The area within the winter range boundary was changed from MA 1 to MA 2 The rest of the area is above the area used by elk in winter and will be managed as MA 1

j. These areas were changed from MA 1 to MA 2 to better protect elk winter range values.

k. We decided not to designate the area as either MA 5 or 6 because the adjacent wilderness area provides sufficient elk security in the general area The area will be managed as MA 1 and Forest-wide standards for control of hunter access will apply

l. The portion of the area in Bugle Creek is already partially roaded so it cannot be managed as roadless The area in the Balsam creek bottom is heavily used elk summer range with possible road building problems We've added the area to MA 5 The rest of the area is suitable for timber production and will be managed as MA 1

m These areas are too small and isolated to be managed as semiprimitive recreation areas The elk values can be protected by the application of road access standards

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General area	Location	Management Emphasis Change from	to	
Tolan Ridge	Sec 17, 18, 19, 20, T1N, R18W	2	5	41n
	Sec. 12, 13, 11N, R19W	3a	5	
Tolan Cr., Reimel Cr, Barley Ridge, Wallace Cr & Diggins Cr.	Sec 14, 22, 23, 24, 25, 26, 36, T1N, R19W	1,2,3a	5	
Justification	These are critical winter ranges that are currently roadless to keep winter disturbances to a minimum and provide security during those years with considerable snowfall during the hunting season, these areas should remain roadless Carefully planned, limited timber harvest could possibly occur, providing thermal cover adjacent to foraging areas and hiding cover values are maintained			
Waddell Cr.	Sec 5, 13N, R21W	1	2	41o
Piquette Cr - East Piquette Cr.	Sec 1, 2, 3, 11, 12, 14, 11N, R21W	1	2	
Justification	This is elk and deer winter range and should be in MA #2 to optimize winter range habitat			
East Piquette Cr	E-1/2 Sec 12, E-1/2 Sec 13, 11N, R21W	1	5	41p
	Sec 6, 7, 18, 11N, R20W	1	5	
Dickson Cr	Sec 31, 32, 12N, R20W	1	5	
Gilbert Cr	Sec 6, 11N, R20W	1	5	
Medicine Point	Sec. 28, 32, 33, 11N, R20W	1	5	
Base Cr.	Sec. 5, 6, 11S, R20W	1	5	
Maynard Cr	Sec 25, 26, 36, T1N, R20W	1	5	
	SW-1/4 Sec 30, T1N, R19W	1	5	
Justification	These are all currently roadless areas and provide important security habitat in and around some areas that have extremely high road densities much of this is rather high elevation country where tree growth and recovery are slow they should be managed as roadless			

FOREST SERVICE RESPONSE Continued

n We think elk winter range values can be protected by designation to MA 2 Timber harvest is appropriate if cover and road access requirements are met. Section 19, T 1 N , R 18 W and E 1/2, Section 24, Section 25 and 36, T 1 N , R 19 W were changed from MA 2 to MA 8c in the Final Plan and therefore will not be roaded at least until reanalyzed in the future

o The piece in Waddell Creek has been changed from MA 1 to MA 2. In the Piquette Creek area, we have changed all the area within the winter range boundary from MA 1 to MA 2 to better protect winter range values

p. We have designated much of the low to nonproductive timberland to MA 8a The result is that most of the area mentioned will remain unroaded, but will not be managed for semiprimitive recreation Portions of the area in Maynard, Dickson and Gilbert Creeks are already roaded and their elk habitat values will be protected by road access management

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General Area	Location	Management Emphasis Change From	To	
Andrews, Prairie, Waugh Cr	Sec 31, T1N, R19W	1&3a	5	41q
	Sec 1, NE-1/4 Sec 12, T1S, R20W	1&3a	5	
	Sec 6, 7, W-1/2 Sec 8, E-1/2 Sec 18, E-1/4 Sec 19, T1S, R19W	1&3a	5	
Justification	These are currently roadless, higher elevation security areas that provide hunting season security for a relatively local elk herd Lower elevations to the e st are highly roaded these areas would combine with the large roadless area to the west			
Took Cr - Mud Cr	Sec 6, 21, 22, 27, 28, T1S, R22W	1	2	41r
Steep Cr	Sec 29, T1N, R21W	1	2	
Justification	This is elk and deer winter range and should be in MA #2 to optimize winter range habitat			
Little Boulder Cr	Sec 19, W-1/3 Sec 20, N-1/2 Sec 30, 29, T1S, R21W	1	5	41s
Justification	The upper portion of Little Boulder Cr is good roadless elk security habitat It should remain roadless			
Slate Cr	Sec 30, T1S, R22W	1	2	41t
Overwhich Cr	Sec 2, 10, 11, 12, T2S, R22W	1	2	
Cow Cr - Stevens Gulch	Sec 23, 26, T2S, R22W	1	2	
Justification	This is elk and deer winter range and should be in MA #2 to optimize winter range habitat			
Overwhich Cr - Hughes Cr.	Sec 22, 23, 24, 26, 27, 28, 29, 30, 35, T2S, R21W	1	5	41u
Hughes Cr - Thunder Mtn	Sec 29, 30, 31, 32, T2S, R20W	1	5	
	Sec 6, 7, T3S, R20W	1	5	
	Sec 1, 11, 12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 28, T3S, R21W	1	5	
	Sec 12, 13, T3S, R22W	1	5	
Justification	This is currently roadless elk security habitat Elk movements to and from seasonal ranges occur on the ridge between Overwhich Cr and Hughes Cr these areas should be managed as roadless to maintain these values for elk			

FOREST SERVICE RESPONSE Continued

q The part of the area below the upper boundary of winter range has been changed from MA 1 to MA 2 MA 3a has standards that are more restrictive to timber harvest and will result in more cover on winter range than MA 2 We have elected to leave some of the area in MA 1 because timber values are relatively high and other resource values can be protected by standards for the Management Area

r The part of the area within the winter range boundary has been changed from MA 1 to MA 2 The rest of the area has been left in MA 1 because timber values are relatively high and other resources can be managed within the standards of the Management Area

s A small part of the area was changed from MA 1 to MA 3a, a small part within the winter range boundary was changed from MA 1 to MA 2, but the rest of the area remains in MA 1 because timber values are relatively high and other resources can be managed within the standards of the Management Area

t All the area within the winter range boundary was designated MA 2 to protect elk winter range values

u More than half the area mentioned was changed from MA 1 to MA 5 because timber stand productivity is marginal or low and road access is difficult and expensive The ridge north of Quartzite Mountain and an area around Thunder Mountain were designated MA 8a because timber productivity is judged to be too low to justify management About one-fourth of the area mentioned remains in MA 1 because timber management activities seem appropriate from the standpoint of economics and other resource values

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General Area	Location	Management Emphasis Change from	to
Blue Joint Roadless Area	Sec. 20, 21, 22, 23, 27, 28, 29, 30, T1S, R23W	5	6
	Sec 2, 11, 12, 13, 14, 15, 22, 23, 24, T2S, R23W	1	6
	Sec 25, 26, 27, 28, 33, 34, 35, 36, T2S, R23W	5	6
	Sec 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, T3S, R23W	5&1	6
	Sec. 29, 30, 31, 32, 33, T2S, R22W	1	6
	Sec 4, 5, 6, 7, 8, 18, T3S, R22W	1	6

Justification These are all currently roadless elk security areas that are included in the Blue Joint Roadless Area These areas should be added to the proposed Blue Joint Wilderness Area since wilderness designation is the only permanent way to keep these areas roadless and these additions will approximate the original size of the roadless area.

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FOREST SERVICE RESPONSE Continued

v In the FEIS for the MWSA areas, we have recommended to Congress that they classify as wilderness the Blue Joint drainage portion of the roadless area A large portion of the heads of Deer and Chicken Creeks have been assigned to MA 5 for management for semiprimitive recreation. The big game winter range portion of the rest of the area has been assigned to MA 2 to be managed for its winter range attributes. Most of the rest of the area will be managed for timber production as MA 1 There are a few hundred acres of MA 8a, unsuitable for timber management, along Razorback Ridge, and a few hundred acres of visually sensitive area at lower elevations which has been assigned to MA 3a Most of the area in question is in the Montana Wilderness Study Act area Wilderness attributes of the area will not be altered until Congress acts

CHAPTER II
REGION TWO-FWP-COMMENTS
THE BITTERROOT NATIONAL FOREST PLAN DRAFT
ENVIRONMENTAL IMPACT STATEMENT

A DEIS Summary

Affected Environment

1 Watershed - We do not agree with the statement "Watershed conditions are good and water quality generally high on the Forest " Severe sediment problems do occur along the east side of the Bitterroot Valley primarily in granitic drainages Sediment movement at present levels require frequent irrigation ditch dredging and dredging at the Lee Metcalf National Wildlife Refuge The addition of significantly more sediment, as planned, to these drainages will create an additional taxpayer as well as private financial liability The movement of sediment from the steeper gradient forest streams to the low gradient private lands will predictably create added problems for private landowners

Environmental Consequences

1 Wilderness - Only the negative aspects of establishing new wilderness areas are mentioned (adverse impacts on timber harvest and mineral production) The long-term benefits from this type of management to big game security habitat, hunter opportunity and hunting season type and length need to be stressed, not ignored

2 Semiprimitive Recreation - The above applies to this section also No mention is made about positive aspects of big game security areas and hunting recreation

3 Landownership and Adjustment - Land exchanges can and often do result in environmental consequences If lands with high wildlife or fisheries values are traded to private ownership for lands of higher timber value but less fish and wildlife value, adverse impacts to the fish and wildlife resource may occur

4 Road System - Road access, combined with an increase in hunting pressure, has also resulted in more hunting season restrictions and reduced hunter opportunities over the past 15 years

5 Fish Habitat - We agree with correcting fish passage barriers created by improperly installed culverts However, we question the predicted improvement in fish carrying capacity by 9,000 fish by the creation of debris pools There is no scientific evidence on the Bitterroot National Forest to indicate such fish population improvement We will not approve of such projects as a blanket prescription for helping trout populations without conclusive proof of the benefits

6 Timber Harvest - "In all alternatives, except E, E1, and J, suitable riparian timberland has even-aged (clearcut and shelterwood) management

FOREST SERVICE RESPONSE Continued

42 We strongly suspect that most of the sediment problem in the main river is due to private land actions, especially irrigation, and natural conditions Ditch problems around the wildlife refuge are due to the ditching on erodible granitic soils of these private lands, and are not a result of sedimentation in the main river Most of the refuge water comes from drainages that originate on private land or the Burnt Fork of the Bitterroot, a drainage that is essentially undeveloped on the Forest

43 We have expanded the discussion of long-term benefits of wilderness and semiprimitive recreation designation in Chapter IV of the FEIS

44 The statement has been amended to read, "The average of four land exchange proposals per year will result in no environmental consequences if the standards for evaluating land exchanges are followed "

45 Analysis of the current open road density on the Forest indicates that the hunter opportunity on the Bitterroot is about what it should be For the past 3 years, the proportion of the bull harvest in the first week has been between 17 and 33 percent Personal communication with John Firebaugh, Region 2 Wildlife Manager, indicated he thought hunter access overall on the Forest was about right, only a few of the developed areas had a few too many roads open during the hunting season. As a result of the analysis, we have deleted the road access management standards from Management Areas and have added three Forest-wide standards (1) Manage roads to attain or maintain 50 percent or higher elk habitat effectiveness in currently roaded third order drainages (where more than 25 percent of the area is now roaded) (2) Maintain 60 percent or higher elk habitat effectiveness in currently undeveloped drainages (where less than 25 percent is roaded) (3) If the proportion of bull elk harvest in the first week of the season exceeds 40 percent, consider restrictions that would reduce the proportion to about 40 percent

46 Habitat improvement by the creation of pools has been used successfully throughout the west Pools and cover are variables that correlate with density of cutthroat populations and evaluations of most of these projects have resulted in higher biomass and larger fish Validation of every project in every drainage is not feasible For example, most harvest regulations or stocking programs by your Department are not validated before they are implemented, and few are scientifically validated after implementation, especially in individual waters Until a couple of years ago, there had been no evaluation of fish populations on the Bitterroot National Forest, yet regulations are established without this information The Department still has insufficient data to assess the effectiveness of their regulations, but proceeds on the best information available Similarly, we would expect to proceed with projects using our best professional judgement and available data from other areas if necessary However, due to constraints in the Final Plan, sediment will be maintained at levels below thresholds damaging to fish habitat potential, therefore, the need to offset losses with an aggressive habitat improvement program has been eliminated A smaller scale program will be implemented where fishing demand is high and where habitat potential can be improved

47 Riparian areas are critically sensitive watershed lands for water, fish, and other resources The lighter the timber harvest in riparian areas the less the water risk, and uneven-age management is less impactive than clearcutting Compromises are made in various alternatives depending upon the resource goals, some alternatives affording less water impact than others.

prescribed and fish population are affected after the fourth decade " We oppose this single purpose management statement on the Bitterroot National Forest for all alternatives except E, LI, and J The Bitterroot National Forest contains significant fisheries resources and furthermore contributes the water to nationally and regionall, important fisheries adjacent to the Forest boundaries

B. Analysis of management Situation

1 Roaded Natural Recreation - There is a serious error in the DLIS in this section It is stated that "the quality of hunting, fishing . will decrease as the population increases unless the area roaded increases proportionately " We believe solitude is a key factor in quality hunting and fishing experiences Maintaining the unroaded areas will maintain the quality experiences - not diminish them!

2 Livestock Range - The additional forage created through timber harvest should not be entirely allocated to livestock use Wildlife use of this forage needs to be allocated.

3. Elk Winter Range - The figure of 3,000 elk on the Bitterroot National Forest winter range in Montana is too high for Ravalli County Using 1984 trend "count" information, this figure should be no higher than 1500-2000 elk since 65-80% of the elk winter on private land in the Bitterroot.

4 Fisheries - The stream-dwelling catchable population of trout is reported as being 67,700 (including Idaho areas). Tables 1, 2 (see Appendix) included with our comments show the results of population estimates completed on the BNF A conservative estimate of the catchable trout population on the BNF in Montana alone is 412,430 in 377 miles of streams. In addition, the forest adjoins a minimum of 157 miles of trout streams which are on private lands that are fishable which adds another 149,878 catchable trout to the total. These off-forest streams do not include the main forks of the Bitterroot River or the Bitterroot River itself and are very conservative estimates We feel that, considering the planned development activities, significant fisheries losses are potential on the BNF.

C. Preferred Alternative

1 Roadless Areas - 71% of the 400,000 acres of the existing roadless land will remain roadless (52%) or be proposed for wilderness (19%) This is a 12% reduction of roadless areas from the current direction e recommend the current direction (Alt. F) for management of roadless areas, with at least 19% for wilderness designation

2. Wilderness - The Stony Mountain area should be recommended for wilderness due to the high wildlife values and diversity of big game species inhabiting the area Management of this 100,000-acre area as wilderness (including the Lolo and Deer Lodge N F) would insure big game security habitat is available in an area that is surrounded by some very high road densities The proposed action is to manage the majority of this area (67%) as roadless by decade 5. However, when the plan comes up for revision in 10-15 years, decisions could be made to

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FOREST SERVICE RESPONSE Continued

The Proposed Plan has been revised so riparian areas will be managed to provide woody debris recruitment to stream channels for stability and fish habitat and to provide vegetation for sediment filtering and wildlife habitat

48 We believe this statement to be true in context If the number of visitors increases and the amount of roaded area remains the same, the quality of the experience for folks who prefer to use roaded areas will decrease This is the case in all recreation settings and we face the dilemma of providing a suitable mix of settings and activities in the face of an ever expanding recreating public

49 Livestock use on winter ranges within allotments will be limited to 35 percent of the available forage according to the management standards for MA's with winter range

50 Elk show no respect for administrative boundaries We have assumed that all of the elk in the Bitterroot spend at least part of the winter on National Forest land Our analysis is based on the capability of the winter range on the Forest to support elk for the winter season The analysis shows the Forest has the capability to support the current population of elk for the winter season The actual number on the Forest at any time is dependent upon weather, animal behavior and preference

51 Population estimates have been revised based on recent electrofishing results and extrapolated based on a process agreed to by your Department. The constraints built into the Final Plan will maintain sediment at levels below the level that would be adverse to the fish population

52 In the Final Plan we have assigned about 240,000 acres to MA 5 for semiprimitive recreation management without roads This is essentially the same area assignment as in Alternative F, current direction, although some of the specific area designations have changed In the Current Direction, we would recommend adding about 50,000 acres to the wilderness system, in the Preferred Alternative we recommend classification of about 77,000 acres

We have not recommended any wilderness classification for the Stony Mountain area We believe we can protect the critical resources with management of about 30,660 acres as semiprimitive recreation area without roads, about 2,300 acres as unsuitable for timber harvest and allow timber production on about 10,700 acres Portions of the area on the Deerlodge and Lolo National Forests will be managed similarly

allow more roads and timber harvest than originally proposed The only permanent way to keep this area as prime elk security habitat is to classify it as wilderness

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3 Timber - The terms "moderate or higher quality timberland" need to be defined, because they continue to propose sales and roads in remote, higher elevation, lower productive sites so valuable for big game security Many of these areas are not lands of moderate or higher quality timberland We recommend that the criteria for defining non-suitable timber producing lands be changed from "less than 20 cubic feet/acre/year" to "40 cubic feet/acre/year " This would help insure that the higher elevation, lower productive timber sites would remain as high wildlife security areas Because the Plan proposes an increased emphasis on lodgepole pine harvest in the future, this indicates more timber harvest activity in the less productive areas

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It is very questionable whether the Bitterroot N F can sustain a timber harvest of 31 MMBF/year based on habitat types, soils, slow recovery of areas logged in the past, and proposals to remove more timber at more remote, higher elevation, slow growing and recovery sites This plan appears to perpetuate the "overharvest" of timber that is occurring on the Bitterroot A more realistic harvest of 20-25 MMBF/year would allow previously logged areas the opportunity to recover and at least maintain a status quo of logged to unlogged areas This would provide more security habitat for wildlife, less sedimentation problems for fisheries and maintain a more stable timber economy

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4 Road System - We oppose the Plan's commitment to fund approximately 33% of the road construction during decades 1-3 as capital investment roads Whenever capital investment dollars are needed to build roads so the timber sale will be viable, a red flag should be raised and questions asked regarding adverse impacts of these types of sales on other resources If the timber will not pay for the road construction, it may not be worth harvesting In most cases, the good productive timber sites have already been harvested and the more expensive, less productive sites are left to be "managed " These "remote" areas tend to be the remaining roadless, high security big game habitat areas so important in maintaining current hunting season lengths and hunter opportunity Other resource values should outweigh timber in these areas and they should remain roadless or be designated as wilderness

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D. Comparison of Alternatives

1. Wilderness and Roadless Management - Maintaining 83% of the remaining 400,000 acres of roadless areas as roadless or wilderness will provide reasonably good security habitat for wildlife if properly distributed throughout the forest We prefer Alternative F it recommends 83% of the roadless lands be managed as roadless (70%) or wilderness (13%) We also prefer at least 19% of the remaining roadless area be designated wilderness as outlined in Alternative C. If the Stony Mountain proposed wilderness area is included, this would increase this figure considerably This will provide more security habitat for big game in the future A major concern is the future of the 200,000-plus acres to remain roadless When the plan is revised in 10-15 years,

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FOREST SERVICE RESPONSE Continued

53 The term "most moderate or higher quality timberland" as used on page II-25 of the DEIS is referenced to the Bitterroot National Forest and coincides with a potential growth of 20 to 84 cubic feet/acre/year Quality timberland in this sense relates to yield rather than to elevation or road access A better choice of words is used in the FEIS

The rate of wood production is no longer a criteria for identifying unsuitable timberland Appendix A of the Final Forest Plan briefly describes the classification of forest land

High elevation wildlife security area is abundant on the Forest and virtually no timber harvest is scheduled in the areas higher than 7,200 feet The increased emphasis on lodgepole pine extends only to the lower and middle portion of its elevational range

54 Within biological limits and legal constraints, the Bitterroot National Forest is capable of sustaining a range of timber harvest rates from 0 to 49 MMBF per year during the first decade When timber harvest rates are maximized, other resource outputs are minimized In response to public comment on the Proposed Plan, we have prescribed a balance of resource outputs which provides a first decade harvest rate of 33 4 MMBF per year for the Final Plan

55 There are areas of the Forest that are economically suitable for timber management, but because of high initial road construction costs require capital investment Since roads are a capital investment, they provide use over an extended period, and an accurate evaluation of roads as an investment requires consideration of the use of the roads over multiple timber harvests The FORPLAN model considers costs and returns over the life of the capital investment Other resource values are included both within the FORPLAN model and as constraints that assure protection of big-game habitat requirements

56 See 52 above

will these roadless allocations hold or will they gradually be developed for timber? There needs to be some assurance that these areas will always remain roadless

2 Road System - The preferred alternative will double the miles of existing road by the 5th decade. This increase in road access will have an adverse impact on big game security habitat, effective use of habitat, and hunter opportunity. Strict adherence to the Montana Fish and Game Commission's Road Management Policy should help offset these impacts. We recommend that the forest implement this policy's guidelines. More emphasis should be given to road closures where the road is back-sloped and obliterated for 1/8-1/4 mile. This would discourage violations of going around or tearing out gates and maintain more secure habitat for big game

3 Present Net Values - Elk Security - We recommend the amount of roadless acres under Alternative F be applied to the preferred Alternative (E) to maintain better levels of elk security habitat

4 Average Annual Resource Outputs - Elk hunting potential (RVD's). The projected loss of elk hunter RVD's from the current level of 45,000 to 29,000-30,000 in the preferred alternative (a 36% loss) is unacceptable to the department and the elk hunting public. The Final EIS and Plan need to explain how these figures were derived. This predicted loss in elk hunter RVD's stresses the need to maintain as much roadless security habitat as possible

b. Affected Environment

1. Wildlife - The definition of elk security areas - "areas of 5,000 to 3,000 acres, below 7,000 feet elevation, that provide high-use fall habitat for elk." - is too limiting. There should be no limit on acres or elevation. Basically, areas provide security because of geography, topography and/or vegetation that will hold elk during periods of stress. Security is a function of space and hiding cover, as influenced by human access. The size of the area necessary to provide security will vary with the degree of access and hiding cover characteristics. This pertains to all seasonal ranges, not just fall

2 Roads - The DEIS states "The average road density on the forest is 2.3 miles of road per square mile on the developed portion of the forest." According to Lyon's graph of the influences of road density on elk habitat effectiveness, this density, if all open roads, results in about 40% habitat effectiveness. This is unacceptable! It appears this density of roads is considerably above the densities recommended in the Fish and Game Commission's Road Management Policy. Acceptance or adherence to the Commission's Road Management Policy would help correct this deficiency.

3 Fish - We disagree with the statement "The clear, cold streams are only moderately productive primarily because many of them flow through relatively sterile granitic soils." The average number of trout larger than 6 inches we have found is about 1,094 per mile in the 5th streams, which is actually quite productive. If we include the very important juvenile segment of these tributary streams, we add another 1,929 trout

FOREST SERVICE RESPONSE Continued

56 57 We have adopted the Commission's Road Management Policy as a Forest-wide standard. We have and will physically close roads to vehicles to discourage violations and maintain more secure elk habitat. The emphasis will continue on gates because they are more cost effective, most of the roads built will be used for future management activities, and we think we can effectively administer the Forest Travel Plan.

57 58 The major difference between Alternatives E and F is the area recommended for wilderness designation. We think either designation provides elk habitat security. In the Final Plan, we have designated 233,000 acres of roadless area to Management Area 5, 76,805 acres to MA 6 and 35,000 acres to MA 8.

58 59 See 38 above.

58 60 We have changed the definition in the Glossary as suggested.

59 61 Our interpretation of Lyon's work indicates we should analyze the effects of open roads on elk habitat effectiveness. There are 3.3 miles of roads per square mile on the developed portion of the Forest, but not all of these roads are open to the public. If the objective of road management is to provide adequate access but limit the bull harvest in the first week of the season to less than 40 percent of the total bull harvest, we are meeting the objective. Bull harvest in the first week averaged less than 30 percent for 1982 through 1984.

60 61 62 Fish population estimates have been adjusted. We recognize that productivity on the east side of the valley is higher than the west side. However we feel that, in the context of some other Montana streams, that productivity cannot be termed high on the Forest, although standing crop may be relatively high in some streams as expressed in relatively small fish.

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per mile for a total of 3,023 trout per mile average On a per unit of flow basis, the eastside (Sapphire) streams are many times more productive than the westside streams

We fully agree with the Bar acceptance of responsibility in the watershed contributions to the Bitterroot River We recognize the many facets of the Bitterroot Valley both past, present, and future but see watershed management as one of the most important jobs of the Forest Service in this area

4 Soils - We feel that the erosion hazard of the granitic soils is an eminent threat to fishery resources under the proposed development plans

5 Watershed - The proposed development will result in a 37% increase in sediment yield over natural conditions at the current level of activity This is unacceptable to us

F Environmental Consequences

1 Wildlife Habitat - The wildlife habitat improvements discussed include only spring burning, shrub planting or shrub pruning to improve forage quality and quantity on winter ranges Security habitat should also be discussed, particularly from the standpoint of maintaining those roadless security areas that remain This should qualify as maintaining or improving wildlife habitat as direct habitat manipulation projects.

2 Landownership and Adjustment - Land exchanges should have as a high priority the maintenance of key wildlife habitat, particularly winter range, in public ownership Land parcels to be acquired should have the objective of acquiring key wildlife habitat

3 Road System - Increases of road access into former big game security habitat, combined with an increase in hunting pressure, has resulted in hunting season restrictions and reduced hunter opportunities over the last 10-15 years This needs to be mentioned in the discussion on roads

4 Timber - Timber harvest can affect water yield and peak flows The Bitterroot River and tributaries currently are among the worst in the state of Montana for stream erosion problems (310 permit applications) The vast majority of these problems are directly related to excessive bedload and sediment, increasing water yields will intensify the bedload problems in the Bitterroot drainage at the cost of fisheries and private landowners.

We appreciate the effort to mention the hazards of even-aged management in riparian zones but are dismayed by the fact the BLM is planning to go ahead and develop these areas anyway

G Assumptions

1 Timber - Closing roads to provide only a 40% elk habitat effectiveness is not acceptable This indicates elk may be using less than half the

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FOREST SERVICE RESPONSE Continued

63 Soil inventories and soils management guidance consider erosion hazard and other factors important to protection of soil and water Granitic soils problems are recognized, and, in fact, the R1/R4 sediment model is based upon research in the Idaho Batholith resulting from well known problems and special management challenges for maintaining soil and water resources on such erodible soils We are continually improving our understanding and ability to manage for multiple uses on granitic soils

64 Sediment increase estimates in the Final Plan have been constrained within the threshold of effect on fish habitat potential

65 It is beyond the scope of the planning process to change accounting procedures Land designations do not qualify as habitat improvement projects, even though they may result in habitat improvement over time

66 The purpose of Chapter IV is to document the expected consequences of management activities We believe we have adequately documented the effects of land ownership adjustment, road construction and transportation systems on big game

67 Perhaps 310 permit applications reflect the number of people attempting irrigation, road, and other channelization projects as well as relative stream stability Several recent studies of the Bitterroot River channel stability and sediment transport characterize the stream as naturally braided, a less stable channel pattern than sinuous or meandering patterns. Increases in precipitation since 1946, and downdropping of the valley floor between Hamilton and Stevensville, may account for a natural shift from a meandering pattern earlier in this century The Bitterroot River is a naturally braided channel flowing through huge quantities of coarse glacial sediments Man's effects on the Bitterroot River are currently more impactive on private land than on Forest Our FEIS Chapter IV analysis of the cumulative downstream effects indicates Forest activities account for only about 1 percent of the sediment in the Bitterroot River at Stevensville

68 Riparian areas are the most productive land for many resources We believe we have implemented management standards which will allow for timber management in these productive areas while protecting other valuable resources

69 We have changed the elk habitat effectiveness standards to those shown in the Forest-wide Management Standards section of the Final Plan and in 45 above

timbered areas they potentially could use because of road systems and associated use This must be changed to at least 60% elk habitat effectiveness

2 Winter Range - Closing roads to provide only 60% elk habitat effectiveness is unacceptible, considering the critical importance of winter range habitat To only provide 60% habitat effectiveness will place additional stress on elk and limit their use of important winter ranges The Forest Service must provide 80% habitat effectiveness on winter ranges The proposed average winter range road densities of not ore than 6 6 miles/section seems extremely high for any areas, specially on winter range These high road densities and associated use will place additional stresses on elk and limit the areas of winter range which they can use Maximum road densities on winter ranges should not exceed 1 mile/section resulting in 80% elk habitat effectiveness.

3 Benefits Used in PNV - Wildlife - The low National "willingness to pay" figure of $21 was apparently used to standardize the values for hunting between forest regions. This averaging of values between states and types of hunting (deer, elk, javelina, etc) tends to downplay the importance of hunting and fishing recreation to a state like Montana where it is a favored recreation of many residents and draws considerable nonresident use "Willingness to pay" values can and will differ between states and between forests. We suggest a joint review project be developed between the U. S Forest Service and the Montana Department of Fish, Wildlife and Parks to study and develop a realistic value for "willingness to pay" that would reflect Montana dollar values The $21 value used in the draft is unrealistically low for Montana's quality of hunting

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FOREST SERVICE RESPONSE Continued

70 The proposed road construction densities are the minimum necessary to access land for timber harvest Elk habitat security is measured by the amount of road open to the public For the Final Plan we have adopted Forest-wide management standards which will result in about 2 miles of open road per section in third order drainages which are now roaded, and 1 mile per section in third order drainages to be roaded The road model we refer to (Lyon 1983) shows elk habitat effectiveness of one mile of road per section is 60 percent, two miles is 50 percent

71 See 28 above

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CHAPTER III
REGION TWO-EWP-COMMENTS
THE PROPOSED BITTERROOT NATIONAL FOREST PLAN

A Management Goals

1 Fish and Wildlife - Recreation related to fish and wildlife should be addressed in this goal statement We suggest the addition of the following "The Forest will be managed to provide for at least a maintenance of the current elk hunter days " 72

2 Roadless - We recommend that the following be added to this goal "The distribution and amount of roadless areas on the forest will reflect the needs of the forest user and wildlife " 73

3 Water Quality and Soil Productivity - The Plan proposes to "meet or exceed State of Montana water quality standards and maintain water quantity and soil productivity " The Montana State Water Quality Standards for sediment read "No increases are allowed above naturally occurring concentrations of sediment " In the non-point sediment discharges of the water quality law, allowances are made in this standard if "Best Management Practices (BMP)" are being followed However, further in the law even this segment is amended to say as long as fish and wildlife are not affected by the action The conclusion is quite clear in the law the USFS-BMI cannot meet State Water Quality Standards based on their own predictions of sediment increases 74

The current actions have sediment yields on a forest-wide basis equal to 37% above natural levels and the proposed plan will increase the yields to 41% under conservative forest estimates

B Management Objectives

1 Recreation - We strongly support the following addition to the Forest-wide Management Objectives and recommend it be listed under the "Recreation" heading "Provide a variety of hunting recreation opportunities by using project planning and road management to assist the Montana Department of Fish, Wildlife and Parks (FWP) in meeting their goal of maintaining long hunting seasons with minimum restrictions " 75

2 Wilderness - We recommend the wilderness allocations in Alternative E, the entire Stony Mountain and Sapphire WSA, and the allocations for the Blue Joint WSA in Alternative H 76

3 Roadless - We recommend the roadless allocations in Alternative F except for those lands that we have recommended for wilderness above

4 Roads - We recommend the following addition "It is our intent to provide public access to forest lands However, roads will be closed where adverse resource impact and/or the maintenance cost of leaving 77

FOREST SERVICE RESPONSE Continued

72 Since this statement is a Forest-wide management objective, there is no need to reiterate it here

73 We think the suggested statement is implicit in the goal statement Our objectives for roadless area designation and management are further expressed in Forest-wide management objectives and management standards for MA 5

74 Sediment yields will be constrained to stay under the threshold of effect on fish habitat potential Therefore, there will be no reduction in fish populations, and State Water Quality Standards will be met

75 See 4 above

76 See 7 above

77 See 8 above

them open exceeds the benefits. Adverse impacts to be considered are increased timber costs to the industry or the public, jeopardizing big game production and protection, jeopardizing recreational hunting and fishing opportunities, and stream sediment or erosion problems. Closures on collector roads will be made to avoid adverse impacts to the resource. Most spur roads will be closed after special resource needs are satisfied.

The criteria to be used to analyze the need for road use restrictions are:

a. Roads will be closed when necessary to protect the safety of Forest users. Examples include roads with hazards such as avalanches, landslides, forest fires, flooding, timber operations, etc.

b. Adverse resource impacts will be mitigated by the road closure, also, beneficial effects will be reviewed and considered. Where roadway use increases soil movement and adversely affects water quality and vegetation, some types of closure will be considered. In cases where fish and wildlife are affected, special emphasis will be placed on road closures. Areas that are identified as opportunities for walk-in hunting or fishing experiences will be considered for closure. Road closures will also be considered to help preserve known historic and prehistoric sites. Temporary closures will be considered for fire damage, roadway erosion, and similar conditions. Road closures may be used to maintain hunting opportunities and to preserve viable habitat, as well as to distribute big game harvest and provide for liberal, lengthy recreational hunting opportunities. To maintain current hunting opportunities the Forest will cooperate in implementing the 'Montana Fish and Game Commission Road Management Policy' of October 13, 1982. Any wildlife closures will be coordinated with the Montana Department of Fish, Wildlife and Parks. 77

c. Road closures will reflect needs of the public in special circumstances and during the different seasons of the year. Emergency events such as fire suppression and search and rescue activities shall be permitted on closed roads. Activities such as firewood gathering, mining, and berrypicking could occur provided the objective of the closure is not compromised.

d. The need for protection of administrative or special use facilities will be a consideration for the closure of certain roads. Lookouts, guard stations, and transmission sites are examples of such facilities.

e. Roads should be considered for closure when necessary to minimize conflicts between user groups. Examples include conflicts between walk-in hunters and road hunters, cross-country skiers and snowmobilers, horseback riders and motorcyclists.

f. The quality of dispersed recreation opportunities will be a factor when considering a road closure (providing for four-wheeled motorized recreation in some areas and other forms of motorized

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recreation in others, where both uses in the same area may result in diminished quality of the recreation experience) "

C Research Needs

1. Fish Populations and Sediment - The Plan proposes "Improvements in fish population modeling related to sediment yields such as threshold amounts and rates of change and validation and modification of other fish habitat models to accurately portray management actions on Bitterroot Forest waters " This reserch is paramount to understanding the impacts of the proposed management plans on the important fisheries resources on the BNF and adjacent streams.

2 Water and Soil - We recommend improvements to the sediment yield model by researching baseline sediment rates, slope-sediment delivery coefficients and stream channel routing coefficients Adequate funding is imperative for this type of basic research

D Condition of the Forest

1 End of First Decade

a Recreation - Accessing by road an average of 6,700 acres of roadless areas per year for the first decade is extremely high, especially when the areas accessed are all prime summer-fall elk security areas

b Roads - We have the same concern as above

2 End of 5th Decade

a Wildlife and Fish - Caution must be exercised when reducing cover on winter range to 40% of the winter range area Thermal cover is important and heavily used for foraging and resting during winters with deep snows Adequate thermal cover must be retained adjacent to primary foraging areas Hiding cover must be maintained on winter ranges also for security reasons. Security habitat on winter range needs to be improved, not reduced, to spread out the elk harvest rates, particularly during those hunting seasons with heavy snowfall.

b Timber - We feel that increasing the timber harvest from 30 MMBF currently to 45 MMBF by the 5th decade is unjustified We feel the timber harvest should be reduced to 20-25 MMBF/year

c Road System - The Final Plan should show what percent of the roaded portion of the forest will be affected by road closures.

E Forest-wide Management Standards

1 Road System - We recommend the criteria used to analyze the need for road-use restrictions as recommended in our comments under Management Objectives

FOREST SERVICE RESPONSE Continued

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78 We agree that fish, water, and sediment modeling improvements are top priority research needs

79 In the Final Plan we propose development of only about 8,500 acres of currently roadless area in the first decade Reductions in the timber harvest level and necessary road construction, increased emphasis on managing economically efficient timberland, and increased designation to MA's 5 and 8 have resulted in slower development than projected in the Proposed Plan

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80 Reductions in the timber harvest level and more land assigned to MA's 5 and 8 have resulted in less road construction in the first decade than projected in the Proposed Plan About 250 miles of new road will be built in the first decade

81 Our goal is to maintain or enhance elk winter range habitat (Final Plan Chapter I, Section II, A 3.) We think the lower limit for cover on big game winter ranges is 40 percent According to the monitoring plan, if elk populations or hunter opportunities begin to decline, we will consider changing management direction to meet this goal

82 The increases in timber harvest in the "out decades" are largely a result of visual and hydrologic recovery of past high levels of timber harvest and fire We should be able to harvest at the indicated levels, however, re-analysis will be required every 10 to 15 years.

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83 The travel planning process is a continuing process and in many cases restrictions are seasonal For these reasons we have chosen to show the restrictions outside the Plan on the travel plan map, and address closures as they relate to game management through the habitat effectiveness criteria in the Plan, which we believe is more meaningful

84 See 8. above

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2 Road Standards - We recommend that roads should be built to the minimum standard whenever possible to reduce public use and facilitate closures]85

3 Standards for Road Density - The road densities stated here are very high in terms of miles of road/square mile These densities will reduce elk habitat effectiveness considerably Most of these exceed the Fish and Game Commission's Management Policy densities The Forest Service should also obliterate some roads for the first 1/8 to 1/4 mile when closing them instead of just using gates This would discourage violations and maintain a more secure habitat for big game]86

4 Wildlife and Fish - The criteria for using cutthroat trout populations as an indicator of fisheries habitat changes needs to be stated in specific and measurable terms]87

5 Water, Air and Soil - We recommend that the Forest, as part of project planning, make a commitment to redesign, reschedule or drop projects that cannot meet Montana Water Quality Standards.]88

We are very concerned about the adverse implications to effective project design by the following statement "If it is determined during project design that the best way to meet the goals of the Forest Plan conflicts with a Forest Plan standard, the Forest Supervisor may approve an exception to that standard for that project, such exceptions must be described in the Finding of No Significant Impact/Decision Notice for the project, and the rationale for making the exception must be documented in the project file or environmental assessment "]89

6 Funding - The following statement needs to be rewritten to require that development can occur only with adequate fish, wildlife and water quality monitoring "Subsequent activities affecting the Forest, including budget proposals, shall be based on the Forest Plan Proposed implementation schedules may be changed to reflect differences between proposed annual budgets and appropriated funds Such scheduled changes shall be considered an amendment to the Forest Plan, but shall not be considered a significant amendment, or require the preparation of an environmental impact statement, unless the changes significantly alter the long-term relationship between levels of multiple use goods and services projected under planned budget proposals as compared to those projected under actual appropriations " Monitoring and research needs must be tied directly to resource development budgets]90

F. Management Area Direction

1 Management Area 1

a Wildlife and Fish - Maintaining at least 40% elk habitat effectiveness is low and means there will be an average of three miles of open road per square mile This should be adjusted to at least 60% or not more than one mile of road per square mile]91

b. Range - Wildlife forage needs to be added to the criteria used to consider livestock use and range improvements in these management areas]92

FOREST SERVICE RESPONSE Continued

85 See 9. above

86 See 10 above

87 As you are aware, natural variability makes monitoring standards difficult to establish Indicator species will be used by the Forest as one variable to measure whether management activities are compatible with other resources A downward change in cutthroat populations that cannot be explained with natural variability, along with an adverse change in habitat variables will be used by the Forest Supervisor in evaluating the compatibility of management activities

88 It is Forest Service policy to comply with State Water Quality Standards in all our activities

89 We believe land managers need flexibility in applying any rule The statement is not intended for common use and is subject to public review through the Decision Notice and environmental assessment processes

90 We have added language at the end of the Monitoring and Evaluation section of Chapter II of the Final Plan to require a balance between resource outputs and monitoring activity.

91 See 11 above

92. See 12 above

960

c. Road System - Road densities used here are very high These should be reduced to comply with the Fish and Game Commission's Road Management Policy]93

2 Management Area 2

a Wildlife and Fish - Habitat effectiveness at a minimum of 60% is too low for winter range This should be a minimum of 80% for winter range]94

b. Range - Allowing nearly half the winter range forage (40%) to livestock is too high 30% would be more compatible with wildlife and would reduce forage competition This applies to all Management Areas]95

c Lands - We appreciate the fact that the Forest has not reduced public ownership of its winter ranges and is considering adding additional important winter range

d Road System - These road densities, especially for winter range, are too high]96

3 Management Area 3a

a. Wildlife and Fish - 60% habitat effectiveness is too low for winter ranges We recommend at least 80% habitat effectiveness.]97

b. Road System - The road densities are too high]98

4 Management Area 8b

a Wildlife and Fish - Since these are sparsely forested, open winter ranges, 60% habitat effectiveness is not sufficient and will not result in optimum elk use of these critical areas They should be managed for at least 80% habitat effectiveness]99

b Range - Livestock use should be limited to 30% of the available forage 40% is too high, particularly for winter range]100

G Monitoring

1 Hunter trends and season - We recommend adding the following "When the bull elk harvest in any hunting district consistently (three years running) exceeds 40% during the first week of the hunting season, additional fall road closures will be considered "]101

2 Roads - A new monitoring criterion is necessary Miles of road open to public use - measured and reported annually, variability of ±5% would initiate evaluation]102

3 Funding - It is extremely important that monitoring be adequately funded to insure the validity of the Plan's activities]103

FOREST SERVICE RESPONSE Continued

93 See 13 above
94 See 14 above
95 See 15 above
96 See 16 above
97 See 14 above
98 See 16 above
99 See 14 above
100 See 15 above
101 See 21 above
102 See 22 above
103 See 23 above

4 Cutthroat Trout - The proposed plan monitoring calls for doing something on cutthroat trout with moderate precision and moderate reliability on six stream sections annually at a cost of $7,500 If numbers vary by 10% then the Plan calls for further evaluation A moderate level of sampling will not be able to detect a low variation, a high level of precision is necessary for that detection level Six sampling sections is not adequate to cover disturbed drainages or the long-term cumulative impacts.

5 Water and Sediment Yields - Six sediment and flow monitoring stations per year with low precision and moderate reliability are to be used to validate the sediment model and assess land management effects on fisheries and other watershed considerations, with 150 days of effort and $2,560 in lab costs. This low level of statistical accuracy should not be used for model validation, but as checks on whether drainages are close to a validated model value A significantly greater effort needs to be developed with better data accuracy for model validation

6. Water Quality and Fish - The Plan proposes to monitor ten macroinvertebrate sampling stations with low precision and moderate reliability per year costing 10 days time and $1,200 per year This level only covers the first year of development Each year thereafter this amount needs to be added to the previous year's budget because of the long-term nature of impacts associated with development and the multiplicity of factors which control watershed conditions

7 Stream Channel Condition - Eight days of effort probably is adequate for the first year of development but the cumulative effect of each additional year's development makes this level of activity inadequate shortly after implementation of the Plan Watershed management is a long-term commitment and development impacts may not be detectable for many years

8. Hydrologic Recovery - This monitoring activity is designed to look at one project per district per year with low precision and moderate reliability This is inadequate This type of data needs to be upgraded to increase the quality of the results Each year should include a continuation of studies on existing projects as well as the new ones

9 Riparian Area Condition - This monitoring item is designed to look at one project per district per year This is inadequate This type of data needs to be upgraded to increase the quality of the results Each year should include a continuation of studies on existing projects as well as the new ones

104

FOREST SERVICE RESPONSE Continued

104 See 24 through 27 above

MONTANA HISTORICAL SOCIETY

HISTORIC PRESERVATION OFFICE

225 NORTH ROBERTS STREET • (406) 444 4584 • HELENA, MONTANA 59620

March 11, 1985

RECEIVED
APR 15 1985
Bitterroot National Forest

Mr Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 N Third Street
Hamilton, MT 59804

RE Review of the Bitterroot National Forest's Proposed Forest Plan

Dear Mr Morgan

Thank you for providing this office the opportunity to review and comment on the Bitterroot National Forest's Proposed Forest Plan We note that under the Forest-Wide Management Objectives (Chapter II), cultural resources will,

1) be managed in accordance with relevant federal laws and policies

2) inventories will be conducted where land-disturbing activities are planned, and

3) all wilderness and roadless areas will be completely inventoried in the next 50 years

We also note that under Forest-Wide Management Standards for cultural resources (Chapter II), the Forest intends to conduct a systematic program of resource inventory, evaluation and preservation This program will entail evaluations of significance under the National Register criteria, preservation when warranted, as well as enhancement and interpretation for the education and enjoyment of the public

We encourage this general approach and commitment to completing an overview by 1989. However, we believe these efforts warrant the inclusion of the cultural resource program in Table II-1, Average Annual Projected Outputs and Activities by Time Period, Table IV-1, Monitering and Evaluation Action Plan, and, Appendix J, Projected Budget REquired to Implement the Forest Plan We find the omission of cultural resources from these aspects of the Plan to be a serious oversight. Unless supportive data is provided, the reader cannot determine whether there is even a remote chance that the objectives and standards will be met In order to document its commitment to the stated cultural resource objectives and standards, the Forest must provide for the necessary funding, personnel, and program review mechanisms in the Plan

1

Sincerely,

Alan L. Stanfill,
Archaeologist/Anthropologist

FOREST SERVICE RESPONSE

12

1 The Bitterroot has completed two cultural resource overviews "A Cultural Resource Overview, Bitterroot National Forest" (Caywood and Light 1984), and "The Prehistory of the Lolo and Bitterroot National Forests" (McCleod and Melton 1986)

We agree that the cultural resource material was difficult to track and have included data in the tables you referenced The cultural resource costs are included in the recreation costs shown in Appendix J

928

State of Montana
Office of the Governor
Helena, Montana 59620

TED SCHWINDEN
GOVERNOR

August 16, 1985

RECEIVED
AUG 19 19[illegible]
Bitterroot National For[illegible]

Mr Bob Morgan, Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

Dear Mr. Morgan:

The State of Montana appreciates this opportunity to review and comment on the Draft Bitterroot National Forest Plan (Plan) and Environmental Impact Statement (EIS) Your agency's cooperation and presentation of the Plan to Montana's Interagency Planning Task Force is also appreciated The attached comments reflect the task force review and concerns regarding the Plan

The Bitterroot National Forest (BNF) is to be commended for producing a Plan and EIS that are well organized and easily read

The state supports planning efforts on the BNF to assure that a sufficient amount of timber is offered to maintain a competitive forest products industry without jeopardizing other important forest resources We are concerned, however, that because of the length of the planning process, the economic conditions that originally influenced the FORPLAN model are now outdated This situation, coupled with the lack of analysis regarding specific mill capacity and local economic conditions, provides insufficient information to determine whether the proposed harvest for the BNF is too high or too low 1

We look forward to your consideration and response to the attached comments in the Final Plan and EIS

Sincerely,

TED SCHWINDEN
Governor

Attachment

FOREST SERVICE RESPONSE

928

1 A timber supply and demand analysis for a four Forest bid area has beer added to the FEIS in Chapters II and III

928

State of Montana
Office of the Governor
Helena, Montana 59620

TED SCHWINDEN
GOVERNOR

MONTANA COMMENTS ON THE 1985 DRAFT BITTERROOT NATIONAL FOREST PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Overview

The Bitterroot National Forest (BNF) Plan and Draft Environmental Impact Statement (DEIS) are well written and easy to follow The alternatives are clearly displayed and explained to the reader The BNF has done an excellent job of displaying the trade-offs between both resource outputs and land allocation by management emphasis This makes comparing the relative merit of the alternatives much easier

Appendix B (Description of the Analysis Process) was especially helpful It provided an excellent, easily readable discussion and display of the various analytical tools used by the Forest The sections on sensitivity analysis, constraints, and alternative generation, were particularly helpful

Regarding water quality and watershed protection, however, the Plan and DEIS continue to follow the deficient pattern of inadequate monitoring, data collection and modeling efforts we have seen in other current forest planning efforts in Region 1 As a result, little information is available in the documents to support water quality/quantity evaluations [2]

In addition, the following concerns were identified

- Proposed timber harvest levels are based upon a very limited and questionable set of assumptions built into the FORPLAN model, with little detailed analysis of the economic situation related to either the timber or recreation industry Because of this, it is very difficult to determine if the proposed harvest levels are appropriate [3]
- A significant change in management direction is shown by approximately 61,000 acres of land previously allocated to roadless management in BNF Unit Plans now proposed for roaded development in the BNF Plan [4]
- Although implementation of the proposed Plan will double the miles of existing roads by the 5th decade, the Plan does not address the implementation of the Montana Fish and Game Commission's Road Management Policy, or the Cooperative Elk/Logging Guidelines necessary to reduce adverse impacts on big game habitat security, effective use of habitat, and hunter opportunity on the BNF [5]
- The BNF program to monitor changes in the aquatic resources appears to be underfunded and understaffed beyond the first year [6]
- The BNF Plan has used monetary values in its evaluations of wildlife, wilderness, and dispersed recreation that are unrealistically low for Montana [7]

FOREST SERVICE RESPONSE Continued

2 Water quality and quantity monitoring will be programmed with ties to outputs as described in the Monitoring and Evaluation section of the Final Plan Monitoring plans have been redesigned to include 1985 fish population and habitat study results and program needs Water yield, sediment, and fish habitat effects models will continue to improve as research and practical experience with monitoring improve understanding

3 See 1 above

4 Since we do not have the rationale used to arrive at the 61,000 acre figure, it is difficult to respond The Final Plan has about the same area managed as roadless and wilderness as Alternative F (current direction) About 27,000 acres were recommended as additions to wilderness and 27,000 acres less assigned to semiprimitive recreation management About 35,000 acres of inventoried roadless area are assigned to the minimum level Management Area 8

5 We have added a Forest-wide management standard to adopt the Montana Fish and Game Commission Road Management Policy and the Cooperative Elk/Logging Guidelines We will also follow the recommendation of the Department of Fish, Wildlife and Parks to monitor the bull elk harvest distribution through the season If more than 40 percent of the bull harvest occurs in the first week of the season, we will consider more restrictions on access to reduce harvest in the first week See the monitoring plan at the end of Chapter IV of the Final Plan for details. The implementation of these standards will assure the maintenance of at least the current level of hunter opportunity on the Bitterroot See Table at end of Chapter II, FEIS, for estimates of effects on elk hunter recreation days over time

6 We have revised the Forest Plan Monitoring Requirements in the Final Plan and believe it will provide the necessary studies and evaluations to trigger a change of management direction if necessary

7 Wilderness and recreation values are based on willingness-to-pay (WTP) values and are discussed in more detail in Appendix B of the FEIS WTP values were determined through studies contracted by the Washington Office of the Forest Service for use in Forest Planning and the RPA An explanation of why the WTP values appear low and what they represent is warranted WTP values estimate what the recreationist would be willing to pay at the point of use Money spent elsewhere by the recreationist, such as for travel, lodging, meals or equipment is not included in the WTP values In this respect these values are similar to timber which is valued on the stump Expenditures to harvest and manufacture timber is not included in the stumpage value Expenditures such as travel and lodging certainly have an influence on the local economy and they are considered in a different analysis, called Impact Analysis In an Impact Analysis, input-output coefficients are used to determine the impact of recreation activities on the local economy in terms of jobs and income This analysis was also used in the preparation of the Final Plan Discussion of tradeoffs in Section 19 of Chapter II of the FEIS includes the level of income and jobs in the local community that are affected by Forest Service management decisions

These and other concerns are addressed in more detail in the following discussion 7

1 Timber

One of the state's major concerns is that sufficient timber harvest is planned to maintain a competitive forest products industry in Montana without sacrificing other important forest resources Although the Plan offers the conclusion that it is necessary to increase allowable harvest by nearly fifty percent over the current level by the third decade, it projects that needs of the local timber economy will be unmet by a wide margin This conclusion should be considered tentative, because it is not supported by appropriate analysis regarding projected demand for timber products, or by thorough comparisons of historical data regarding timber offered for sale, versus timber purchased, versus actual cut Proposed harvest levels were based on a very limited and questionable set of assumptions built into the FORPLAN model, with little detailed analysis of the economic situation related to the timber industry For example, the Forest Service has assumed continually increasing real prices for timber over the planning period Timber harvest levels have been determined using that assumption only However, the high sensitivity of land allocation to increases in real lumber prices is clearly shown in Appendix B This analysis indicates that the assumption made regarding future lumber prices should be varied among alternatives Future planning efforts should incorporate this approach 8

We support additional studies including an analysis based on zones of influence and emphasizing mill capacity, historical volumes processed by specific mills and the percentage use of Forest Service timber Evaluations of timber supply should be based on bid area or some other geographic orientation which accounts for the overlap of supply to mills from different National Forest units Because of the length of the planning process, the economic conditions that originally influenced the FORPLAN model are now outdated This situation, coupled with the lack of analysis regarding specific mill capacity and local economic condition, make it virtually impossible to determine whether the proposed harvest is too high or too low Perhaps the most useful and most difficult area of analysis is projecting demand for timber products This type of analysis is much more relevant than mill capacity since, depending on the fluctuation of demand, mill capacity may rise or fall due to plant openings or closures

There appears to be a discrepancy in the figure used for the average 1971-1980 sale level in the "Description of Alternatives" section of Chapter II of the DEIS In this section the proposed timber sale level under each alternative is compared to the 1971-80 sale level According to page 8 of the summary, an average of 28 MMBF was sold from 1971-80 If this figure is correct, then errors exist in the discussions of timber outputs for several of the alternatives For example, alternative F on page II-29 states that "The first decade base sale schedule of 28 MMBF/year is 8% below the 1971-80 sale level " 9

Table II-B of the DEIS shows that under the preferred alternative, timber stand improvement work is scheduled only during the first decade This point should be clarified 10

FOREST SERVICE RESPONSE Continued

8 See 1 above

9 The quote "an average of 28 MMBF was sold from 1971-80" on page 8 of th DEIS summary is on the basis of timber volume sold The 1971-80 averag volume of about 31 MMBF mentioned in the Description of Alternatives sec tion of Chapter II of the DEIS is timber scheduled for sale To avoi confusion we will refer to timber volume sold in the FEIS

10 The Bitterroot Forest's Management Team has specified that an average o 1,200 acres of precommercial thinning per year should be accomplished dur ing the 10-year planning period programmed for the preferred alternative No attempt was made to analyze the probable thinning program beyond thi 10-year period, however, the same resource consideration which influence the first 10-year planning period will probably justify a similar progra through the conversion period of the existing timber stands

928

The effectiveness of precommercial thinning should be re-evaluated. It is questionable whether the prognosis model used to develop the timber yield tables accurately modeled the volume growth response to thinning. 11

Productive sites should be treated to control diseases where treatment is feasibile and cost effective. The use of IPM strategies and treatments for stand protection is an excellent approach.

Timber area management standards are generally very good. Delayed regeneration of transition range would provide additional forage for livestock and wildlife if weeds are controlled. Desirable forage species may be planted on these sites to increase the amount of forage available and help prevent weed invasion. Reforestation planting with a variety of tree species, as mentioned in the Plan, might increase diversity but could prove costly if certain species do not survive. Proposed habitat type conversions should be outlined in the Plan. 12

2. Wilderness.

The preferred Plan proposes to add 76,805 acres of wilderness to the BNF. We urge the planners to reconsider the Governor's May 10, 1984 Wilderness Recommendation to the Montana Congressional Delegation for a 73,945 acre addition to the BNF portion of the wilderness system as follows: 13

Area	Acres
1001 North Big Hole	2,840
1BAA Selway-BR Canyons	12,700
1061 Blodgett Canyon	9,600
1062 North Fork Lost Horse	7,800
1063 Trapper Creek	2,500
1064 Nelson Lake	2,900
M1845 Meadow Creek	12,600
1808 (LIBARD) Stony Mountain	23,005
TOTAL	73,945

A detailed discussion of the wilderness values of these areas from the Governor's 1984 Wilderness Recommendations is attached for your consideration. The Plan's proposed timber management activities for these areas should not be implemented until Congressional action has resolved the BNF wilderness issue. 14

Only the negative aspects of establishing new wilderness areas are mentioned (adverse impacts on timber harvest and mineral production). The long-term benefits from this type of management to watershed, recreation, big game security habitat, hunter opportunity and hunting season type and length need to be identified in the Plan. 15

The type of motorized use that will be allowed in roadless areas and the criteria for use decisions are unclear (Page II-22). Both should be clarified in the final Plan. 16

FOREST SERVICE RESPONSE Continued

11. The efficiency of precommercial thinning was evaluated by a team of District and Forest silviculturists and the Forest Economist in November, 1983. The analysis indicated the predicted yield on most Bitterroot sites would have to be doubled to pay for thinning. Although there may be some question about the sensitivity of the prognosis model to the thinning treatment, there is little likelihood the yield from any stand could be doubled.

12. We do not anticipate planting desirable forage species on transitory range. Tree establishment can be severely jeopardized by competition from grasses and shrubs. Natural establishment of native, seral grass, shrub and forb species will supply needed forage. Noxious weeds will be controlled through integrated pest management. A variety of tree species will be planted only to the extent that each individual site is capable of supporting them. No type conversions are planned. Habitat type is a classification system denoted by climax species. By definition, it cannot be changed unless the physical properties of the site are radically altered.

13. The difference between the Governor's recommendation and the Preferred Alternative lies in the assignment of the Stony Mountain, Sapphire, North Big Hole, and Blue Joint areas. We believe the Blue Joint area adds unique biological and physical attributes to the wilderness system and the Stony Mountain, Sapphire, and North Big Hole areas can best meet the needs of the public by management for semiprimitive recreation.

14. No activities that would detract from their wilderness characteristics will be permitted within Montana Wilderness Study Act (MWSA) areas, or within other areas recommended to congress for wilderness classification, until congress has acted on the recommendations.

15. We have expanded the discussion of long-term benefits of wilderness designation in the FEIS Chapter IV. B. 1.

16. Motorized use in roadless areas is addressed in the Standards section of MA 5 direction in Chapter III of the Final Plan. The intent is to allow current use to continue unless monitoring indicates that motorized use is impacting other resources. Adjustments are made during the annual travel plan review in accordance with Executive Order 11644.

928

3 Land Allocation

The BNF is to be complimented for its roadless recommendation in the Brooks Creek and Moose Creek areas In addition to the scenic and recreational values, these are good elk security areas, especially during the hunting season [17]

A comparison of the BNF Unit Plans prepared in the mid-1970's, with the proposed Forest Plan preferred alternative land allocations reveals approximately 71,000 acres of previously proposed roadless management is now being proposed for developed, roaded management Conversely, approximately 10,000 acres of land (mainly in the Brooks Creek, Flat Rock Creek and Moose Creek drainages) that was proposed for development in the old Unit Plans is recommended for roadless management under the BNF Plan As a result, a net total of about 61,000 acres of previously allocated to roadless management has been proposed for roads This is a significant change in management direction and will adversely impact future elk security and hunting opportunity Such changes place in question the current planning for roadless areas in decades 2-5 [17]

Additional site specific comments on the Plan's proposed land allocations have been prepared by the Montana Department of Fish, Wildlife and Parks (DFWP), and are attached as Appendix A [18]

4 Management Area Direction

Best Management Practices (BMPs) for water quality protection, specific for each management area, should be listed under the Standards section Reference to forest-wide management direction in Chapter II is generally applicable, but not specific to chronic problems that may occur or already exist in some waterhseds [19]

a Management Area 1

Maintaining at least 40% elk habitat effectiveness means there will be an average of three miles of open road per square mile This should be changed to at least 60% or not more than one mile of road per square mile [20]

Wildlife forage needs should be added to the criteria used to consider livestock use and range improvements in these management areas [21]

Road densities allowed are very high, and should be reduced to comply with the Montana Fish and Game Commission's Road Management Policy [22]

b Management Area 2

The proposed habitat effectiveness of 60% is considered too low for winter range and it should be revised to a minimum of 80% [23]

Allowing 40% of the winter range forage for livestock is too high To be more compatible with wildlife, and to conform with the practices of other forests, this should be lowered to 35% [24]

Road densities allowed especially for winter range, should be reduced [25]

FOREST SERVICE RESPONSE Continued

17. See 4 above

18 *Responses to the Department's site-specific comments are in Forest Service Response No 88*

19 Forest-wide management standards are specifically applicable to all Management Areas so listing them for each MA would be redundant We know of no existing chronic watershed problems but have a standard in each MA to *implement watershed* rehabilitation projects to repair those that may be found and the Forest Plan Monitoring Requirements should prevent their occurrence

20 Analysis of the current open road density on the Forest indicates the hunter opportunity on the Bitterroot is about what it should be For the *past three years*, the proportion of the bull harvest in the first week has been between 17 and 33 percent Personal communication with John Firebaugh, Region 2 Wildlife Manager, indicated he thought hunter access overall on the Forest was about right, only a few of the developed areas had a few too many roads open during the hunting season As a result of the analysis, we have deleted the management standards from the Management Areas and added three Forest-wide standards (1) Manage roads to attain or maintain 50 percent or higher elk habitat effectiveness in currently roaded third order drainages (where >25 percent of the area is now roaded) (2) Maintain 60 percent or higher elk habitat effectiveness in currently undeveloped drainages (where <25 percent is roaded) (3) If the proportion of bull elk harvest in the first week of the season exceeds 40 percent, consider restrictions which would reduce the proportion to about 40 percent

21 Although 26 range allotments occur within the boundaries of MA 1, most of the suitable rangeland will be in transitory range created by timber harvest In general, the forage resource is of relatively low quality and somewhat inaccessible to livestock because of isolation or terrain Transitory range currently supplies only about 10 to 20 percent of the useable forage on the Forest We do not anticipate competition for forage between big game and livestock in this MA We think proper range management as prescribed by allotment management plans is all that is necessary to manage the range resource in MA 1

22 Road densities prescribed are the minimum necessary to *fully access* the timber resources of the MA We interpret the Montana Fish and Game Commission Road Management Policy to specifically address the issue of roads open to the public, not road construction density Densities recommended in the Policy are not adequate to physically access land to be managed for timber production

23 See 20 above

24 We have changed the allocation of the forage resource on winter range within allotments to limit livestock use to 35 percent of the available forage About 60 percent of the winter range is outside allotments and not grazed by livestock

25 See 22. above

928

c Management Area 3a

For winter ranges, the proposed 60% habitat effectiveness is considered too low We recommend the BNF use at least 80% 26

d Management Area 3b

Since these are sparsely forested, open winter ranges, 60% habitat effectiveness is not sufficient and will not result in optimum elk use of these critical areas We recommend management by the BNF for at least 80% habitat effectiveness 27

Livestock use should be limited to 35% of the available forage, 40% is too high, particularly for winter range 28

5 Management Standards

A watershed cumulative effects feasibility analysis of projects involving significant vegetation removal, including implementation schedules, should be incorporated into the final Plan as agreed by the Region 1 Forest Service Office An analysis identifying specific opportunities to improve or mitigate adverse water quality and fish habitat degradation should be included in this section 29

6 Best Management Practices (BMPs)

The following definition should be included in the final Plan and LIS as agreed upon by the Regional 1 Forest Service Office

BMPs, the set of practices in the Plan which, when applied during implementation of a project, ensure that water-related beneficial uses are protected and that State water quality standards are met BMPs can take several forms Some are defined by State regulation or memoranda of understanding between the Forest Service and the States Others are defined by the Forest interdisciplinary planning team for application Forest-wide Both kinds of BMPs are included in the Plan as Forest-wide Standards A third kind is identified by the interdisciplinary team for application to specific management areas, these BMPs are included as Management Area Standards in the appropriate management areas A fourth kind, project level BMPs, is based on site specific evaluation, and represents the most effective and practicable means of accomplishing water quality and other goals of the specific area involved in the project These project level BMPs can either supplement or replace the Plan standards for specific projects 30

7 Roads

The preferred alternative will double the miles of existing road by the 5th decade This increase in road access will have an adverse impact on big game habitat security, effective use of habitat and hunter opportunity Adherence to the Montana Fish and Game Commission's Road Management Policy should help offset these impacts We recommend that the BNF implement these guidelines along with the Elk/Logging guidelines 31

FOREST SERVICE RESPONSE Continued

26 See 20 above.

27 See 20 above

28 See 24 above.

29 The matrix of habitat and landtypes hydrologic recovery and road density standards provide a cumulative effects guideline for timber sale activities Our goal is to prevent water quality and fish habitat degradation, but when improvement or mitigation needs arise they will be inventoried and accomplished as described in the Forest Plan Monitoring Requirements in the Final Plan An analysis of downstream cumulative watershed effects has been added to Chapter IV of the FEIS

30 The definition has been added to the Glossary in the Final Plan

31 We have added Forest-wide standards to include the Montana Fish and Game Commission Road Management Policy and the Elk/Logging guidelines in the Final Plan

928

through generation of sediment projects related to road building have a greater effect on resources than any other activity In the DEIS's description of the additional road network required for forest management, however adverse effects from the new road system are not addressed in terms of the effect on water quality, the decrease in aquatic habitat nor the decrease in fisheries Addressing these deficiencies and justifying this management direction should be a high priority in this section of the DFIS] 32

We recommend that roads should be built to the minimum standard whenever possible to reduce public use and facilitate closures if necessary following harvest activities] 33

The road densities listed are very high and will considerably reduce elk habitat effectiveness The BNF should consider obliterating some roads for the first 1/8 to 1/4 mile, rather than using gates to discourage violations and to maintain a more secure habitat for big game] 34

The Plan's commitment to fund approximately 33% of the road construction during decades 1-3 as capital investment roads is questionable If the long-term timber harvest will not pay for the road construction it may not be worth harvesting, especially if road construction adversely effects other important forest resources] 35

We suggest the following addition to the Plan's Road Management Objective "It is our intent to provide public access to forest lands However, roads will be closed where adverse resource impact and/or the maintenance cost of leaving them open exceeds the benefits Adverse impacts to be considered are increased timber costs to the industry or the public, jeopardizing big game production and protection, jeopardizing recreation hunting and fishing opportunities, and stream sediment or erosion problems Closures on collector roads will be made to avoid adverse impacts to the resource Most spur roads will be closed after special resource needs are satisfied "] 36

DFWP has suggested the addition of several road management related criteria to the Plan's management guidelines They are attached to these comments as Appendix B] 37

Accessing by road an average of 6,700 acres of roadless areas per year for the first decade is extremely high, especially when the areas accessed are all prime summer-fall elk security areas These factors stress the need for the BNF to adopt the Montana Fish and Game Commission's Road Management Policy] 38

The final Plan should show what percent of the roaded portion of the forest will be affected by road closures] 39

8 Recreation

a Hunting and Fishing

We suggest the following addition to the Forest-wide Management Objectives and recommend it be listed under the "Recreation" heading "Provide a variety of hunting recreation opportunities by using project planning and road management to assist the DFWP in meeting their goal of maintaining long hunting seasons with minimum restrictions "] 40

FOREST SERVICE RESPONSE Continued

32 A discussion of road system effects on water quality has been added to Chapter IV of the FEIS Road encroachment on stream channels will be minimized with road standards for riparian areas In general, riparian roads tend to reduce channel stability, increase stream sediment, increase peak flows by converting subsurface runoff to surface runoff and concentrate surface runoff It is a fact that the fewer the miles of road built, particularly on sensitive lands, and the more the care in road design, construction, and maintenance the less the impact on watersheds and water quality

33 All roads built will be a part of the transportation system of the Forest and will be used for future entries The road standards of the Final Plan are the minimum necessary to provide a safe, maintainable road

34 With few exceptions, roads built for access for timber management will be needed for future management activities We have public support for the current road management policies which include the use of gates to close roads seasonally or year round We think we can maintain other resource values by the use of gates rather than obliteration

35 Timber revenues may not balance initial entry road costs, but these roads will be used to access several future sales The Forest will road only those areas where discounted revenues from all timber sales exceed discounted cost, unless other public benefits such as improved forage production and timber related jobs, justify a loss Road closures, minimum road standards, and mitigation measures incorporated into road projects will reduce impacts to other important forest resources to an acceptable level

36 Terminology varies, but, these objectives are a part of the standards for all the Management Areas

37 We believe the concerns expressed by the Department are dealt with in the Forest-wide or Management Area standards without using the specific language they suggest Some of the concerns are legitimately deferred to the travel planning process which will be done annually.

38 In the Final Plan, we project access of about 17,700 acres of roadless area in the first decade. The reduction between the Proposed and Final Plan is a result of lower timber harvest level, and increased assignment to MA's 5 and 8 We have adopted the Montana Fish and Game Commission's Road Management Policy as a Forest-wide standard

39 All of the roaded portion of the Forest will be somehow effected by road closures We have Forest-wide standards to maintain either one or two miles of open road per section depending upon whether an area is currently roaded

40 We have chosen not to adopt this specific addition to standards of recreation management because we believe it is covered by the standards for maintaining the proportion of the first week bull elk harvest at less than 40 percent and the adoption of the Commission's Road Management Policy

928

Recreation related to fish and wildlife should be addressed in this goal statement We suggest the addition of the following "The Forest will be managed to provide for at least a maintenance of the current elk hunter days " 41

We question the DEIS statement regarding roaded natural recreation that "the quality of hunting, fishing will decrease as the population increases unless the area roaded increases proportionately " We believe solitude is a key factor in quality hunting and fishing experiences Maintaining the unroaded areas will maintain the quality experiences 42

The 35% projected decrease of elk hunter recreational visitor days (RVDs) from the current level of 45,000 to 29,000 - 30,000 in the preferred alternative is not acceptable This predicted loss in elk hunter RVDs stresses the need to maintain as much roadless security habitat as possible 43

b Alternatives

Recreation is an important use of all Montana National Forests, including the Bitterroot The alternatives developed should reflect a range of recreation options rather than simply treating recreation as a static resource Alternatives that provide a range of new and expanded recreational improvements could encourage more recreation use by enhancing the quality of existing and future recreational experiences Recreational improvements should include such things as campgrounds, picnic areas, parking lots, trailheads, foot, ski and handicap trails, and informational maps and brochures Unfortunately, the Plan's investments of resources and capital for new recreational improvements are minimal in the plan Except for expansion of Lake Como campground, no new development recreation sites are proposed (DEIS II-24) 44

c Trails

The current 1,600 miles of trail on the BNF should not be reduced The 2,000 miles of proposed road will certainly destroy some existing trails, and no new trail construction is planned For example, the forest-wide management standard states that trails paralleled by new roads should be evaluated for retention (Plan II-14) To assure that the 1,600 miles of trails are not reduced, an additional forest-wide standard is suggested for each mile of trail lost by road construction, an additional mile of new trail would be constructed 45

The Plan's trail construction cost of $22,900 per mile seems excessively high 46

d Recreation Use Projections

Recreation is projected to increase on the BNF as the population of Western Montana increases (DEIS B-12 and 42) It is erroneous to assume that increased RVDs is a function only of Western Montana's population RVDs are, therefore, likely to be significantly underestimated 47

FOREST SERVICE RESPONSE Continued

41 We have chosen not to adopt this specific recommendation because we believe it is covered by Forest-wide management goals, Chapter I, Section II, A, Forest-wide management objectives, Chapter I, Section II, B, and in the Monitoring and Evaluation Action Plan.

42. We believe the statement is correct when taken in context Our projection of decreased hunting quality referred only to hunting roaded areas open to vehicle traffic, not to hunting in general.

43 The 1980 baseline figure of 45,000 is incorrect There have never been 45,000 elk hunting RVD's on the Forest The correct baseline for 1980 is about 30,000 elk hunting RVD's Implementation of the Final Plan will have no effect on elk hunting RVD's

44 Based on current use and observed trends, we think that existing and proposed facilities on the Bitterroot are more than adequate to meet projected demand. Adding facilities in expectation of an increase is neither practical nor cost effective

45 We think that interdisciplinary planning will eliminate most conflicts in areas that are roaded. In some cases, closed roads provide a substitute for trails for horseback riding, snowmobiling, cross-country skiing, etc Total miles is not a good criteria for evaluating a trail management program Public use level, need for solitude, management area direction and other associated recreational opportunities are all factors that need to be evaluated

46 Our projected trail construction costs are based on the amount of heavy clearing and rock work associated with our long range construction program Replacement costs are high since we are moving deteriorating trails into more stable locations The high construction costs are experienced costs for this kind of construction

47 Past field observations indicate that the majority of use on the Bitterroot originates in Western Montana and adjacent portions of Idaho We have shown that recreation use of the Forest is directly correlated with population increases in western Montana The Monitoring and Evaluation Action Plan has criteria for monitoring recreation use and can trigger a change in management direction should it become necessary.

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Increasing numbers of non-residents are expected to visit Montana to avail themselves of outdoor recreation, particularly since similar opportunities are diminishing in other states Recreation projections should be based on both Montana population trends and on non-resident visitor projections The Montana Department of Commerce will gladly assist the BNF to develop revised projections 47

e Recreation and Wildlife Values

The values shown in the DEIS-B42 for wilderness ($8 00) and other dispersed recreation ($3 00) visits seem low, particularly relative to other forms of recreation listed The Plan should include information detailing how the BNF determined these values 48

The total value of developed recreation should be greater than actual user fees collected, $5,000 Clearly, the Plan should recognize that user fees only represent a small portion of the total public value of developed recreation facilities on the BNF For example, consumer surplus studies (travel cost or willingness to pay) or realistic RVD values may be used to evaluate recreational benefits 49

The low national "willingness to pay" figure of $21 was apparently used to standardize the values for hunting between forest regions This averaging of values between states and types of hunting (deer, elk, javelina, etc) tends to downplay the importance of hunting and fishing recreation to a state like Montana, where it is a favored recreation of many residents and draws considerable non-resident use "Willingness to pay" values can and will differ between states and between forests We suggest a joint review project be developed between the U S Forest Service and the DFWP to study and develop a realistic value for "willingness to pay" The $21 value used in the draft is unrealistically low for Montana's quality of hunting 50

f Vehicle Use

Off-road vehicle use should be limited in Research Natural Areas and key wildlife areas Separate areas should be designated for motorized and non-motorized recreation to avoid user conflicts and provide satisfying recreational experiences for all types of recreationists Closed roads may provide opportunities for cross country skiing, hiking, hunter access and handicapped access even though vehicle access is limited 51

9 Water

a Water Quality

The Burnt Fork of the Bitterroot River should be included in the inventory of public water supply watersheds, i e Town of Stevensville Special watershed management prescriptions are required in these drainages, and should be identified in the Plan 52

FOREST SERVICE RESPONSE Continued

48. See 7 above

49 We agree that the total value of developed recreation is greater than the actual user fees collected, however user fees accurately reflect the amount of revenue generated by developed recreation The total economic effect of the recreation program has been ascertained by the Input/Output model as described in Appendix B of the FEIS

50 Willingness-to-pay values used by the Forest Service are standardized for regions Differences among regions can be reflected in the Impact Analysis which would show the variation in income and employment impacts The research required to develop a set of Montana WTP values is beyond the capability and budget of most individual Forests, but a cooperative effort between the DFWP and the Regional Office of the FS is currently underway

51. ORV closures may be initiated through the Travel Plan process for Research Natural Areas, "key" wildlife areas, recreation areas or to protect other resource values depending upon the need for protection

52. Burnt Fork and Cow Creek will be identified as public supply watersheds and all project plans for these areas will be subject to review by the State Water Quality Bureau and water users Management will provide water suitable for human consumption within the realm of State water quality standards and water supply regulations

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b Sedimentation

The Plan should specify watershed restoration practices and site specific best management practices that will be incorporated into project plans Hydrologic recovery area standards and road construction standards seem good and should prevent excessive watershed damage and sedimentation However, we agree that more research is needed to predict sediment yield from management activities and to evaluate the effects of increased sediment on fish populations and other aquatic life Sediment monitoring needs to be more precise to reduce the potential variability, and narrow the 35% difference between undisturbed and treated streams that is proposed to trigger further evaluation 53

Forest Service studies have shown that mitigation early in development can reduce sediment yields by up to 80% The proposed BNF Plan includes these mitigation measures only as recommendations, not as required practices Since the high sediment yields projected in the Plan were developed from discounted sediment yield rates assuming the use of these mitigation measures, these measures should be identified in the Plan as requirements 54

We question the statement in the DEIS "Watershed conditions are good and water quality generally high on the Forest " Severe sediment problems occur along the east side of the Bitterroot Valley, primarily in granitic drainages Sediment movement at present levels requires frequent dredging of irrigation ditches and dredging at the Lee Metcalf National Wildlife Refuge The addition of significantly more sediment to these drainages as projected, will create an additional taxpayer and private financial liability not addressed in the Plan 55

c Water Yield

Timing of runoff continues to be a concern of the state Portraying increased water yield as an unqualified benefit of timber management is not justified Increased water yield in the spring may equate to lower flows during critical parts of late summer Moreover, increased flow also means increased sedimentation risk This has obvious implications to downstream irrigators and to stream fisheries These impacts should be considered on a cumulative watershed basis in the timber harvest planning process, and should be included in a monitoring program 56

10 Wildlife

The Plan's definition of elk security areas - "areas of 5,000 to 8,000 acres below 7,000 feet elevation, that provides high-use fall habitat for elk " - is too limiting Security is a function of space and hiding cover, as influenced by human access, and is not limited by acres or elevation Areas may provide security because of geography, topography and/or vegetation that elk seek during periods of stress The size of the area necessary to provide security will vary with the degree of access and hiding cover characteristics This pertains to all seasonal ranges, not just fall ranges 57

Caution must be exercised when reducing cover on winter range to 40% of the area Thermal cover is important and heavily used for foraging and resting during winters with deep snows Adequate thermal cover must be 58

FOREST SERVICE RESPONSE Continued

53 The Final Plan has a list of road construction standards which may be applied to all construction projects The mitigation of sediment entry into streams is mandatory, the application of appropriate mitigation measures will be left to the project manager We think the Forest-wide road construction standards, Forest-wide standards for management of the water and soil resources, and specific Management Area standards provide adequate direction for maintenance of the water resources of the Forest The Forest Plan Monitoring Requirements the Final Plan have criteria for monitoring fish populations and habitat that will cause management direction change if necessary to protect fisheries

54 Road sediment mitigation practices will not be mandatory in the Final Plan, but the manager will be charged with applying the appropriate measures to limit sediment entry into streams

55 Most Bitterroot River sediment is glacial detritus, and the river continually works through the sediments Public and private land management practices and changes in climate affect the hydrology of the river and its ability to create and transport sediment East side sediment problems in irrigation ditches are due to the ditches themselves and the erodible granitic soils of private lands Much of the east side Stevensville area soils on Forest are of less erodible quartzitic materials A cumulative effects analysis of Forest management practices included in Chapter IV of the Final Plan indicates the Forest will produce less than one percent of the sediment in the river at Stevensville The Bitterroot watershed is healthy and is producing high quality water

56 Increased water yield from timber harvest does not reduce late season flows, but may occasionally be a problem by increasing peak snowmelt flows which can affect channels and sediment transport capacity. Projects which may aggravate peak flows will be analyzed using water yield analysis procedures to modify the project to minimize degradation or aggradation of stream channels We believe we have provided for adequate monitoring activity to collect the information necessary to cause a change in management direction should it be needed

57 We have changed the definition in the Final Plan Glossary to include the comment

58 Our goal is to maintain or enhance elk winter range habitat (Final Plan Chapter I, Section II) We think the lower limit for cover on big game winter ranges is 40 percent According to the Forest Plan Monitoring Requirements, if elk populations or hunter opportunities begin to decline, we will consider changing management direction to meet this goal

retained adjacent to primary foraging areas Hiding cover must also be maintained on winter ranges for security reasons *To spread out elk* harvest rates, security habitat on the winter range needs to be improved, *not* reduced, particularly during hunting seasons with heavy snowfall 58

Closing roads to provide only 60% elk habitat effectiveness on critical winter range is unacceptable The proposed average winter range road densities of not more than 6 6 miles/section seems extremely high, regardless of the area, although especially on winter range These high road densities and associated use will place additional stresses on elk and limit the areas of winter range they can use Maximum road densities on winter ranges should not exceed 1 mile/section, resulting in 80% elk habitat effectiveness 59

Lengthy hunting seasons are an important part of the big game hunting tradition in Montana Increases in forest road access along with reduction in cover may necessitate the need for shorter, more restrictive hunting seasons A reduction in hunting opportunity is in direct conflict with the management goals of the DFWP It is imperative that the BNF make every effort to reduce adverse impacts on hunter opportunity This could be accomplished by adopting the recently published "Elk/Logging Guidelines" and by applying the Montana Fish and Game Commission's Road Management policy to all developed areas of the BNF 60

11 Fisheries

The plan projects a 10% decrease in fish populations at the end of the first decade because of sedimentation from road construction and timber harvest (page II-11) Fish habitat improvements such as boulder clusters and woody debris placed in streams to create pools, as suggested in the Plan, will not compensate for reduced fish populations if water quality is limiting More research is necessary to evaluate the limiting factors for fish populations and the value of habitat improvements in mountain streams BMPs and inventories of sensitive soils should be carefully evaluated to reduce the projected increase in stream sedimentation We feel that, considering the planned development activities, significant fisheries losses are a potential on the BNF 61

The Plan reports the stream-dwelling catchable population of trout on the BNF as being 67,700 (including Idaho areas) Appendix C attached to these comments shows the results of population estimates on the BNF by the DFWP A conservative estimate of the catchable trout population on the BNF in Montana alone is 412,438 in 377 miles of streams The forest adjoins a minimum of 137 miles of fishable trout streams on private lands which adds another 149,878 catachable trout to the total These off-forest streams do not include the Bitterroot River or its main forks and are considered to be very conservative estimates 62

We disagree with the Plan's statement "The clear, cold streams are only moderately productive primarily because many of them flow through relatively sterile granitic soils " The average number of trout larger than 6 inches found by the DFWP is about 1,094 per mile in the BNF streams, which is considered productive If the very important juvenile segment of these tributary streams is included, another 1,929 trout per mile are added, for a total of 3,023 trout per mile average On a per unit of flow basis, the eastside (Sapphire) streams are many times more productive than the westside streams 63

FOREST SERVICE RESPONSE Continued

59 Road construction density standards are the minimum necessary to access areas managed for timber production Elk habitat effectiveness is based on the density of roads open to the public The model we are using indicates one mile of open road per square mile results in 60 percent habitat effectiveness (Lyon, 1983).

60 We have adopted these recommendations as Forest-wide management standards

61 We have adopted management standards and mitigating measures that assure sediment production will not exceed the threshold of effect on fish habitat See also 53 above.

62 Fish population estimates have been adjusted with assistance of the Department of Fish, Wildlife and Parks We have used the agreed upon estimates in our analysis of the effects of management practices on fish populations

63. We recognize that productivity on the east side of the valley is higher than the west side However we feel that, in the context of some other Montana streams, that productivity cannot be termed high on the Forest, although standing crop may be relatively high in some streams as expressed in relatively small fish

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We support removing fish passage barriers created by improperly installed culverts However, the predicted improvement in fish carrying capacity (9,000 fish) by the creation of debris pools is questionable There is no scientific evidence on the BNF to indicate fish population improvement of this magnitude 64

The criteria for using cutthroat trout populations as an indicator of fisheries habitat changes needs to be stated in specific and measurable terms in the Plan 65

12 Soils

The discussion of water and soil (the base resource) for each management area should be expanded, especially for management areas where roading and timber cutting are proposed The inventory data and management recommendations for sensitive soils should be integrated into the management area discussions when available The Plan should indicate when this information will be available 66

Timber harvest is proposed to be allowed on land unsuitable for timber production to assist in meeting cover/forage objectives on elk winter range The first priority on unsuitable ground should be protection of the soil resource base 67

13 Range

There is an inconsistency in range use and forage production figures used in the Plan The proposed Plan shows an increase in available AUMs from 12,400 to 14,200 in the next 50 years (Table II-1), but the current program shows only 11,300 AUMs at the beginning, increasing to 17,000 AUMs in 50 years (Table V-1) Both the permitted use of 14,200 AUMs and the actual use of 12,800 AUMs exceed the beginning level of forage shown in the Plan 68

Ideally, the entire range should be in good or excellent condition, and grazing levels should be based on range condition and trend Range managers should adjust livestock numbers to improve the condition of fair, poor, or very poor allotments and to utilize forage as it becomes more available on good or excellent range 69

We support the moderate increase in AUMs projected in the Plan It is possible, however, that tree regeneration may not have to be delayed from 5 to 20 years to maintain AUMs (Page III-3), if intensive livestock grazing has been used to eliminate competitive herbaceous vegetation on clearcuts (which can enhance tree seedling growth) 70

Fences and water developments should be constructed where necessary to improve livestock distribution and prevent stream degredation in allotments that include riparian areas While light grazing on wildlife winter range may improve the quality and production of big game forage, enough forage should remain to sustain big game populations through the winter and reduce damage to adjacent private lands Aquisition of additional winter range, as mentioned in the Plan, might help reduce conflicts with adjacent landowners 71

FOREST SERVICE RESPONSE Continued

64 We have no evidence from the Bitterroot, but results from other areas indicate the carrying capacity of trout streams can be increased by manipulating habitat to a more favorable pool/riffle ratio. We believe the estimates of increased carrying capacity are realistic

65 The criteria are expressed in the Forest Plan Monitoring Requirements

66 Since soils criteria were not used to delineate Management Areas, the full range of soil concerns occur in all forested Management Areas Most of the standards for soils protection therefore are in the Forest-wide management standards We believe we have provided adequate direction for soils management in all areas where activities will occur Soils information is now gathered for use at the project planning level, but a complete soils inventory is scheduled for completion in 1989

67 Timber harvest practices prescribed for unsuitable land in MA 2 must follow the same standards for timber harvest in any other area We believe the standards are sufficient to protect the soils resource

68 The confusion lies in the terminology used The current direction permitted use was 12 4 MAUM in 1980, the actual use in 1980 was 11 3 MAUM because ranchers did not turn out all the cattle they were permitted The current program is the grazing level proposed under the current direction alternative which was based on the Unit Planning process Permitted use for the 1986 season is 13.3 MAUM, actual use was 11 5 MAUM Timber harvest will create transitory range which will be capable of supporting slightly increased cattle numbers, but actual use of the resource will depend on demand which has been decreasing Permitted use is within a few percent of the forage supplies predicted by the FORPLAN yield tables, and well within the error inherent in the tables

69 We agree The specifics of the grazing program are beyond the scope of the Final Forest Plan, but the concern will be dealt with in allotment management plans

70 The range standard in MA 1 allowing delayed regeneration of timber harvest units is only permissive The standard will not be implemented unless deemed necessary in allotment management plans The manager therefore has the flexibility to either graze a unit intensively after it has been regenerated as suggested, or delay regeneration up to twenty years

71 We agree We believe the Final Plan has proper management direction and standards to accomplish the goals suggested

928

The BNF needs a more aggressive weed management program to contain or control existing infestations, and to prevent the spread of noxious weeds to adjacent lands We encourage the use of integrated pest management (IPM) techniques which utilize the best combination of chemical, biological, cultural and mechanical weed control practices that is economically feasible An inventory of weed infestations should be conducted annually, and necessary control actions should be implemented to prevent the spread of any noxious weeds Forest planners and managers should work with the Montana Department of Agriculture, county weed boards, and universities to develop and implement coordinated weed management programs 72

Management guidelines should address the problem of the spread of knapweed and other noxious weeds by vehicles, as well as describing methods of establishing competitive vegetation on disturbed areas Spotted knapweed should be added to the monitoring plans on Page IV-7 73

14 Monitoring

Plan benefits and costs (able IV-1) should be monitored more frequently than every five years to insure that the projects remain feasible and are in the public interest 74

a Roads

We recommend the following criteria be added to the Plan "When the bull elk harvest in any hunting district consistently (three years running) exceeds 40% during the first week of the hunting season, additional fall road closures will be considered " 75

In addition, the following new monitoring criterion is necessary for roads "Miles of road open to public use - measured and reported annually " 76

b Water and Sediment Yields

The proposed low level of statistical accuracy is not appropriate for model validation, but rather as checks on whether drainages are close to a validated model value More and better data are needed for model validation 77

c Water Quality and Fish

We are concerned about the adverse implications to an effective monitoring program by the following statement "If it is determined during project design that the best way to meet the goals of the Plan conflicts with a Forest Plan Standard, the Forest Supervisor may approve an exception to that standard for that project " A further explanation of the criteria for this type of exception should be provided 78

The BNF program to monitor changes in the aquatic resources appears to be underfunded and understaffed beyond the first year The adequate monitoring of proposed development requires pre- and post-development data After the first year, monitoring will apparently fall far behind new development In addition, the proposed monitoring program will not fulfill the need of calibrating the sediment yield and fisheries response models Calibration studies are necessary to provide the statistically reliable results 79

FOREST SERVICE RESPONSE Continued

72 We have expanded the Forest-wide management objectives in range to include integrated pest management techniques for control of noxious weeds Specific control projects will deal with annual spread of weeds, the Forest Plan Monitoring Requirements call for a three year inventory and report on progress of control efforts If infestations increase, we will analyze the situation and take appropriate action

73 Road construction standards include standards for establishing vegetation on disturbed sites Desirable vegetation and the use of biological controls must be relied upon to limit the spread of noxious weeds We recognize the importance of vehicles in the spread of weeds, but many other things also spread weeds, and there are no known methods of eliminating spread by vehicles, unless they are banned In areas managed for timber production, we cannot eliminate vehicle use

74 The Forest Plan Monitoring Requirements has been changed to show that plan benefits and costs will be monitored annually

75 We have added a Forest-Wide management standard in the Final Plan to answer this concern

76 The Forest Plan Monitoring Requirements require the monitoring of habitat effectiveness which requires knowledge of roads open to public use

77 The Forest Plan Monitoring Requirements have been revised to include gathering information to adequately evaluate fish and sediment models

78 The land manager must have the prerogative to approve exceptions to rules The decision must be a justifiable way to meet goals of the Plan

79 See 2 above

928

The proposed monitoring plan calls for doing "something" on cutthroat trout with moderate precision and moderate reliability on six stream sections annually at a cost of $7,500 If numbers vary by 10%, the Plan calls for further evaluation A moderate level of sampling will not be able to detect a 10% variation, a high level of precision is necessary Six sampling sections are not adequate to cover disturbed drainages or the long-term cumulative impacts 80

The Plan proposes to monitor ten macroinvertibrate sampling stations per year with low precision and moderate reliability with 10 days effort and $1,200 per year This level only covers the first year of development Each year thereafter, this amount needs to be added to the previous year's budget because of the long-term nature of impacts associated with development and the multiplicity of factors which control watershed conditions 81

d Stream Channel Condition

A recent Forest Service report titled Watershed Policy and Program Review for the Northern Region states that "Watershed monitoring and inventory activities are presently being funded significantly below estimated low level needs At present funding levels, these activities will not be able to evaluate the effects of land management activities on soil and water resources, document compliance with legal requirements, validate coefficients and assumptions used in the planning process or respond to public inquiries and appeals " It is our hope that the BNF will be successful in obtaining the level of funding necessary to accomplish the goals of its proposed monitoring program 82

Eight days of effort probably is adequate for the first year of development The cumulative effect of each additional year's development, however, makes this level of activity inadequate shortly after implementation of the Plan Watershed management is a long-term commitment and development impacts may not be detectable for many years 83

e Hydrologic Recovery and Riparian Area Condition

Monitoring is designed to look at one project per district per year for each of these items, with low precision and moderate reliability This is inadequate and needs upgrading to increase the quality of the results Each year should include a continuation of studies on existing projects as well as the new ones 84

15 Other

The graph in Figure II-11 on Page II-42 of the DEIS needs improvement The bar displaying the partial retention category is indistinguishable from the modification/maximum modification bar 85

On Pages B 36-39 of the DEIS, a list of costs not calculated in FORPLAN is displayed Further explanation is needed as to why some costs were calculated in FORPLAN but others were not, and the implications of this distinction on land allocation 86

FOREST SERVICE RESPONSE Continued

80 After five years of data gathering to establish a baseline population, we believe we should evaluate our management direction or monitoring procedures if a 10 percent variation in population estimates occurs The sampling procedures will be state of the art, but we do not think the best estimates are more than moderately precise, or moderately reliable We believe six sampling sites are sufficient to sample effects of disturbance on the major landtype groups

81 We intend to sample the effects of disturbance, not monitor every drainage that is developed Invertebrate sampling will occur at the same sites for a long time to aid in establishing long term trends

82 We will request funding to fully implement the Forest Plan Monitoring Requirements We have attempted to tie outputs to monitoring as documented in the Monitoring and Evaluation Section of the Final Plan, but since Congress has the prerogative to fund items as they see fit, no guarantees are possible.

83 The monitoring sites established in the first years of activity will be monitored to collect long term data We do not intend to monitor the effects of each project, but to monitor the effects of development on specific drainages

84 All projects will have monitoring in the sense of interdisciplinary team evaluations as part of the environmental assessment process Hillslope and riparian vegetation conditions, stream channel conditions existing road and cutting unit conditions, estimates of precipitation, runoff, and sediment, and evaluation of soil conditions are a part of the usual assessment process on project evaluations for timber harvest and road construction

85 We agree Figure II-11 was changed to clearly distinguish between partial retention category and the modification/maximum modification

86 The costs not calculated in FORPLAN are those that are fixed over the range of outputs included in the alternatives and benchmarks in the EIS As long as these costs are accounted for outside the FORPLAN model, the present net value reported for each alternative and benchmark is accurate The fixed costs were handled in this manner to reduce the size and cost of running the model The land allocation would be exactly the same whether the fixed costs were included in the model or added outside the model

928

We appreciate inclusion of Table II-3, "Additional Data Requirements and Accomplishment Schedule," in the Proposed Plan It is helpful to have the specific dates when additional needed data will be available, listed in the Plan

The State Airshed Group and the Montana Cooperative Smoke Management Plan should be clearly referenced in all discussions regarding air quality and prescribed fire Specific locations in the DEIS include Pages III-26, IV-41, and B-64 87

FOREST SERVICE RESPONSE Continued

87 We have added the following statement at referenced places in the FEIS

The Bitterroot National Forest is an active member of the Montana State Airshed Group and adheres to practices and policies of the State of Montana Cooperative Smoke Management Plan

928

SELWAY-BITTERROOT CANYONS - SlBAA
Forest Bitterroot
1983 Roadless Area Net Acres 12,700
Recommended Wilderness Acres· 12,700

I WILDERNESS ATTRIBUTES

These nine canyon mouths are additions to the Selway-Bitteroot Wilderness All are highly scenic, characterized by massive granite cliffs and clear, rushing mountain streams. Mountain goats winter in these areas. Pecreation use is high, including hiking, fishing, rock-climbing, hunting and ski touring.

The canyons received a very high Wilderness Attribute Rating Score during RARE II (26).

II. RESOURCE VALUES·

Timber resources are confined to narrow streamside strips and very steep slopes. This timber was not included in the Bitterroot Forest regulated timber base.

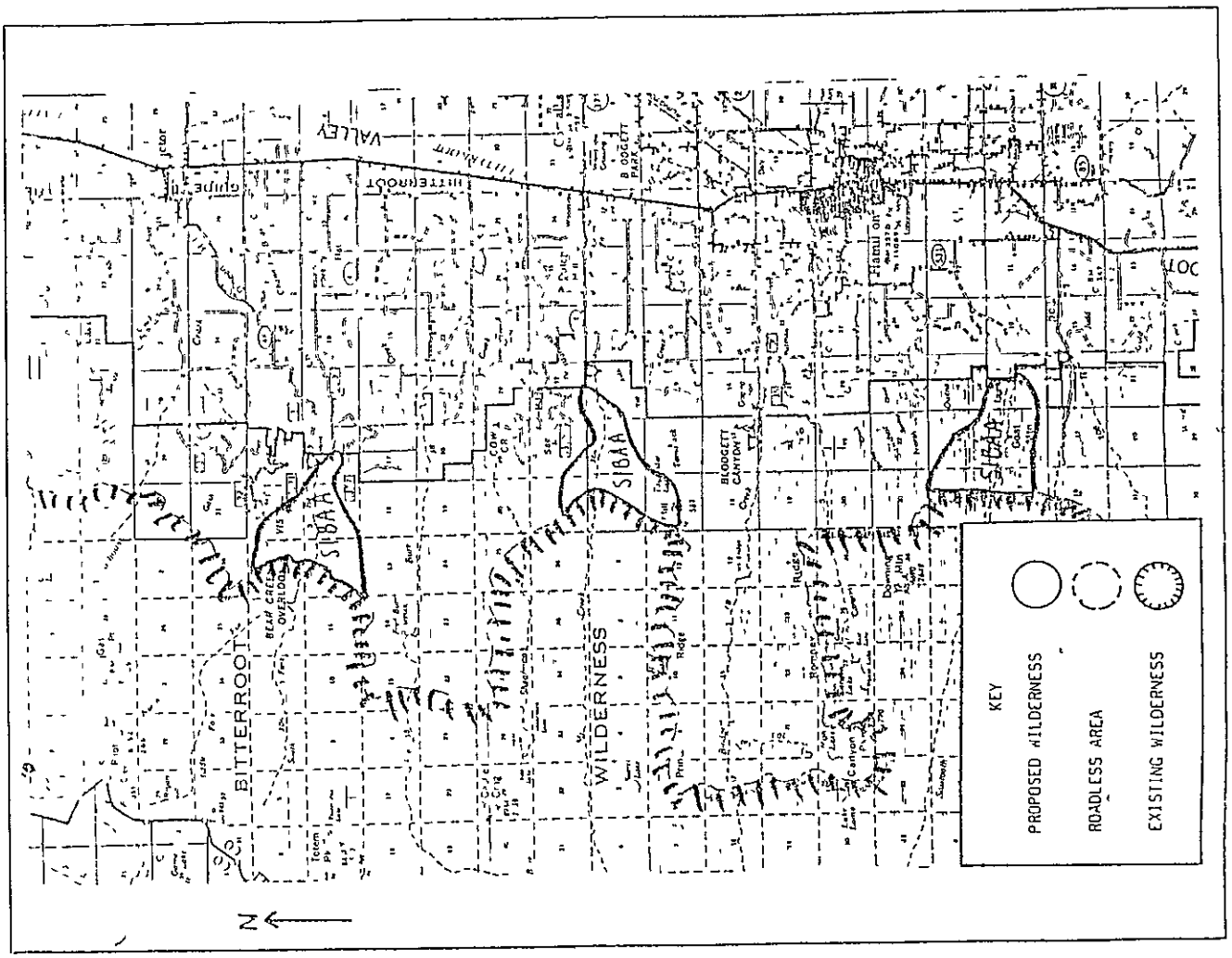
The canyons have low oil and gas and mineral potential.

Wildlife and fishery resources are high. Sizable populations of elk, mule deer, mountain goats and bighorn sheep are present as well as a variety of nongame species

III. BOUNDARY RATIONALE·

These additions would provide an improved boundary to the Selway-Bitterroot by following topographic features to a greater extent. The proposed boundaries follow wilderness recommendations by the Forest Service (RARE II) and by Governor Judge, 1978.

KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
N
FOREST
MISSOULA CO
RAVALLI CO
MISSOULA
SELWAY
St Joseph Pk
St Mary Pk
Sweeney Pk
Pyramid Butte
Florence
FLORENCE BRIDGE
CHIEF LOOKING GLASS
HARRY CREEK
PHYSICAL FITNESS TRAIL
POKER JOE
LEE
CHARLES WATERS MEMORIAL
SIBAA
NATIONAL BISON REFUGE
FORT OWEN
ST MARY MISSION
Stevensville
93
93
93
ZNO


BITTERROOT
WILDERNESS
SIBOA
KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
N

SIBAA
SIBAA
SIBAA
SIBAA
MOUNTAINS
NORTH
LAKE COMO
BIKE HOSTEL
TRAPPER CP CC CENTER
BOULDER CREEK
KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS

BLODGETT CANYON - 01061
Forest Bitterroot
1983 Roadless Area Net Acres 9,600
Recommended Wilderness Acres 9,600

I WILDERNESS ATTRIBUTES:

This proposed addition to the Selway-Bitterroot Wilderness consists of a spectacular canyon about four miles west of Hamilton. Blodgett is a classic glaciated valley with steep cliffs and many cirques and avalanche chutes.

Blodgett Canyon has been used as defacto wilderness for years. Hiking, rock climbing, fishing, hunting and ski touring are important uses It is a major pathway into the Selway-Bitterroot.

This area received a very high (26) Wilderness Attribute Rating Score during RARE II.

II. RESOURCE VALUES:

Timber is confined to narrow streamside strips and very steep, rocky slopes. This timber was not included in the Bitterroot Forest regulated timber base

Mineral and oil and gas potential is low

Scenic, wildlife and recreation values are very high. A variety of game and non-game wildlife species inhabit the area. The granite cliffs provide some of the best technical rock climbing in western Montana.

III. BOUNDARY RATIONALE:

The boundary corresponds to the RARE II boundary recommended by the Forest Service (1979), Governor Judge (1978) and the Ad Hoc Committee on Forest Resources (1983)

KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
N
WILDERNESS
BITTERROOT RANGE
MOUNTAINS
1061
BLODGETT CANYON
Hamilton
BITTERROOT
BITTERROOT
1ST

NORTH FORK LOST HORSE - 01062
Forest: Bitterroot
1983 Roadless Area Net Acres 7,800
Recommended Wilderness Acres. 7,800

I WILDERNESS ATTRIBUTES

This addition to the Selway-Bitterroot Wilderness Area contains two glaciated hanging valleys. Both are very rugged and steep Travel is consequently difficult in the area and use is light.

Wildlife values are high Mountain goat viewing and hunting are major attractions.

Outstanding opportunities for solitude, rugged topography, and varied scenery make this area an outstanding wilderness candidate.

II. RESOURCE VALUES:

About 22 percent of the area is forest land Most of this is isolated by steep, rugged topography and could contribute little to the economical timber base

Mineral, as well as oil and gas potential is low in this area.

Wildlife and recreation resources are outstanding Mountain goats and a variety of other game and non-game species are present. Rock climbing and mountaineering opportunities are exceptional.

III. BOUNDARY RATIONALE:

The boundary follows topographic features to the extent possible and corresponds to that recommended for wilderness by the Forest Service (1979), Governor Judge (1978), the Ad Hoc Committee on Forest Resources (1983) and WETA (1983).

N
1062
BITTERROOT
MONTANA
IDAHO
SCHUMAKER
BEAR CREEK PASS
LOST HORSE OBSERVATION POINT
CROSS COUNTRY SKI TRAILS
LAKE COMO
1ST
KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS

TRAPPER CREEK - 01063
Forest. Bitterroot
1983 Roadless Area Net Acres· 2,500
Recommended Wilderness Acres 2,500

I. WILDERNESS ATTRIBUTES.

This addition to the Selway-Bitterroot Wilderness Area is characterized by rugged, glaciated canyons and steep granite cliffs.

Wildlife resources are a major attraction, hunting, fishing and mountain goat viewing are major activities in the area.

Rock climbing and backpacking attract recreationists during the summer months.

II. RESOURCE VALUES·

Timber resources occur in stringers on steep slopes and along streams. Road building would be difficult and expensive.

Mineral and oil/gas potentials are low.

Wildlife and recreation resources are outstanding. A variety of game and nongame species inhabit the area and the exceptional scenery attracts recreationists year-round. The area is adjacent to the spectacular Trapper Peak which has long been heavily used by mountaineers.

III. BOUNDARY RATIONALE·

The boundary follows topographic features to the extent possible and corresponds to the boundary recommended for wilderness by the Forest Service (1979), and the Ad Hoc Committee on Forest Resources (1983).

KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
N
LAKE COMO
BIKE HOSTEL
GUIDE
Grouse
VISTA
1063
TRAPPER CR
CC CENTER
BITTERROOT
BOULDER CREEK
Boulder Pk
Trapper Pk
Roody Knob

NELSON LAKE - 01064
Forest: Bitterroot

1983 Roadless Area Net Acres	2,900
Recommended Wilderness Acres	2,900

I WILDERNESS ATTRIBUTES

This Selway-Bitterroot Wilderness addition consists of rugged, glaciated canyons. Nelson Lake, formed by a massive landslide, is a major attaction.

Big game hunting and fishing opportunities reflect the importance of the varied fish and wildlife populations

Rugged topography and alpine scenery attract recreationists to the several trails, which access the Selway-Bitterroot.

II. RESOURCE VALUES·

Timber occurs as isolated stringers on about one fourth of the area. Roads accessing this timber would be costly and difficult to build.

Mineral and oil/gas potentials are low.

Wildlife and wilderness values are very high Mountain goats are a major attraction and the well known Trapper Peek, which has long been heavily used by mountaineers, can be viewed from the area.

III. BOUNDARY RATIONALE:

The boundary follows topographic features where possible and corresponds to that recommended for wilderness by the Forest Service (1979), Governor Judge (1978) and the Ad Hoc Committee on Forest Resources (1983).

NORTH
WILDERNESS
1064
LITTLE WEST FORK
ROMBO
LITTLE BOULDER
SLATE CR
PAINTED ROCKS
ALTA PINE NATL REC TRAIL
KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS

MEADOW CREEK - M1845
Forest Bitterroot
1983 Roadless Area Net Acres 12,600
Recommended Wilderness Acres. 12,600

I. WILDERNESS ATTRIBUTES:

This proposed Selway-Bitterroot Wilderness addition is generally timbered, in contrast with other proposed additions to this wilderness area. Topography is rugged and steep, consisting of "V" shaped, steep-sided canyons.

Wildlife values are high A band of 50-100 bighorn sheep winters in the area. Elk, mule deer, whitetails, mountain goats, moose, black bear and mountain lion, in addition to a variety of nongame species inhabit the area. Three commercial outfitters use the area during the hunting season. Backpacking and horseback riding are other major uses.

II. RESOURCE VALUES

Commercial forestland occupies about 70 percent of the area, although economical harvest would not be possible on all of this, especially considering the erosive granite soils. Major tree species include douglas fir, ponderosa pine and lodgepole pine.

Little mineral or oil and gas potential exists.

As mentioned above, wildlife and recreation values are high.

III. BOUNDARY RATIONALE:

The boundary follows topographic features to the extent possible and corresponds with that recommended for wilderness by the Forest Service (1979).

KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
WILDERNESS
BITTERROOT
MONTANA
1845
FALES FLAT
PAINTED ROCKS
ALTA
RAVALLI CO
N

928

STONY MOUNTAIN - 01808

Forest Bitterroot, Lolo, Deer Lodge
1983 Roadless Area Net Acres 101,500 (43,965/33,120/22,400)
Recommended Wilderness Acres 68,430 (23,005/30,560/12,850)

I WILDERNESS ATTRIBUTES

The Stony Moutain roadless area straddles the Sapphire Mountain crest east of a line between Stevensville and Hamilton The area is bounded by Rock Creek, a blue ribbon fishery, on the east side and overlooks the Bitterroot Valley to the west

The area is characterized by rolling, forested topography interspersed with grassland parks and rocky areas.

Wildlife is the major attraction to the area which provides quality hunting in a roadless setting A large elk herd, deer, moose, bear and mountain goats attract hunters Fuse and Stony Lakes receive moderate fishing pressure Artic grayling may be caught in Fuse Lake

The Easthouse National Recreation trail traverses the area The Palisades National Recreation trail accesses Burnt Fork Lake on the edge of the proposed wilderness area

II RESOURCE VALUES

Timber values are very low on the Bitterroot and Lolo Forest portions of the area but the Deer Lodge Forest part has some of the best timber on that forest.

There are a few non-patented, inactive mining claims along the western boundary and a large block of placer gold and garnet claims on the east side of the Sapphire Divide in the middle of the Lolo Forest part of the area A small part of one grazing allotment (38 AUM's) is found on the Deer Lodge Forest.

III BOUNDARY RATIONALE

The boundary has been adjusted (see map) to exclude the best timber sites on the Deer Lodge and Bitterroot Forests This adjustment was made after consultation with Forest Service personnel on the Philipsburg Ranger District

KEY
PROPOSED WILDERNESS
ROADLESS AREA
EXISTING WILDERNESS
SAPPHIRE
BITTERROOT FLAT
Squaw Pk
Green Mtn
Fisher
Eagle Pk
Owen Pk
Boulder Basin
Dominic
Willow
1808
GRANITE
PRESERVATION
Dome Shaped Mtn
DEERLODGE
T 7 N
T 6 N
GAME
Skalkaho Mtn
SKALKAHO FALLS
Skalkaho Pass
CRYSTAL CREEK
SKALKAHO
R 18 W
NATIONAL
R 17 W

928

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS COMMENTS

APPENDIX

Proposed Bitterroot Forest Plan Land Allocations

GENERAL AREA	LOCATION	MANAGEMENT EMPHASIS FROM	TO	
Little Threemile Cr	W-1/2 Sec 20, and the M.A #1 portion of Sec 30, T8N, R18W	1	2	88a
Justification	This is elk and deer winter range and should be in M A. #2 to optimize winter range habitat			
Gold Cr	Sec 12, 13, 14, 23, 24, 25, 26, T7N, R19W and Sec. 7, 18, 19, T7N, R18W	1	5	88b
Justification	This is the Stoney Mountain roadless area portion of the Bitterroot Some is proposed for intensive timber management and the remainder for roadless management It should all be recommended MA5 to insure that big game security habitat is permanently provided in an area that is surrounded by some very high road densities			
Eastman Cr. - St Clair Cr	Sec 10, 15, 22, 27, T6N, R19W	1	2	88c
Justification	This is elk (particularly bulls) and deer winter range and should be in M A #2 to optimize winter range habitat.			
Beef Ridge - east	Sec 25, T5N, R20W	3a	4	88d
	Sec 31, 32, 33, T5N, R19W	3a	4	
Justification	These areas provide critical winter range cover and security during the hunting season			
Bear Gulch - Black Bear Pt	Sec 26, 27, 33, 34, 35, 36, T5N, R19W	3a	5	88e
	N-1/2 Sec 2, 3, and 4, T4N, R19W	1	5	
Justification	Radio-collared elk locations indicate these areas have high security values during the hunting season The surrounding country is heavily roaded, and this island of roadless security habitat should remain unroaded			
Bald Top - Sleeping Child Creek	E-1/2 Sec 8, Sec. 9, 16, E-1/2 Sec 17, 21, W-1/2 Sec. 22, 27, E-1/2 Sec. 28, T4N, R19W	1	5	88f

FOREST SERVICE RESPONSE Continued

88 Responses to the Department's site-specific comments follow

a The area was changed from MA 1 to either MA 2 or 3a, both of which will protect winter range values

b We have decided to manage the riparian area of the Gold Creek drainage as MA 3b, the big game winter range portion as MA 2, and the rest of the drainage as MA 1 The area west of Gold Creek is suitable timberland and is already partially developed We think the other resource values of the portion of the Gold Creek drainage east of the creek can be protected while the area is managed for timber production or as big game winter range

c All of the area within the winter range boundary has been changed from MA 1 to MA 2 to protect winter range values

d We believe visual and access restrictions will adequately protect winter range values and will leave the area in MA 3a

e We believe elk values can be protected by assigning the area to MA 3a for the winter range portion of the area and MA 1 for the remainder

f All of the area has been added to MA 5 in the Final Plan.

Justification	These additions would expand the Bald Top - Divide Cr roadless area and provide additional security for elk in an area surrounded by high road densities			
Harlan-Roan Gulch	Portions of Sec 18, 17, 19, 20, T4N, R20W	1	2	88g
	Portion of Sec 24, T4N, R21W	1	2	
Justification	This is prime elk and deer winter range and should be managed with winter range considerations			
Burke Gulch	S-1/2 Sec 33, T4N, R20W	1	2	88h
	Sec 4, T3N, R20W	1	2	
Justification	This is elk winter range (often bulls winter in this area), and because of this and the heavy cutting on adjacent private land, it should be managed as winter range			
Lower Rye Cr Area				88i
1) Spring Gulch	Portions of Sec 20, 29, 20, T3N, R19W	1	2	
2) Bear Gulch - Rye Cr.	Portions of Sec 5, 6, T2N, P19W	1	2	
	Portions of Sec 28, 29, 32, T3N, R19W	1	2	
3) Benson Cr.	Portions of Sec 34, 35, T3N, R20W	1	2	
	Sec 3, T2N, R20W			
Justification	This is elk winter range and should be managed as such.			
Swift Cr	Sec 32, 33, T2N, R17W	1	5	88j
Justification	This is good fall elk security habitat and should be managed as roadless			
Balsam Cr & Bugle Cr.	Sec. 13, 23, 24, 26, T1N, R18W	1	5	88k
Upper Meadow Cr	Sec 19, T1N, R17W	1	5	
Justification	This is good fall elk security habitat and should be managed as roadless			
Tolan Cr	Sec 3, 8, 9, T1S, R18W	1	5	88l
Reimil Cr	Sec 1, 2, T1S, R19W	1	5	
	Sec. 6, T1S, R18W	1	5	
Justification	These are high elevation security areas that should be managed as roadless			

FOREST SERVICE RESPONSE Continued

g. The area has been changed from MA 1 to MA 2 to better protect winter range values.

h The area within the winter range boundary was changed from MA 1 to MA 2. The rest of the area is above the area used by elk in winter and will be managed as MA 1

i These areas were changed from MA 1 to MA 2 to better protect elk winter range values

j We decided not to designate the area as either MA 5 or 6 because the adjacent wilderness area provides sufficient elk security in the general area The area will be managed as MA 1 and Forest-wide standards for control of hunter access will apply.

k. The portion of the area in Bugle Creek is already partially roaded so it cannot be managed as roadless. The area in the Balsam creek bottom is heavily used elk summer range with possible road building problems We've added the area to MA 5 The rest of the area is suitable for timber production and will be managed as MA 1.

l. These areas are too small and isolated to be managed as semiprimitive recreation areas The elk values can be protected by the application of road access standards.

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Tolan Ridge	Sec 17, 18, 19, 20, T1N, R18W	2	5	88m
	Sec 12, 13, T1N, R19W	3a	5	
Tolan Cr , Reimel Cr , Barley Ridge, Wallace Cr and Diggins Cr	Sec. 14, 22, 23, 24, 25, 26, 36 T1N, R19W	1,2,&3a	5	
Justification	These are critical winter ranges that are currently roadless To keep winter disturbances to a minimum and provide security during those years with considerable snowfall during the hunting season, these areas should remain roadless. Carefully planned, limited timber harvest could possibly occur, providing thermal cover adjacent to foraging areas and hiding cover values are maintained			
Waddell Cr	Sec. 5, T3N, R21W	1	2	88n
Piquette Cr - East Piquette Cr	Sec 1, 2, 3, 11, 12, 14, T1N, R21W	1	2	
Justification	This is elk and deer winter range and should be in M A #2 to optimize winter range habitat			
East Piquette Cr	E-1/4 Sec 12, E-1/4 Sec 13, T1N, R21W	1	5	88o
	Sec 6, 7, 18, T1N, R20W	1	5	
Dickson Cr	Sec 31, 32, T2N, R20W	1	5	
Gilbert Cr.	Sec 8, T1N, R20W	1	5	
Medicine Point	Sec 28, 32, 33, T1N, R20W	1	5	
Base Cr	Sec 5, 6, T1S, R20W	1	5	
Maynard Cr	Sec 25, 26, 36, T1N, R20W	1	5	
	SW-1/4 Sec. 30, T1N, R19W	1	5	
Justification,	These are all currently roadless areas and provide important security habitat in and around some areas that have extremely high road densities They should be managed as roadless.			
Andrews, Priane, Waugh Cr	Sec 31, T1N, R19W	1&3a	5	88p
	Sec 1, NE-1/4 Sec. 12, T1S, R20W	1&3a	5	
	Sec 6, 7, W-1/2 Sec 8, E-1/2 Sec 18, E-1/4 Sec 19, T1S, R19W	1&3a	5	

FOREST SERVICE RESPONSE Continued

m We think elk winter range values can be protected by designation to MA 2 Timber harvest is appropriate if cover and road access requirements are met Section 19, T. 1 N , R 18 W. and E 1/2, Section 24, Section 25 and 36, T 1 N , R 19 W. were changed from MA 2 to MA 8c in the Final Plan and therefore will not be roaded at least until reanalyzed in the future

n The piece in Waddell Creek has been changed from MA 1 to MA 2 In the Piquette Creek area, we have changed all the area within the winter range boundary from MA 1 to MA 2 to better protect winter range values

o We have designated much of the low to nonproductive timberland to MA 8a The result is that most of the area mentioned will remain unroaded, but will not be managed for semiprimitive recreation Portions of the area in Maynard, Dickson and Gilbert Creeks are already roaded and their elk habitat values will be protected by road access management

p The part of the area below the upper boundary of winter range has been changed from MA 1 to MA 2 MA 3a has standards that are more restrictive to timber harvest and will result in more cover on winter range than MA 2 We have elected to leave some of the area in MA 1 because timber values are relatively high and other resource values can be protected by standards for the Management Area

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Justification	These are currently roadless, higher elevation security areas that provide hunting season security for a local elk herd lower elevations to the east are highly roaded			
Took Cr - Mud Cr	Sec. 6, 21, 22, 27, 28, T1S, R22W	1	2	88q
Steep Cr	Sec. 29, T1N, R21W	1	2	
Justification	This is elk and deer winter range and should be in M A #2 to optimize winter range habitat			
Little Boulder Cr	Sec 19, W-1/3 Sec 20, N-1/2 Sec 30, 29, T1S, R21W	1	5	88r
Justification.	The upper portion of Little Boulder Cr is good roadless elk security habitat It should remain roadless			
Slate Cr	Sec 36, T1S, R22W	1	2	88s
Overwhich Cr	Sec 2, 10, 11, 12, T2S, R22W	1	2	
Cow Cr - Stevens Gulch	Sec 23, 26, T2S, R22W	1	2	
Justification	This is elk and deer winter range and should be in M A #2 to optimize winter range habitat			
Overwhich Cr - Hughes Cr.	Sec 22, 23, 24, 26, 27, 28, 29, 30 35, T2S, R21W	1	5	88t
Hughes Cr - Thunder Mtn.	Sec 29, 30, 31, 32, T2S, R20W	1	5	
	Sec 6, 7, T3S, R20W	1	5	
	Sec 1, 11, 12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 28, T3S, R21W	1	5	
	Sec. 11, 12, 13, T3S, R22W	1	5	
Justification·	This is currently roadless elk security habitat. Elk movements to and from seasonal ranges occur on the ridge between Overwhich Cr and Hughes Cr These areas should be managed as roadless to maintain these values for elk			

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FOREST SERVICE RESPONSE Continued

q The part of the area within the winter range boundary has been changed from MA 1 to MA 2 The rest of the area has been left in MA 1 because timber values are relatively high and other resources can be managed within the standards of the Management Area.

r A small part of the area was changed from MA 1 to MA 3a, a small part within the winter range boundary was changed from MA 1 to MA 2, but the rest of the area remains in MA 1 because timber values are relatively high and other resources can be managed within the standards of the Management Area

s All the area within the winter range boundary was designated MA 2 to protect elk winter range values.

t More than half the area mentioned was changed from MA 1 to MA 5 because timber stand productivity is marginal or low and road access is difficult and expensive The ridge north of Quartzite Mountain and an area around Thunder Mountain were designated MA 8a because timber productivity is judged to be too low to justify management. About one-fourth of the area mentioned remains in MA 1 because timber management activities seem appropriate from the standpoint of economics and other resource values.

928

Table 1 Peterson mark and recapture population estimates completed by the Montana Department of Fish, Wildlife and Parks in September of 1984 on selected Bitterroot drainage streams

Stream name	Length of Section (ft)	Species	Size class (in)	Marked	Captured	Re-captured	Number estimate	(80%) Confidence interval	Number per mile
Overwhich Creek	450	Cutthroat	3 0-5 9	62	41 -	27	96	±13	1126
			6 0-8.9	18	10	8	23	± 4	270
			9 0	2	1	1	2	-	23
		Brook	3 0-5 9	1	2	0	3	-	35
			6 0-8 9	1	1	0	2	-	23
		Bull	6 0-9 5	2	2	1	3	-	35
		Mtn whitefish	3 0-8 2	6	2	0	8	-	93
Warm Springs Creek	300	Cutthroat	3.0-5 9	67	55	23	150	±30	2780
			6 0-8 9	34	16	12	45	± 8	792
			9 0	4	1	0	5	-	88
		Rainbow	3 0-5 9	7	3	1	9	-	158
			6 0-8 9	5	5	5	5	-	88
			9 0	1	1	1	1	-	17
		Brook	3 0-5 9	7	13	3	28	±14	482
			6 0-8 9	4	3	0	7	-	123
		Bull	3 0-5 9	6	2	0	8	-	141
			6 0-8 9	3	0	0	3	-	52
Burnt Fork	300	Cutthroat	3 0-5 9	33	20	5	119	±49	2094
			6 0-8 9	31	17	7	72	±23	1267
			9 0	1	0	0	1	-	17
		Brook, bull, hybrids	3 0-5 9	4	11	1	14	-	246
			6 0-8 9	15	14	5	40	± 5	704
Daly Creek	550	Cutthroat	3 0-5 9	8	16	4	30	±14	288
			6 0-8 9	16	5	3	18	-	172
			9 0	6	4	3	7	-	67
		Bull	3 0-5 9	22	11	6	39	±17	374
			6 0-8 9	9	8	2	15	-	144
			9 0	3	3	0	6	-	58

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Table 3 A partial list of streams on the Bitterroot National Forest and estimated stream mileage on each

WILDERNESS STREAMS				NON-WILDERNESS STREAMS			
	Estimated miles of fish stream		Estimated Mi of fishable stream off		Estimated miles of fish stream		Estimated Mi of fishable stream off
Name	on Natl	Fst	Natl Fst	Name	on Natl	Fst	Natl Fst
Sweeney Cr	6		1	Eightmile Cr	2		3
*Bass Cr	5		1	Ambrose Cr	0		3
*Kootenai Cr	7		1	Threemile Cr	1		4
*Big Cr	10		1	*Burnt Fork Cr	12		4
Sweathouse	5		2	Willow Cr	5		3
*Bear Cr	10		3				
Fred Burr Cr	7		2	Gird Cr	2		4
*Mill Cr	10		2	*Skalkaho Cr	12		7
				*Daly Cr	8		0
*Blodgett Cr	10		3	*Sleeping Child Cr	12		5
*Sawtooth Cr	11		1	*Rye Cr	11		7
*Roaring Lion Cr	6		1	Cameron Cr	6		5
*Lost Horse Cr.	13		2	*E Fork Bitterroot	15		20
Rock Cr	7		0	*W Fork Bitterroot	17		17
*Tin Cup Cr	12		3	*Martin Cr	12		6
Chaffin	5		2	*Moose Cr	8		4
Trapper	9		1	*Meadow Cr	7		0
*Boulder	8		0	Tolan Cr	8		2
				Camp Cr	3		6
Nelson Cr	8		0	*Warm Springs Cr	10		1
Witchtower Cr	8		0	*Piquett Cr	8		1
Sheepshead	8			*Overwhich Cr	14		
TOTALS	165		26	Hughes Cr	8		7
				Deer Cr	10		0
				*Blue Joint Cr.	15		0
				*Nez Perce Fork	11		2
				TOTALS	212		111

*Larger more significant drainages and fisheries

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MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS
ADDITIONAL ROAD MANAGEMENT CRITERIA
APPENDIX B

428

The following criteria are suggested for inclusion under management guidelines

a. Roads will be closed when necessary to protect the safety of Forest users *Examples include roads with hazards* such as avalanches, landslides, forest fires, flooding, timber operations, etc.

b Adverse resource impacts will be mitigated by the road closure Where roadway use increases soil movement and adversely affects water quality and vegetation, some type of closure will be considered *In* cases where fish and wildlife are affected, special emphasis will be placed on road closures. Areas that are identified as opportunities *for walk-in hunting or* fishing experiences will be considered for closure. Road closures will also be considered to help preserve known historic and prehistoric sites Temporary closures will be considered for fire damage, roadway erosion, and similar conditions Road closures may be used to maintain hunting opportunities and to preserve viable habitat, as well as to distribute big game harvest and provide for liberal, lengthy recreational hunting opportunities To maintain current hunting opportunities the Forest will cooperate in implementing the 'Montana Fish *and Game Commission Road Management* Policy' of October 13, 1982. Any wildlife closures will be coordinated with the Montana Department of Fish, Wildlife and Parks

c Road closures will reflect needs of the public in special circumstances and during the different seasons of the year Emergency events such as fire suppression and search and rescue activities shall

be permitted on closed roads Activities such as firewood gathering, mining, and berrypicking could occur provided the objective of the closure is not compromised

d The need for protection of administrative or special use facilities will be a consideration for the closure of certain roads. Lookouts, guard stations, and transmission sites are examples of such facilities.

e Roads should be considered for closure when necessary to minimize conflicts between user groups Examples include conflicts between walk-in hunters and road hunters, cross-country skiers and snowmobilers, horseback riders and motorcyclists.

f The quality of dispersed recreation opportunities will be a factor when considering a road closure (providing for four-wheeled motorized recreation in some areas and other forms of motorized recreation in others, where both uses in the same area may result in diminished quality of the recreation experience) "

State of Montana
Office of the Governor
Helena, Montana 59620

TED SCHWINDEN
GOVERNOR

March 26, 1986

Mr Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, Montana 59840

Dear Mr Morgan

In August, 1985, I submitted my comments on the Draft Bitterroot National Forest Plan and Environmental Impact Statement These comments, which were prepared by my Planning Task Force, did not specifically address the appropriateness of wilderness designation for those Bitterroot National Forest areas identified in the Montana Wilderness Study Act (SB 393) My Wilderness Advisory Committee has subsequently reconvened and reviewed our information on these lands, which include the Blue Joint and Sapphire Wilderness Study areas

During the review process for these areas, the Committee has kept Montana's Congressional Delegation informed and has met informally with local staff from the delegation to share our information. Although the Committee's review process does not reflect the in-depth study of each area as was accomplished for my 1984 wilderness recommendations, I would like to share the Committee's comments with you

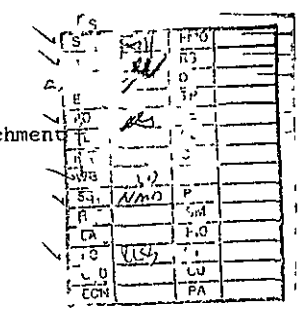
I hope the comments will be useful to you in your continuing consideration of the difficult issues of wilderness recommendations Ralph Driear of my staff is chairman of the Committee and can answer any questions that you may have regarding the comments

Sincerely,

Ted Schwinden

TED SCHWINDEN
Governor

Attachment



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D3 4/8/86
D4

State of Montana
Governor's Wilderness Advisory Committee
comments on
Blue Joint and Sapphire Wilderness Study Areas
Bitterroot and Deerlodge National Forests

The following comments were prepared by the Governor's Wilderness Advisory Committee and are the result of the Committee's review of available resource information regarding the Blue Joint and Sapphire Wilderness Study Areas in the Bitterroot and Deerlodge National Forests.

1. Blue Joint Wilderness Study Area

The Governor's Wilderness Advisory Committee recommends wilderness designation for approximately 42,500 acres of the Blue Joint Wilderness Study area. The Committee recommends that the Blue Joint Wilderness boundary include the entire area proposed for wilderness designation by the Bitterroot National Forest (BNF) in their 1985 Report and Draft Environmental Impact Statement of the Blue Joint and Sapphire Montana Wilderness Study Act Areas, as well as additional lands to the east of the Blue Joint Creek drainage in the study area

The topographically enclosed nature of the Blue Joint Creek drainage does not provide easy access to the Frank Church-River of No Return Wilderness in Idaho immediately to the west of the area. This may limit the future exchange of wilderness users between the two areas, potentially concentrating future Montana wilderness use in a single stream drainage if the BNF wilderness boundary proposal is considered. To accommodate a greater dispersal of wilderness use in this area, while minimizing the impact upon commodity resources, the Committee recommends that the wilderness boundary proposed by the BNF be expanded to include the headwaters of Chicken and Deer Creeks; an adjacent area with suitable wilderness qualities and proposed by the BNF for semi-primitive recreation/roadless management.

While the eastern boundary proposed by the BNF for the semi-primitive area is generally supported as the eastern boundary for the Blue Joint Wilderness, the Committee recommends additional review by the BNF to develop a boundary that can best accommodate the transition between the wilderness area and the adjacent roadless area to the east proposed by the BNF for timber-related development.

89

2. Sapphire Wilderness Study Area

The Governor's Wilderness Advisory Committee recommends two areas for wilderness designation within the Sapphire

90

FOREST SERVICE RESPONSE Continued

89 We carefully evaluated the wilderness attributes of the Blue Joint roadless area, the public comments on assignment for management of the area and concluded that we should confine our recommendation for addition to the wilderness system to the Blue Joint drainage Most of the rest of the roadless area will be managed for semiprimitive recreation without roads The rationale for this decision in documented in the Record of Decision

90 We have decided not to recommend any wilderness classification for the Sapphire roadless area About 27,500 acres of the 44,100 acre area will be managed for semiprimitive recreation without roads and about 15,700 acres have been assigned to Management Areas which allow road construction and timber harvest The rationale for this decision is documented in the Record of Decision

Wilderness Study Area, a core area with high wilderness values, (approximately 30,000) acres and an addition to the Anaconda Pintlar Wilderness Area (approximately 6,400 acres)

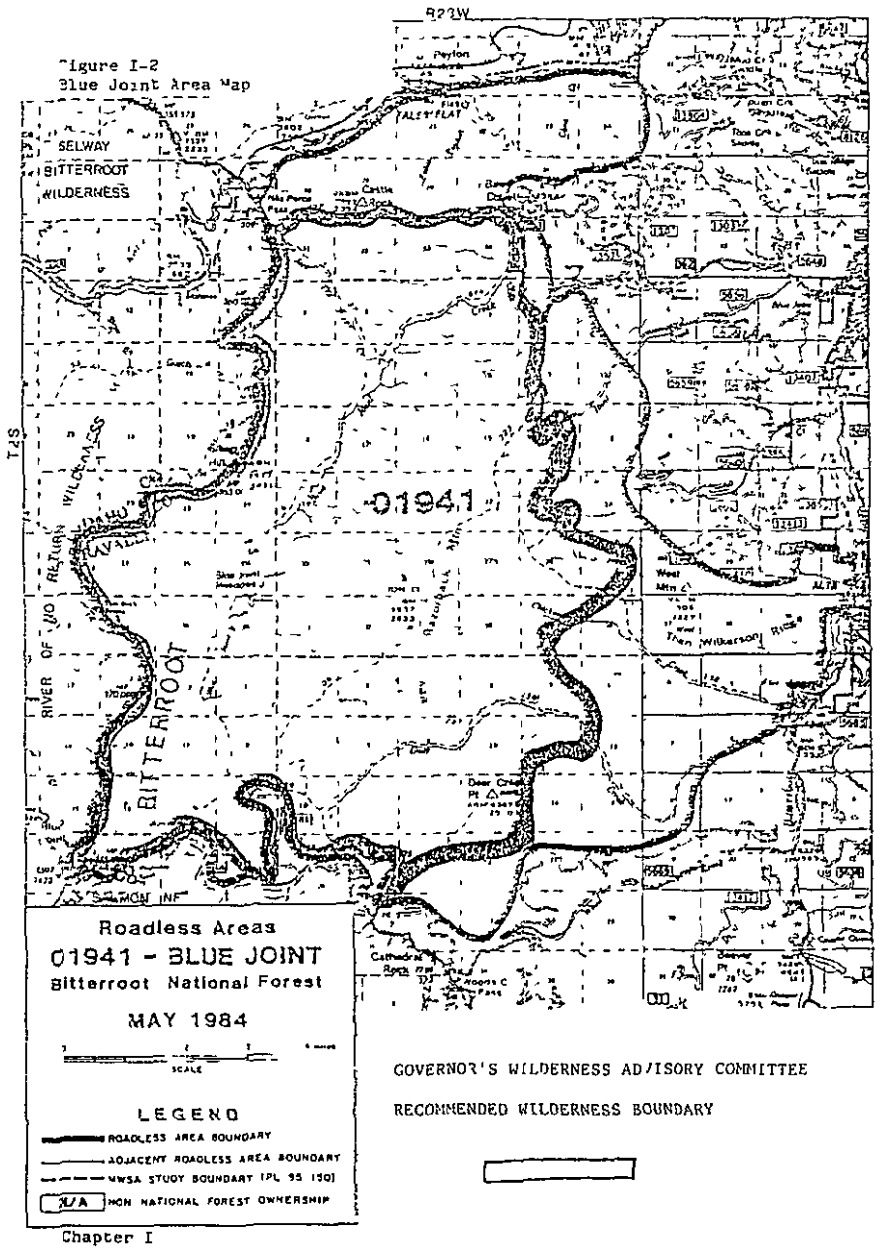
The Committee recommends that boundary adjustments be made to the northern portion of the study area to accommodate semi-primitive motorized recreation (snowmobiles and trail bikes), and to eliminate the narrow (less that 3 miles wide) "neck" of roadless lands in this area to improve wilderness boundary management The Committee recommends adjustment of the eastern boundary of the study area to accommodate timber values north, east and south of Moose Mountain, and in the Meyers Creek drainage The Committee recommends the western boundary be adjusted to exclude the Moose Meadows area in the Bitterroot National Forest in recognition of the significant amount of snowmobile use in this area Further recommendations for boundary adjustments include the exclusion of the Legend Lake/Spud Lake Basin south of the Sapphire Divide to accommodate semi-primitive motorized use, and the exclusion of the Frog Pond Basin area because of mineral-related development and claims, as well as the existing use of the area for snowmobile and trail bike access to Legend/Spud Lake Basin from the Cooper Creek Road

The Committee's wilderness recommendation preserves the *highest wilderness and watershed values within the study* area, while recognizing the need to maintain quality semi-primitive motorized recreation and timber harvest opportunities in the area

The Committee recommends that the Bitterroot and Deerlodge National Forests review and define the most appropriate, precise wilderness boundaries for these recommended areas.

90

Figure I-2
Blue Joint Area Map



Chapter I

R18W
R17W
R16W
US Dept of Agriculture
Forest Service
01-421 SAPPHIRE
P.L. 95-1501
June 1979
LEGEND
RARE II Area Boundary
Boundary Adjustment Delineation - Pg e II
Ownership - Non National Forest
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
BITTERROOT
DEERLODGE
NATIONAL
FOREST
ANACONDA
PINTLAR
WILDERNESS
GOVERNOR'S WILDERNESS ADVISORY COMMITTEE
RECOMMENDED WILDERNESS BOUNDARY

3. Local Government and Elected Officials

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Missoula County Conservation District	163
Ravalli County (Commissioners)	175
Thomas, Fred (State Representative)	176

BITTERROOT CONSERVATION DISTRICT
273 S 2nd Street
HAMILTON, MONTANA 59840
(406)363-5010

August 14, 1985

RECEIVED
AUG 16 1985
Bitterroot National Forest

Robert Morgan, Forest Supervisor
Bitterroot National Forest
316 North Third Street
Hamilton, MT 59840

Dear Mr Morgan

In response to your earlier request for recommendations and comments on a proposed Forest Plan the Bitterroot Conservation District noted last night to recommend Alternative G

A copy of the basic summary document prepared by Dick Orasbee on which our discussion was based is enclosed for your information Our decision was based primarily on our concern for the future quality and seasonable availability of water in support of agricultural needs on irrigated land in the valley and future values of this land Other important considerations were of concern to this valley residents in timber industries and our desire to preserve the outstanding values embodied in the Bitterroot River channel corridor the valleys, and the general qualities of the Bitterroot Valley that make it a good place for people to live

Table II of the enclosed document probably sums up the concerns on which our judgment was based as well as anything

Sincerely,

Tom Murphy
TOM MURPHY, Chairman
Board of Supervisors

TM/et

P S We were disappointed there was no mention made of insect control disease control and noxious weed control which are important to the timber industry and our forests 1

FOREST SERVICE RESPONSE

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1 We have Forest-wide standards for insect and disease control specified in Chapter II, of the Final Plan There is also a discussion in Chapter III of the FEIS

We share your concern about noxious weed control About the only comment concerning noxious weeds is on page II-3 of the Proposed Forest Plan It states that "Noxious weeds will be controlled." We have included an expanded discussion of noxious weed control efforts in Chapter II of the Final Plan

BITTERROOT FOREST PLAN

Richard A Olmsbee, BRCD

The Bitterroot National Forest has studies the options for future use and development of the Bitterroot Forest for the next 50 years

Their forest planners came up with a series of options, identified as Alternatives A, B, C, D, E1, F, G, H, and I The proposed Bitterroot Forest Plan adopts Alternative E and they have asked the Bitterroot Conservation District for it's comments and suggestions

There follows a description of possible problems, suggestions and recommendations in areas which are proper concerns of the Bitterroot Conservation District

Ravalli County encompasses 1 525,760 acres (Table 1) Of this total, 355,774 acres are privately owned Of the privately owned acreage 9-,0?4 acres are range land and 115,e.0 are irrigated farm land Within the 355,77- privately owned land lie 1683 miles of state and county roads within the 77?,83? acres of National Forest land lie 205? miles of forest roads

The Bitterroot River drains an average of 2,0?2 ?00 acres per day from about 2844 square miles About 1,?00,000 acre feet of this flows from the Bitterroot Forest The surface of the Bitterroot River within the Conservation District comprises 2970 acres Irrigated lands use about ?5,?0 acre feet of water per year About 6? of the annual water yield in the Bitterroot National Forest comes from land above 7,000 feet in altitude

The Bitterroot National Forest includes both economic and recreational values within its boundaries The Draft Environmental Impact Statement (DEIS attempts to estimate all these values in monetary or economic terms These values include water, timber, forage, plus forest-related values such as hunting, fishing, camping, hiking skiing and snowmobiling all of which are of direct or indirect importance to the economy of the Bitterroot Conservation District

The total economy of Ravalli County (1979) amounts to $83,957,000 annually Of this 46 4% or $38,956,048 is income from timber activities (Montana Business Quarterly) Jobs in timber and related woods products industries make up $4,953,463 or 5 9% of this total

Social Security, railroad and government retirement payments contribute $10,074,840 or 12 0% of the total

Federal outlays in Ravalli Count by the U S Department of Agriculture (1979) amounted to $10,775,000 of which the Forest Service contributed $6,162,000 or 57 2% (BRCD Long Range Plan)

The 1980 production, employment and income derived from the Bitterroot National forest were summarized in the DEIS (Table 808, p F-49) From this can be calculated the summary shown in Table 2 These data show that 379 jobs resulting in $8,340 000 dollars in wages were derived from the timber industry and 363 jobs resulting in $3,070,000 in wages wer derived from forest recreation

The Forest Service considers the following major issues and aspects in its DEIS for future development and use of the Bitterroot National Forest

Water

Timber

Scenic Qualities

Recreational Values

Roadless Areas

Wilderness Areas

Water is probably the most important of these for consideration by the BRCD The management of water in the Bitterroot National Forest is therefore a matter of major and continuing concern to us as mandated in our Long Range Plan

Road building is a major source of sediment in water Sediment chokes the courses of secondary streams, impedes the flow of water in ditches, particularly on the east side of the valley, and causes disastrous meandering in the Bitterroot River] 2

FOREST SERVICE RESPONSE Continued

2 Roads are a major sediment source in man's watershed influence Most sediment in the main Bitterroot river and mouths of the tributaries is coarse material from glacial action thousands of years ago The Bitterroot River is a naturally braided stream flowing through the glacial sediments, and the river is dynamic There are two theories to explain meandering of the River An increase in precipitation and runoff since 1946 may have resulted in a shift from a more sinuous pattern A downdrop block between faults near Charlo Heights and Stevensville may be filling with sediments as the river readjusts to a more braided pattern The river is naturally tending toward a relatively braided pattern based upon its geologic, climatic, and hydrologic conditions Most man-induced sediment arises on private land, not on Forest watersheds Ditches built through the erodible soils in the east side of the valley are themselves a source of sediment

It also is deleterious to the trout population by promoting embeddedness which inhibits growth and reproduction Table 3 lists the miles of road to be built depending on the plan selected 3

Erosion rates are adjusted by geologic erosion factors, the amount of area actually disturbed, mitigating practices, the amount of soil that reaches a stream and the amount of sediment transported by first and second order streams to third order streams which usually support catchable fish The natural sediment level is estimated at 10 7 tons per year per square mile and the average annual water quantity is 1 7 million acre feet for the Montana portion of the BNF

Predicted increases in sediment are indicated in Table 4 These projections indicate increases up to 17% above current concentrations In Alternative F, the increase has been calculated to be 44 tons per square mile of logging activity 4

Proposed timber sales which will be accessed by roading total 37 on the east side of the valley and 28 on the west side of the valley proper Nineteen of the east side locations lie between Darby and Victor This area is the scene of some of the most labile and troublesome sediments in the Bitterroot valley It also contained creeks with some of the most productive trout fisheries in the Bitterroot drainage With regard to the catchable trout population in Class C streams it is predicted that Alternative A will greatly reduce fish populations In Alternative F and G there will be some increase due to scheduled habitat improvement as compensation for sediment effects In Alternate H a 13% decrease is forecast 5

In comparing the various plans with regard to water, management of riparian areas is also important in maintaining the quality of the annual water flow Table 6 indicates the number of acres of riparian land available for timber harvest under various options Sediment from riparian areas is most apt to contaminate forest streams Alternative G will harvest the least acreage in riparian areas The greatest protection to riparian areas is provided by Alternative G in which 38% or 19 250 acres will not be logged 6

FOREST SERVICE RESPONSE Continued

3 The Final Plan has Forest-wide management standards which will ensure we will not exceed the threshold level of sediment production which would affect fish habitat

4 Alternative E sediment estimate is about 15 tons per square mile per year, a 4.4 tons per square mile per year or 41 percent increase above natural levels Increases are up to 17 percent above current conditions for Alternative A

5 See 3 above

6 Riparian areas are the most sensitive watershed lands Sediment modeling has accounted for the sediment potential of the riparian areas We have included riparian area management standards for Management Area (MA) 3b that will protect all the resource values of the riparian areas

[illegible] method to be used in the action alternatives as shown in Table 7 It seems clear that virtually all timber is going to be harvested by one or the other even-aged harvest techniques This is justified by the U S Forest Service conclusion that even-aged harvest is least expensive, provides the best chance for long-term productivity and the best opportunity to control insects and diseases The other side of this argument is that even-aged cutting promotes erosion, lowering of water quality and greater imbalance in season water flows Increasing spring high water, which clear-cutting in particular does, may improve timber production at the expense of down stream agriculture, degraded water quality and increased erosion and instability of larger downstream water courses Effects of erosion are also shown in Table 8 which also illustrates the acreage shifts among roadless, roaded and wilderness categories as directed by the different alternatives

Uneven-aged harvesting is prescribed only for riparian zones (Table 6) and most of this will not be cut within the first decade as shown in Table 7 and 8 It seems clear that Alternative G or H go easiest on timber in riparian areas

Economic benefits of various alternatives are shown in Figure 1 (II-33) p II-67 This graph indicates that Alternative A B and C produce the greatest increase in jobs and local income Alternatives E, F, and G show only very slight increases in the first decade, I indicates a significant loss in jobs and income F, produces a significant increase in both jobs and income

Economic costs are depicted in Table 10 They indicate that deficit financing will be necessary for all developed alternatives The lowest deficit will occur in Alternative H and the highest deficit in Alternative A in the group of alternates considered here

Other economic considerations concern the future use of the 355,000 acres of private land in the Bitterroot Valley It seems clear that these acres will experience a significant population increase in the next decade The Bitterroot Valley is increasingly attractive as a retirement location and a place for varied, high quality recreation It is attractive not only for its' mountain scenery but also for the attractiveness of the cultivated lands in the valley floor For these reasons this acreage is steadily increasing in market value

FOREST SERVICE RESPONSE Continued

7 We will consider uneven-aged management systems where they are ecologically and silviculturally appropriate, i.e , in fisheries riparian prescriptions and where logging occurs on hot, dry ponderosa pine slopes In nearly all other timber stands some form of even-aged management is silviculturally and economically optimum.

The vast majority of our existing timber stands are even-aged due to the natural occurrence of fire, insects and disease and the biological characteristics of the species that occur here Our fastest growing and most valuable species, ponderosa pine, lodgepole pine, western larch and to some extent, Douglas-fir, do best as members of an even-aged stand where early competition for light, nutrients and water is minimal Impacts from insect and disease are minimized and regeneration success for these species is higher in a managed even-aged situation In some instances, clearcutting is recommended to provide wildlife forage or as the only alternative that allows effective treatment of fuels Economics, though generally more favorable under a clearcut alternative, is only a consideration and cannot stand apart from biological justification.

8 Even-age cutting has more effect than uneven-age cutting on water yield, sediment yield and stream woody debris recruitment from riparian areas Uneven-age timber harvest has little or no watershed effect, but the associated roads would be impactive concerns We think the standards imposed upon even-age management in the Final Plan will provide sustained water yield and high water quality without degrading beneficial water uses

9 We estimate the cumulative results of proposed management practices is less than a 2 percent increase in annual water yield as shown in the Table at the end of Chapter II of the Final Plan.

10 These statements are correct, but the deficits referred to are for the first decade only and due to investments that will generate returns in the future By the third decade all alternatives result in returns that exceed costs. In the Final Plan, Alternative E2, economic efficiency changes and reductions in allowable sale quantity and road construction in the first decade result in a net return of about $500,000 per year

In planning future development in the Valley, consideration must be given to the residents who live here Agriculture and the timber industry must be considered in terms of present residents and their occupations but also in terms of possible future developments These include increasing use of the recreational and retirement values It seems clear that the future use of these resources may increase more rapidly than foreseen a few years ago Thus compromises between present and future land use needs to be considered Because logging conflicts with many recreational and social uses of the forests lands, care must be taken to see that both survive in viable form 11

Timber and game resources are renewable Wilderness and roadless resources as such, are irretrievably lost once they have been roaded and logged Agricultural values of privately owned irrigated land in the valley are discounted by increased sedimentation andhigher spring floods and, to the extent that they depend upon scenic and recreational values, they are damaged by degradation of these values Timber values are largely governed by the amount of land available and the natural environment, neither of which can be significantly changed by man Land values of private lands in the valley which are related to surrounding scenic and recreational resources depends upon the perceptions of the owners These values appear to be increasing steadily as more and more people are drawn here to live because of their enjoyment of the recreational opportunities now available

The timber resources of the Bitterroot National Forest require, according to the DEIS, the investment of substantial sums of federal funds over the next decade including a significant amount of deficit financing of forest roads Returns to the U S Treasury in no case exceed 38% by the end of the first decade 12

FOREST SERVICE RESPONSE Continued

11 We agree with this statement and have attempted to consider the compromises between present and future land uses in the FORPLAN model with the expected future value of both commodity and nonmarket outputs Forest standards are described in the Final Plan for each Management Area The standards are designed to assure that conflicts between alternative land uses are resolved

12 This statement is correct Investments in roads in the first decade will provide future benefits when the roads are used for subsequent timber harvests Total revenue in the future is expected to exceed costs.

[illegible] Ravalli County *

Ravalli County	1,525,760 acres
Privately Owned	355,744 acres
Rangeland	94,054 acres
Irrigated Farm Land	116,620 acres
State & County Land	1,619 miles
U.S. Forest Service Land	773,836 acres
Forest Service Roads	2,037 miles
Bitter Root River	
Drainage	2,844 sq miles
River Surface	2,900 acres
Water Yield	2,072,600 acre feet
Used for Irrigation	475,000 acre ft 1 year

*Bitterroot Conservation District Long Range Plan

from the Petterroot National Forest in 1980 *

	1980 Production	Employment Direct Jobs	Total Jobs	Income - $ Direct Jobs	Total Jobs	@270/MBF Lumber
Softwood Sawtimber	31 2MMBF	149(29%)	379(36%)	3780(42%)	8340(44%)	8424
Recreation	515 7MRVD	221(32 %)	363(35%)	1823(20%)	5070(29%)	

*Iron Table B-8 in DEIS, p B-49

Table 3 Comparison of Resource and Economic Outputs by Alternative*

Output	A	B	C	E	E1	F	G	H	J
Annual timber harvest in decade 1 (MMBF)	49	43	41	31	37	28	30	24	15
New roads in 50 years (miles)	3000	2900	2600	2000	2000	1800	2100	1700	1000
New wilderness (thousand acres)	0	50	98	77	77	50	172	296	396
Roadless (thousand acres)	133	100	117	204	204	242	105	66	12
Annual livestock use in decade 1 (AUM's)	14	12 8	12 7	12 4	12 6	11 3	12 2	12 3	11 0
Available for minerals/ energy (thousand acres)	828	777	730	749	749	777	656	531	442
Present net value at 4% (million)	148	143	125	95	85	127	91	103	63
Annual expenditures in decade 1 (million $)	9 2	9 2	9 1	8 6	9 8	7.0	8 5	7 9	7.4
Annual returns in decade 1 (million $)	2 5	3 4	3 5	2 2	2 2	1 5	2 3	2 0	1.3
Annual benefits in decade 1 (million $)	6 4	7 3	7.4	6 0	6.1	5 2	6 2	5 9	5.2
Annual local jobs in decade 1 (change from 1980)	348	258	218	80	208	-22	58	-42	-172

*DEIS, p summary 6

Table 4 Sediment Increases in Percent Above Current Rate in Decades 1, 2 and 3*

Alternative	% Increase
A	17
E	10
G	9
H	7
J	4

*p IV-50

Table 5 A Comparision of Sediment Production Created by Proposed Alternatives in First three years of Operations *

Alternative	A	E	G	H
Miles of Roads	180	120	93	72
Acres Logged	13950	9300	9762	7935
Tons of Sediment	23 8	15.9	12 5	9 7
% Increase-Sediment	17%	10%	9%	7%

* p II-50

Roads = 0 1 ton/mile

Logging = 0 00013 ton/acre

Table 6 Management of Riparian Zones*

Timber Management 1000's of Acres	Total	Riparian Areas Available for Timber Areas-Acres	Restricted Acre	
Alt A	546	63,400	0	0%
Alt E	204	49,400	16,400	33%
Alt G	206	50,800	19,250	38%
Alt H	147	41,500	7,800	19%

*DEIS, p IV -30

Table 7 Planned Timber Harvest in First Decade (by percentage of Total)

	Alternative								
	A	B	C	E	E1	F	G	H	J
Clearcut	83	77	82	59	57	47	73	73	80
Shelterwood	14	22	16	39	35	46	26	24	20
Total	97	99	98	98	92	93	99	97	100

*From Table IV-14, p IV-28 (DEIS)
*

Table 8. Timber Harvested in First Decade by Selection Cutting (Percent of Total)*

Alternative							
A	B	C	E	E1	F	G	H
0	1	1	11	11	7	1	0

*From Table IV-19, p IV-33 (DEIS)

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TABLE 9 Shifts in forest category and effects on fish populations depending on selection of alternative

1,600,000 - Total
435,000 - Roaded
400,000 - Roadless
589,000 - Available and suitable for timber production
743,000 - Wilderness

	ROADLESS (400,000)	ROADED (435,000)	WILDERNESS (743,000)	ROADS	FISH	TIMBERLAND UTILIZED (Available=589,000)
A	+100	+260	743,000	42	-12% to -35%	97%
B	+100	+248	+52	50	-12% to -18%	96%
C	+116	+168	+96	49	-12% to -17%	87%
E	+204	+116	+76	40	-12% to + 2%	76%
E_1	+204	+116	+76	61	-10% to + 2%	76%
F	+244	+68	+160	35	-12% to -12%	76%
G	+104	+92	+172	31	-12% to + 2%	79%
H	+ 68	+68	+296	30	-13% to -14%	62%
J	-396	+ 4	+396	18	+13%	54%

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Table 10 Economic Costs of various Alternatives for the first decade *

	A	E	G	H	J
Annual expenditures in Decade 1 (millions of$)	9 2	8 6	8 5	7 9	7 4
Annual returns in Decade 1 (millions of $)	2 5	2 2	2 3	2,0	1 3
Net Deficit in Decade 1 (millions of $)	6 7	6 4	6 2	5 9	6 1

*From Table 1 p summary -6

TABLE 11 Relative standings of options developed by the U.S. Forest Service with regard to maintenance and enhancement of major economic and social values in the Bitterroot Valley

	OPINION						FACT		
RANK	WATER	TIMBER	SCENIC	RECREATION	PRIVATE AGRICULTURE	PRIVATE LAND VALUES	MOST ROADED	MOST ROADLESS	MOST WILDERNESS
1	J	A	J	G	I	G	A	F	J
2	H	B	F, E_1	H	H	H	B	E, E_1	H
3	G	C	G	J	G	J	C	C	G
4	F	G	F	F	E	F, F_1	E,I_1	G	F
5	I	I, G_1,I	H	I, I_1,	F, I_1,	I	I	A, B	C
6	I_1	I					H		I, F_1
7	C	H	C	C	C	C	I	A,B	
8	B		B	B	B	B		H	B
9	A	J	A	A	A	A	J	J	A

A 4
B 3
C 1
E 4
E_1 4

I 3
G 14
H 12
J 16

Lemhi Soil and Water Conservation District

P O Box 550 Salmon Idaho 83467 Phone 756 2425

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May 7, 1985

Dick Hauff, Supervisor
Salmon National Forest
P.O Box 729
Salmon, Idaho 83467

Dear Mr. Hauff

The members of the Lemhi Soil and Water Conservation District Board, after studying and discussing the "Draft Environmental Impact Statement" are in favor of non-wilderness as described in Alternative E of the Bitterroot National Forest DEIS. 1

Sincerely,

James Whittaker

James Whittaker, Chairman
Lemhi Soil Conservation District

JW/ras

RECEIVED
MAY 9 '85
FOREST SERVICE
Land Stewardship Planning Office

FOREST SERVICE RESPONSE

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1 Your support for Alternative E has been noted We have chosen to implement Alternative E2, a modification of Alternative E, for reasons documented in the Record of Decision Alternative E2 has the same wilderness recommendation as Alternative E

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MISSOULA COUNTY
CONSERVATION DISTRICT

2300 West Broadway
Missoula, MT 59802

August 15, 1985

Robert S Morgan
Forest Supervisor
Bitterroot National Forest
316 North 3rd Street
Hamilton, MT 59840

Re Bitterroot National Forest Plan and Draft Environment Impact Statement

Dear Mr Morgan

These comments are submitted on behalf of the Missoula County Conservation District

Submitted by,

Peggy Haaglund

Peggy Haaglund
District Secretary

RECEIVED
AUG 16 1985
Bitterroot National Forest

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C	Estimates of sediment yield presented in the forest plan do not accurately represent sediment yields on the BNF, and should be amended to do so	5
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E.	The forest plan and DEIS do not adequately address the impacts of changes in water quality and water yield on watersheds downstream from the forest, and should be amended to do so	7
F	The proposed plan should address sedimentation and water quality degradation caused by grazing in riparian zones	8
G.	Proposed sediment and flow monitoring is inadequate, and should be modified to allow evaluation of 1) the sediment model and 2) land management effects on fisheries and other watershed considerations including floodplains and wetlands	9
H.	The proposed plan fails to provide for adequate monitoring of hydrologic recovery, and should be amended to include long term as well as short term evaluation of projects	9
I	The proposed plan fails to fulfill its stated goal to meet or exceed state water quality standards, and should be revised to do so	10

Introduction

The Missoula County Conservation District was formed in 1946 and is a legal entity of the State of Montana The boundaries of the district are identical to that of Missoula County, excluding Missoula City--city limits as of 1946 A small portion of the Northern edge of the Bitterroot National Forest is located in the district, and the Bitterroot River, with its headwaters and major tributaries on the BNF, traverses the majority of the district and merges with the Clark Fork River within the district The McClain creek drainage, which has been of considerable concern to the district, is located on the BNF

As noted in the Missoula County Conservation District Long Range Plan,"The conservation district, operated and controlled by the people in the district, provides a tool for the local development and initiation of programs to promote soil and water conservation It cooperates with governmental agencies, groups, and individuals concerned with resource conservation and development, and encourages the multiple use of resources while maintaining environmental quality " (MCCDLRP at 3).

In order to achieve these objectives, "It is the policy of the Missoula County Conservation District that the natural rivers and streams, and the lands and property immediately adjacent to them within this district are to be protected and preserved in their natural, or existing state, to prohibit unauthorized projects, and in so doing to keep soil erosion

and sedimentation to a minimum, except as may be necessary and appropriate after due consideration of all factors involved. Further, it is the policy of this district to recognize the needs of agricultural use of the rivers and streams in the State of Montana and to protect the use of water for any useful or beneficial purpose as guaranteed by the constitution and laws of the State of Montana." (MCCDLRP at 3).

The conservation District relies on two seperate pieces of important legislation to effectuate these policies. The Montana Natural Streambed and Land Preservation Act of 1975 (75-7 et sec. MCA 1985) requires the District to adopt standards and guidelines for projects involving work in a perennial stream.

Under Section 208 of Public Law 92-500, the 1972 Federal Water Pollution Control Act Amendments, and a supplemental agreement with the Montana Department of Health and Environmental Sciences and the Montana Department of Natural Resources and Conservation, "the Missoula County Conservation District became the non-point source water quality management agency within the Districts boundaries." (MCCDLRP at 4). To effectuate the objectives of this legislation, the district supervisors "established the policy to reduce non-point source pollution by a non-regulatory approach which stresses public education on water quality, contact with individual landowners, and voluntary, cooperative, problem solving." (MCCDLRP at 5).

Given the objectives and policies, actions on the BNF and management prescriptions in the proposed plan concern

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us for several reasons First, the Bitterroot River and its tributaries contribute a substantial amount of water to this District, and water quality here is directly affected by the water in the river system. Since much of this water resource orginates on National Forest Land, over which we have no control, our ability to achieve our objectives of preserving water quality and promoting soil conservation is dependent on the management practices implemented by the forest service on the BNF

Second, problems of slumpage, sedimentation, and decreasing water quality in the McClain Creek drainage seem to be the result of and are influenced by BNF management of that drainage Planning documents also suggest a significant decrease in water quality in the Bitterroot River and its tributaries, due largely to a 40% plus per cent increase in sedimentation caused by proposed management activities on the forest (MDFWP comments at I-5) 1

Lastly, although we are an agency that is responsible for management of soil and water resources in an area affected by the proposed management plan, we have not been notified or consulted by the BNF for our input into the proposed management action This concerns us, for it is only through cooperation and coordination with the BNF that we can achieve our objective of preserving water quality and encouraging soil conservation in a significant part of this district 2

These comments address issues related to soil and water conservation. They are intended to address what we percieve

FOREST SERVICE RESPONSE

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1 Undeveloped mass failure prone lands in McClain Creek has been removed from the suitable timber land base and no road construction or timber harvest will occur

2 This was an oversight on our part Thanks for providing us with your concerns and the parts of the Missoula County Conservation District Long Range Plan that are particularly relevant to the Forest We have obtained the full text of the MCCDLRP for our records and will keep you informed about relevant activities

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as shortcomings in the proposed plan and/or planning documents. It is hoped that they will generate constructive cooperation between and coordination of MCCD and BNF efforts to encourage soil and water conservation. The work completed by the forest service thus far in analyzing soil and water resources on the BNF is admirable Yet though analysis of the future impacts of management activities is extensive and comprehensive, changes in the analysis of the affects of the proposed plan and the condition of soil and water quality on the BNF will result in improved management decisions on the forest It is hoped that these comments are incorporated in the development of a final management for the BNF. Please contact us concerning these comments and the issues presented herein

A The Proposed plan should be modified to manage the McClain Creek Drainage to prevent further slumping and water quality drainage.

As noted in the proposed plan at 6-20, the McClain Creek Drainage is scheduled for additional timber sales in 1995. This sale will consist of a 115 acre clear cut (Plan at 6-20). Given the geology of this drainage and the problems this district has experienced with water quality degradation and slumpage in this area, we strongly recommend that management of this drainage be changed to eliminate clear cutting and/or timber harvest. New slumps of up to 5 acres exist in this drainage, and indications are that logging and road construction in the area has caused or contributed to this problem, which has severly impacted landowners in the area with sedimentation. 3

FOREST SERVICE RESPONSE Continued

3. See 1 above

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The area is recognized by hydrology and soils professionals in and out of the forest service as one of the most unstable landscapes in Montana, due to the presence of micaceous schist soil, steep slopes and high precipitation Much of the drainage consists of old landslides or currently active landslides This is best evidenced by the fact that Region 1 forest service landslide workshops use the drainage for field examples and training. Since this drainage is an extremely small part of the timber base, we recommend that no further road construction or timber harvest occur in the drainage due to the high probability of significant landslides and increased sediment yields 3

B Proposed increases in sediment yields resulting from the forest plan are unacceptable to the MCCD.

The proposed Bitterroot National Forest Plan estimates that sediment yields will increase 41% as a result of planned development of the forest In general terms, this increase is unacceptable because it causes a significant decrease in water quality, significant impacts to the fishery resource on the forest, andgeneral decline in soil productivity on the forest The proposed plan should be revised to minimize these impact to the greatest degree possible, by requiring use of sediment mitigation techniques for road construction, logging, grazing and recreational activities 4 5

C Estimates of sediment yield presented in the forest plan do not accurately represent sediment yields on the BNF, and should be amended to do so

The plan at II-12 notes that the present road system on the forest will be increased form 2057 to 2457 at the 6

FOREST SERVICE RESPONSE Continued

4 We will build only about 25 miles of road per year in the first decade of the Final Plan Management activities have been constrained to maintain sediment delivery increases below the threshold of effect on fish habitat potential and we have a Forest-wide standard to comply with State Water Quality Standards

5 The application of appropriate sediment delivery mitigation measures for new road construction is mandatory in the Final Plan.

6 Sediment from existing nonsystem roads was inventoried and found to be negligible. Most of the temporary roads have been impassable for 10 or more years and have revegetated naturally

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at the end of the first decade This statement is erroneous and inconsistent with the DEIS, which provides that the present road system on the forest is 3500 miles in length (DEIS at summary 8, III-24) This discrepancy is significant in relation to the sedimentation models proposed for the forest Total sediment yields were analyzed by adding together projected sediment yields from new roads to estimated sediment yields from 2057 miles of existing roads, (DEIS at B-32, Pers Comm BNF, August 4, 1985) The actual existing sediment yield on the forest was underestimated therefore, since 3500 miles of road exist on the forest presently, all of which add some amount of sediment to present sediment yields Since most of these existing roads will continue to add to sediment yields under the proposed plan, an evaluation of total sediment yields under the proposed roads and all existing roads is needed to properly evaluate the impacts of proposed management activities. Calculations of sediment yield prepared under the plan should be revised to do this. 6

D The proposed plan should be modified to significantly comply with MCCD objectives to preserve and improve water quality in the MCCD.

In simple terms, we do not feel that a 40 plus per cent increase in sedimentation in tributaries of the Bitterroot River will preserve or improve water quality on the BNF or in the MCCD Our objectives and policies are targeted to improve and maintain soil and water quality on non-federal land in the MCCD. We can not do this without the help of the BNF, due to its significant contributions to the water resource in this district. 7

Cooperation between and coordination of MCCD and BNF

FOREST SERVICE RESPONSE Continued

7 The Final Plan estimated sediment increases have been reduced from estimates in the Proposed Plan We will comply with Montana Water Quality Standards and will keep the MCCD informed about relevant activities

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efforts is necessary to maintain soil and water quality Dialogue with the MCCD and modification of the proposed plan in a manner that will allow the BNF and the MCCD to achieve their objectives is needed, and should be persued as soon as practical

E The forest plan and DEIS do not adequately address the impacts of changes in water quality and water yield on watersheds downstream from the forest, and should be amended to do so

The proposed plan and DEIS do not mention the importance of the watersheds to downstream rivers, and streams, such as those in this conservation district and do not assess the impacts of management actions on these resources In our view renders the DEIS inadequate under the Naitonal Environment Policy Act, 42, U S C § 4331 et seq

Sedimentation figures and projected water yields specifically demonstrate how impacts on downstream fisheries resources were inadequately addressed in the DEIS and Proposed Forest Plan. The forest service predicts that water yield will increase Nowhere in the proposed plan or DEIS are the impacts of this increase discussed The Forest Service views water yields as a beneficial output because the demand for water is expected to increase. However, increased water yield caused by removal of vegetation cover is not a beneficial forest output if it comes at the wrong time of the year Runoff timing is crucial Changes in stream flow regimes have impacts on flood control, irrigation and stream fisheries The economic and environmental damage can be severe if runoff

FOREST SERVICE RESPONSE Continued

8 At the forest boundary streamflow and sedimentation effects will be well within watershed geomorphic thresholds and beneficial water uses like fisheries will not be degraded We have added a discussion of downstream water quality and quantity effects to Chapter IV of the FEIS

9 Increases in annual water yield caused by timber harvest will occur during spring snowmelt, primarily during rising stages of the hydrograph, and late season low flows will be unaffected Water yield analyses of tree removal will be related to stream channel conditions, the ability to carry the increased runoff, and whenever the rare instance of potential impact occurs, tree removal will be modified to assure maintenance of channel stability Streamflow increases caused by timber harvest are usually well within the capability of the channel to accommodate the increase with no effect on channel stability As tree regrowth occurs the water yield effect diminishes

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comes too early and fast, and late flows are reduced The Proposed Plan and DEIS must address the effect of increased timber harvest on snowpack retention and associated time of runoff. Additionally, the Forest Service has failed to address the impact on the fisheries resources beyond the forest boundary

We recognize the Forest Service cannot practically estimate all the effects of BNF activities on other resources downstream However, NEPA requires that reasonably foreseeable consequences of an agency's actions be addressed in the EIS The forest's impact on the Bitterroot and Clark Fork Rivers, as well as other smaller tributaries, is not so remote in time and space to render such an evaluation useless. For this reason NEPA requires the federal agency to evaluate reasonably foreseeable impacts of its actions Failure to do so impedes public participation and hinders reasoned resource allocation decisions. The proposed BNF plan and DEIS failed to fulfill these requrements

- The proposed plan should address sedimentation and water quality degradation caused by grazing in riparian zones

The forest should be commended for maintaining existing grazing permits without evidence of conflict with wildlife. However, potential conflicts caused by grazing on the forest exist in the form of decreased water quality through poor stream bank stability Grazing in riparian zones during times of high soil moisture causes water quality degradation through increase sedimentation Management actions to prevent this problem should be incorporated in the plan, and should

FOREST SERVICE RESPONSE Continued

10 Tree removal has maximum effect on snowpack in small clearcuts which accumulate more snow than surrounding forest Maximum snow redistribution in clearcuts is for openings of diameter about 5 times average tree height If clearcuts are larger than about 15 times average tree height the snowpack in the opening is scoured by wind and there is less snow accumulation in the opening than in the surrounding forest Snowmelt in clearcut openings can occur up to several weeks earlier than in surrounding forest depending on shade due to terrain and surrounding vegetation Runoff increases from timber removal will occur during spring snowmelt, primarily during rising stages of the hydrograph We have added this discussion to the timber harvest section of Chapter IV of the FEIS

11 We have added a discussion of downstream effects of our management practices on water quality and quantity in Chapter IV of the FEIS A cumulative analysis of sediment contribution to the main stem Bitterroot from our proposed management activities shows less than a 1 percent increase at Stevensville In addition, our water yield changes are not likely to contribute to the dewatering problem that is most prevalent throughout the system Our management activities would likely contribute additional water to the annual water budget. Dewatering and channel damage from channeling and overgrazing on private land would be expected to mask the minor contribution of sediment delivered to downstream waters from Forest management activities There has been no evaluation of which habitat factors limit the fishery of the Bitterroot River, nor what a 1 percent increase in sediment budget might mean to the fishery Therefore, a quantified cumulative analysis of fish populations is impractical

12. We have added a discussion of downstream effects to Chapter IV of the FEIS

13 Grazing in riparian areas can affect stream channel stability, sedimentation, and fish habitat. Riparian area grazing was not an issue in the planning process and we do not think we have significant problems, although the potential exists. We have added a management standard in MA 3b to establish cattle utilization standards for riparian shrubs and grasses in allotment management plans Cattle are not permitted on the Forest from November 1 through June 1, normally the wettest part of the year

include removal of stock during periods of high bank instability fencing of riparian shrubs and trees

G Proposed sediment and flow monitoring is inadequate, and should be modified to allow evaluation of 1) the sediment model and 2) land management effects on fisheries and other watershed considerations including floodplains and wetlands

While this is the purpose of the proposed monitoring program, we feel it is an inadequate effort The proposed 6 stations and 150 days of effort will not provide a level of statistical accuracy which is reliable to check sediment models, particularly those of the larger drainages These stations will not provide any indication of downstream or off forest impacts on flood plains, wetlands or watershed resources A greater effort and a commitment to sediment model verification and the biological and hydrological effects of management needs to be set out in the proposed plan

H The proposed plan fails to provide for adequate monitoring of hydrologic recovery, and should be amended to include long term as well as short term evaluation of projects

As noted in the plan and DEIS, the hydrologic impacts of logging and road building can continue for 20 years or more. This being the case, it makes little sense to monitor hydrologic recovery based on examination of one project per district per year A commitment to the continuation of existing studies and initiation of new studies which are long term in nature should be provided in the plan, along with the means by which this monitoring program will be implemented

FOREST SERVICE RESPONSE Continued

13 Forest Plan Monitoring Requirements have been revised to sample embeddedness, streamflow, sediment input and sediment transport We believe the monitoring program on this and adjacent Forests and continuing Forest Service research will give us the information necessary to judge the effects of Forest activities

14 We have revised the Forest Plan Monitoring Requirements to include a method for evaluating the cumulative effect of logging and road construction in watersheds The method requires recordkeeping over the long term and will provide information pertinent to hydrologic recovery

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I The proposed plan fails to fulfill its stated goal to meet or exceed state water quality standards, and should be revised to do so

As noted in the proposed plan, the proposed action addresses 6 major issues and concerns, including water quality and soil productivity, which are addressed by goals for particular resource areas (Plan at II-1) The stated goal for the water and soil resource is to "meet or exceed state of Montana water quality standards and maintain water quantity and soil productivity." (Plan at II-1) The proposed plan, in allowing a 40 plus per cent increase in sediment levels on the forest fails to meet Montana State water quality standards which read "No increases are allowed above naturally occuring concentrations of sediment." Non-point sediment discharges may exceed these levels only so long as fish and wildlife are not affected by the action. This is clearly not the case on the BNF, since the trout population "declines in direct proportion to increases in sedimentation caused mostly by timber harvest and road construction " (Plan at V-9) The plan clearly fails to meet or exceed state water quality standards, and should be changed to implement only those management actions that do so

16

FOREST SERVICE RESPONSE Continued

16 The Final Plan will meet State Water Quality Standards by maintaining sediment effects below the threshold of effect on fish habitat potential and other beneficial water uses

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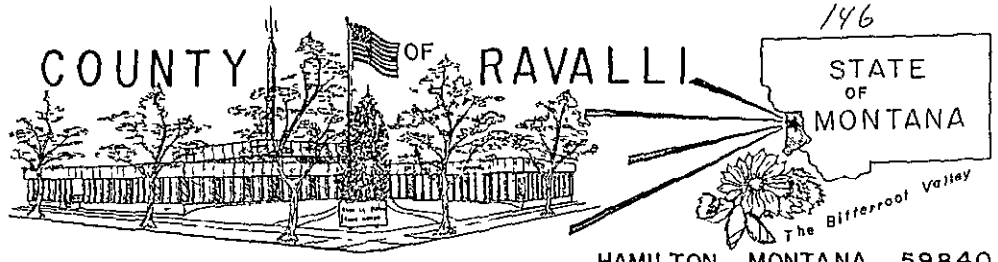

HAMILTON, MONTANA 59840
Courthouse Box 5001
August 14, 1985

Mr Robert S Morgan, Forest Supervisor
Bitter Root National Forest Service
316 North 3rd Street
Hamilton, Mt 59840

Dear Mr. Morgan

The Ravalli County Commissioners have endeavored to make a serious factual evaluation of the various Proposed Forest Plans as submitted by your office

It is our opinion that the adoption of Alternate Plan E is our recommendation It appears to represent a reasonable balance of the various interested factions 1

Sincerely,
BOARD OF COUNTY COMMISSIONERS
Ravalli County, Montana

F I Williams, Chairman

F B Tossberg, Member

Marion H. Davis, Member

RECEIVED
AUG 15 1985
Bitterroot National Forest

FOREST SERVICE RESPONSE

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1 Your support for Alternative E has been noted We have decided to implemc Alternative E2, a modification of Alternative E, for reasons documented the Record of Decision

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The Big Sky Country

MONTANA HOUSE OF REPRESENTATIVES

REPRESENTATIVE FRED THOMAS
146 BROOK LANE
STEVENSVILLE MONTANA 59870
PHONE (406) 777 5000

COMMITTEES
EDUCATION
BUSINESS & LABOR

August 13, 1985

RECEIVED
AUG 14 1985
Bitterroot National Forest

Robert Morgan, Superintendent
Bitterroot National Forest
315 N. 3rd.
Hamilton, Montana 59840

Re: Bitterroot Forest Plan

Bob, I wish to add my opinion to the public comment on the Bitterroot Forest Plan

It is my opinion that we should leave the roadless areas open for multiple use management options I really do not want to see more of the Bitterroot Forest indefinitely locked up and closed to future flexibility. 1

To be honest, I really do not want to see any new roads on the West side of our Valley, but I do not feel there are many, if any, westside canyons that are suitable for roads. That problem takes care of itself 2

I feel much more comfortable leaving the door open to reasonable options. Thus, not locking up our future and throwing away the key. 3

In closing, I feel we need a flexible future for our Bitterroot Valley. Please consider this when the final decision is made.

Sincerely,

Fred Thomas

FOREST SERVICE RESPONSE

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1 Your opinion about the management of roadless lands has been noted We have chosen to recommend about 233,000 acres for semiprimitive recreation management under the standards of Management Area 5 Most of the area is unsuitable for timber production due to low productivity and much of the land is economically inefficient because productive timber stands are small and scattered When the Final Plan is reviewed in 10 or 15 years other management options will be considered

2 The upper slopes of the west side are above productive timberlands and no roads will be built or timber harvested The Brooks Creek drainage and the lower slopes of the area between Mill and Camas Creeks has been assigned to MA 5 for management for semiprimitive recreation Many of the canyon mouths have been recommended to Congress for addition to the wilderness system The rest of the west side will be managed as MA 3a where timber harvest is allowed with visual considerations

3 We think the Final Plan contains the flexibility necessary for future management direction changes while providing sufficient direction for the near future

D. List of Commenters

This list includes the name of all persons submitting written comments on the DEIS and Proposed Forest Plan. Commenters are listed alphabetically by the following groups:

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State Agencies	60
Local Government and Elected Officials	144
Organizations	178
Industry and Business	178
Individuals	179

Some comments were received from individuals with no return address. Unless we could find their name in a local telephone directory, these names could not be included on the Forest Plan mailing address nor could the Forest's response to their comment be mailed to them. These letters were reviewed, but their names could not be placed on the commenters' list.

Comments received after the August 15, 1985, deadline date were considered in formulation of the final documents, but are not included in the comment summaries, including statistics.

1. Indian Tribes and Federal Agencies

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2. State Agencies

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4. Organizations

American Wilderness Alliance
Bitterroot Back Country Horsemen
Back Country Horsemen of Missoula
Bitterroot Operators Group
Bitterroot Chamber of Commerce
Continental Divide Trail Society
Defenders of Wildlife
Eastern Washington Dirt Riders Association
Glacier-Two Medicine Alliance
Idaho Environmental Council
Inland Forest Resource Council
Intermountain Forestry Services
Mission Valley Backcountry Horsemen
Montana Bowhunters Association
Montana Logging Association
Montana Snowmobile Association
Montana Wilderness Association
Montana Wilderness Association (Bitterroot Chapter)
Montana Women in Timber
National Wildlife Federation
The Nature Conservancy
Outdoors Unlimited, Inc.
Ravalli County Fish & Wildlife Association
Rocky Mountain Oil & Gas Association
Salmon Search and Rescue
Sleeping Child Planning Group
Spokane Resident Physicians Action League
Trout Unlimited, Bitterroot Chapter
Western Environmental Trade Association
Wildlife Management Institute
Wood Products Association

5. Industry and Business

AMFAC Fluid Power
AMOCO Production Company
ARCO Exploration Company
Bitterroot Community Federal Credit Union
Brand S Corporation
Broadway Splicing and Supply Company
Byron, Robert O.
Champion International Corp.
City Electric
Coeur D'Alenes Company
Conner Enterprises Inc.
Darby Lumber, Inc.
Diversified Plastics
Fox Lumber Sales, Inc.
Hoffman & Sons
Hydro-Point Engineering Company
John Jump Trucking, Inc.
Long Machinery
Marathon Letourneau Sales and Service Company
McConnell Industries
McFarland Cascade
Modern Machinery Company, Inc.
Montana Bolt Company
Missoula White Pine Sash Company
Montana Power Company
Neville's Log Homes
Plum Creek Timber Company, Inc.
Ravalli County Electric Cooperative, Inc.
Rocky Mountain Log Homes
Salem Equipment

Francis Sargent Logging Company
Schlegel & Sons, Inc.
Schurman Machine Incorporated
Shiffman Industrial Service, Inc.
Stoltze-Conner Lumber Company
Texaco USA
Timberline Log Homes
Torque-A-Matic
Triple Tree Inc.
U.S. Borax
West Electric Distributors, Inc.
Wilnau Logging

6. Individuals

Abbey, Donald F.
Abbot, Bill
Abbot, Charlene
Abell, Russell Mr. & Mrs.
Alameda, Craig
Aldrich, Donald
Allison, Janet R., PHD.
Almquist, Marty
Alt, Dave & Sandy
Althen, Phillip C.
Ambelang, Linda
Anderson, Edie
Anderson, Janice
Anderson, Walter A.
Armstrong, Robert R.
Arrington, George
Atwood, Craig
Atwood, Richard
Austin, Alice
Bacon, George
Bailey, Carl
Bailey, Dana
Bailey, Gail
Bailey, Mary
Bailey, Jeanine
Baird, Dennis
Baker, Dale
Baldwin, Carl & Florence
Banner, Welder LG
Barker, Robert
Barker, Robin
Barneson, June Roth
Barngrover, Jim
Barrett, Maxine
Barrett, Sanford
Barringer, Bill
Barringer, Brad
Barringer, Elaine
Barringer, Lyle D.
Bartholomew, Robert C.
Battaion, Mark
Bauer, Mrs. Bonita
Baxendell, E. Martha
Baxendell, William
Beason, Dennis
Beck, Bob
Bedey, Arlene
Bedey, Bette
Bedey, Frank W., Jr.
Bedey, Mike
Bedey, Robert E.
Beebe, Teddye L.
Beer, Mary S.
Behling, Gerald A.
Behrman, Mark & Susan
Bell, Dr. Fritz
Bell, Marvin
Benche, Errol D.
Bennett, Sue
Bergren, Larry
Bergren, Philip
Bergren, Terry
Bernofsky, Jo Ann
Bielenberg, Mary
Bingaman, Alan
Bingaman, Bonnie
Bingaman, Fred
Bingaman, Maxine
Biship, Bill
Blair, Danny
Blair, David
Blair, Debra
Blanchard, R.W.
Blank, Debby
Blasing, Larry B.
Block, Daniel G.
Blood, W.A.
Bloom, Jerry
Bloom, Marshall
Bloom, Tama
Bohannon, Raymond F.
Bomers, Jo

Bonnett, Ivan E. & Elsie R.
Boody, Bruce
Bopp, Kevin
Bove, Cliff
Bowler, Stephen W.
Bowman, Warren & Edith
Boyer, Robert A.
Braach, Edward E.
Braden, Byron
Brader, Joyce L.
Brader, Thomas
Bradley, Homer L.
Bradt, William C.
Brandborg, Ruth M.
Brandon, Earl
Brasel, Carol
Bright, Kathleen
Bright, Zubel
Brist, Wilma
Broadwater, M.
Brock, Janet M.
Brookman, Robert L.
Browman, Ludvig G.
Brown, Faye
Brown, Karen
Brown, Lon
Brown, Reed
Brown, Ric
Brown, Rick
Brutto, Mr. & Mrs. Frank
Bryan, Susan Miles
Buchanan, Rick
Buentemeier, Barbara
Buhner, Jamie
Bully, Richard
Bundige, Harold E.
Burbo, Gae
Burt, Bob
Burt, David
Burt, La Von
Busa, Mr. & Mrs. Hugo
Butler, Gene
Butler, Henry
Byrne, G.T.
Byron, Robert O.
Cabill, Sandra
Cadenas-Kelly, Barbara
Callan, Arthur D.
Callan, Nancy W.
Campbell, Larry
Carey, Meridith
Carpenter, Susan
Carr, David
Carruther, David B.
Casey, Bill
Casper, Elizabeth
Cathey, Charles E.
Cattle, Frank
Centers, Charles D.
Centers, Ruth
Chaffin, Clyde
Champlin, Mrs. Albert
Chappuis, Albert
Chessin, Meyer
Christopherson, Gary L.
Christopherson, Karlakay
Cizewski, Julie Renee
Cizewski, Mr. & Mrs. Ronald
Clarla, Urana
Clausen, Jeff
Clouter, Mr. & Mrs. R. B.
Coffman, Douglas
Coffman, Peggy G.
Cogswell, Ida M.
Cole, Floyd C.
Cole, Phylis L.
Combat Corner
Compton, Glenn
Concerned Taxpayer
Conklin, Joyce L.
Connell, Patrick
Conner, Bruce
Conner, Esther A.
Conner, Mrs. Wes (Nellie B.)
Conroy, D'Arcy V.
Conroy, Mike
Conroy, Tari R.
Converse, Leander D.
Cook, Philip W.
Coombs, Robert H.
Cooper, Carl
Cooper, Rose C.
Cooper, Sandi
Cooper, Stanton
Cory, Jack
Couture, William F.
Cox, Charlene M.
Cox, Ellie
Cox, Harold
Cox, Marion
Cox, Violet
Cox, Wade
Craft, A. R.
Craft, Bill
Craft, John J.
Crawford, Donald L.
Crawford, W. L.
Crick, Bob

Crismore, Carol
Crockford, Mary Ellen
Crosley, Ray
Crozer, Al
Cunningham, Bill
Curtis, James F.
Danelz, Greg
Davis, Caroline Hare
Davison's Service Station
Day, Mr. & Mrs. Arthur J.
Day, Kerri
Day, Martin
Day, Willis
Dean, Rosalie
Decker, Patricia
Decker, William H.
Dehner, Ray
Dello-Russo, Robert
Dembisky, Chad .
Dembisky, Mike M.
Deutsch, Bob
Dilley, John
Diversified Business & Tax Service
Dodge, Don
Donnelley, Thomas E.
Donofria, Mac
Doolittle, James
Dotson, Curtis M.
Dotson, Mary
Dowdy, Nathan W.
Downing, Sam
Drake, Art & Natalie
Duckworth, Bill
Duff, Duane R.
Dunbar, M.
Dunbar, Cary N.
Duncan, E. M. (Gene)
Duncan, Gail
Duncan, John L.
Duus, James M.
Eckert, Terry L.
Efferding, Alice L.
Eitel, Billie
Elliott, Mr. & Mrs. Eddie
Ellis, Guy R.
Ellis, Ruth W.
Ellis, Stephen S., M.D.
Ellis, Steve J.
Engel, A. E.
Engel, Celeste G.
Erickson, Kirby & Pamela
Essig, Don A.
Eustace, Mr. R.
Evans, Mr. & Mrs. Keith J.
Evans, Mark
Evers, Robert
Falconer, Phyllis
Falk, Ron & Sue
Fallon-Baker, Fay
Feisty, Russ
Fetterhoff, Mr. & Mrs. Joe
Fiehrer, Mary Ann
Fifield, Charles E.
Fifield, Evelyn
Fisher, Tana
Fisher, Keith
Fix, Florence
Fix, Robert H.
Flormann, Florence
Fogel, Karen Marvin
Ford, Daryl L.
Ford, Suzanne
Ford, Thomas A.
Forehand, Dick
Foss, Edward L.
Foss, Esther L.
Foster, Jackie
Fowler, Harry & Bertie
France, David & Susan
Francisco, Bret
Fraser, Joe
Frederick, Dennis
Frey, Richard J.
Frost, Betty
Frost, Dean
Frost, Jane
Frost, Terry
Fruitland Farms
Furhman, Ms. Marilyn
Furtney, Jerry
Furtney, Debby
Galipeau, Colleen
Gehrke, George E.
Gensemer, Pauline
Gerloff, Robert K.
Gidel, Art
Gilchrist, John M., Sr.
Gilchrist, Margery P.
Gilliland, E. B.
Glazer, Rachel
Gloege, H. B.
Goheen, Stephen
Goldsmith, Ken
Good, William R.
Goode, Mr. & Mrs. Dan
Goodhart, David T., Jr.
Gover, Kelvin
Grace, Betty

Grace, Stan
Grace, T. S.
Grace, Viola
Graham, Sharon
Grant, Don
Grant, Ken
Grant, Paula L.
Grant, R. H.
Greenly, M. L.
Greenup, Dana K.
Greenup, G. JoAnn
Greenup, Glade
Greenup, Karen
Greenup, Kenneth
Greenup, Rodney D.
Greenup, Sylvia
Greenup, Scott
Greenup, Tara K.
Gregas, Norman P.
Greeg, Pat
Grimes, Mr. & Mrs. Edward
Grove, John D.
Grover, George J.
Gutkoski, Joseph
Hadden, David
Hadley, J.
Hagen, Don
Hale, Jean A.
Hall, Susan
Hall, David O. (Bud)
Halm, Glen
Hamilton, Allen
Hamilton, Eric
Hamilton, Karen
Hammett, John F.
Hancock, Scott & Jullie
Hanneman, Janet
Hanneman, Rodney
Hanson, Doris M.
Hanson, Mike
Hanson, Sherry
Harbaugh, Alice R.
Hargett, M. V., M.D.
Hargrove, Mrs. Jay
Harmeson, James K.
Harmeson, Kimberly
Harper, C. J.
Hart, Arnold
Hartley, Miss Zelma Jean
Hartwell, David
Hasenclever, Joan L.
Hatch, Kevin J.
Hauis, Paul E.
Hawkinson, Sharon
Hayes, Florence
Hayes, John A.
Haynes, James A.
Heberling, Jon L.
Hedditch, Mr. & Mrs. Kenneth
Hedman, Wayne A.
Henk, William E.
Hettrick, Gary R.
Hilander, Sally
Hilgren, Cari
Hilgren, Carla
Hilgren, Sally
Hoblitt, Arron L.
Hocker, Philip M.
Hoffman, Don L.
Hoffman, Retta
Holland, Samuel
Holman, George H.
Holsapple, Mr. & Mrs. Pen
Homan, Forrest E.
Homan, Lois
Honey, Gene
Honey, Paul
Honican, Mr. Albert E.
Hopwood, Barbara
Hopwood, Hugh L., Sr.
Horak, George C.
Hornerkamp, Mary Anne
Horrax, David G.
Horsens, Kevan
Hotchkiss, Jack
Hoth, Dale
Houghton, W.
House, Robert S.
Hovendeck, Stan C.
Howard, Linda
Howard, Robert W.
Howe, Duane
Hoyt, Tony
Huggans, Eric
Humphrey, Georgia
Hunter, Ray
Hunter, Sylvia
Hurst, Howard
Irwin, Monte
J., David
Jackson, Jon A.
Jamison, Jean L.
Jayne, Jerry
Jellison, William L.
Jenkins, James C.
Jenkins, Mary Louise
Joachim, M.
Johnson, H. J.

Johnson, Paul A.
Jones, Lt. Col. & Mrs. B. D.
Jones, Cedron
Jones, Chris
Joron, Andrew
Joron, Leo P.
Joron, Patricia
Joslin, R. W.
Kane, Martin
Kearney, Mickey
Kearney, Tim
Kelly, Robert
Kennedy, Richard & Billie
Kennedy, Stanley R.
Khayami, J.
Kidd, Tim
Kimmel, Charles J.
Kirkness, Kim
Kitzinger, Dianne
Kitzinger, Robert W.
Klampe, Dr. Terry
Klapwyk, Patricia
Klapwyk, William
Kline, Judith
Kline, Mike
Kline, Robert
Klinger, Daniel
Knez, Edward R.
Koch, Ruth M.
Kohls, Jeannette
Kohrt, Agnes
Kohrt, Eric
Kohrt, Michael
Kohrt, Rem
Kohrt, Sara
Kolb, Al
Kowack, Mark & Dianne
Kramis, Nick
Kratofil, Rudy
Kremer, John G.
Kuspa, George M.
Kuspa, Roberta M.
La Crosse, Dan
La Que, Curt
La Que, Merrill
Laaksoharju, Teresia
Lackman, David B.
Lafond, Lloyd
Lagerstrom, Dean H.
Lagerstrom, Mark
Lagerstrom, Maxine
Lamar, Sharon
Lambert, Anne Sunderman
Lambutus, F. A.
Langenderfer, M.
Langley, Jeff
Larkin, Bud
Larkin, Shirley
Lawrence, Russell W.
Lay, George G.
Lay, Margaret P.
Leach, Leona E.
Leavens, Don
Leavens, Suzanne
Leenhout, Robin
Leifer, Bonnie R.
Lewing, Mark
Lewis Controls, Inc.
Lewis, Roger D.
Lindquist, Chris
Lindsey, Roy
Liss, Barbara
Little, Warren
Livingston, Mrs. Ed
Locatelli, Mario
Locke, Charlene
Locke, Mary
Lockhart, Richard J.
Lodmell, Donald L.
Lodmell, Donald & Jone
Loftis, Dennis F.
Logan, Leon D.
Lossine, Neva
Lossing, Dulmas
Loucks, Kenneth M.
Loucks, Patrice
Louis, Paulette
Lovitt, Pauline T.
Lubke, Bill
Luedecke, Robert B.
Luhisen, Shirley
Lydig, Dean A.
Lynch, Skip
Lynes, John (Brad)
Mabbott, Charles
Mac Lachlan, Shirley
Mackie, Terry H.
Mackin, Carole
Maclay, Bruce H.
Maclean, Priscilla
Maentz, Frances
Maloit, Bill
Mann, Richard L.
Marehitto, Kevin S.
Mares, Mr. & Mrs. Barney
Marino, Joe
Marks, Ken
Marshall, Hal & Marylou

Martin, Lilli Ann
Mason, Gary
Mathews, Neil
Matteson, Mollie Y.
Matthews, Jean M.
Maughan, Ralph
Maxwell, Carol
Maxwell, Randy
Maydole, Betty
Maydole, Jerry
Maydole, John W.
Maydole, Shirley
Maydole, Wesley
Mc Kelvey, Mavis
McArther, Thomas
McArthur, Bruce
McCaulay, Carley
McCoy, Mary
McCready, Bill
McCready, Lois
McDonald, James P.
McDougal, Susan
McEntee, Pamela
McKay, Tim L.
McKinley, William & Thelma
McKinney, Gordon W.
McKinney, Nancy G.
McQuaid, Shirley
Meis, Rick
Merritt, Theresa
Merritt, Vella
Merritt, William J.
Miles, Joan
Miller, Beth
Miller, Pete
Miller, Stewart E.
Miller, Yvonne M.
Milner, Doris H.
Milner, Eric C. B.
Mitchell, Norma
Mitchell, Robert
Modrall, Ronald
Mohn, Carl M.
Moncure, Peyton
Montagne, Joan W.
Montagne, Phoebe
Monteith, Amy
Moreland, Mark
Morris, Floyd
Morris, Joyce
Morris, Pat A.
Mosbrucker, Gary N.
Mosbrucker, Steven
Mousley, Larue
Munoz, Peggy
Munson, John F.
Murie, Margaret
Murphy, Tom
Murray, Ester
Murray, Landon & Audrey
Nardini, Tim A.
Neely, L. L.
Nelsen, Walter
Nelson, Fred
Nelson, Lynn
Nelson, Mrs. Walter
Newkirk, John D.
Newton, Ronald A. & Edna
Nichols, Mike
Nichols, Pam
Nichols, William Gray
Nicholls, Jerry
Nicolet, Frances P.
Nicolet, Samuel C.
Nobles, Terry
Noffsinger, Mr. & Mrs. R.
Nutt, Pete
Nuttall, William A.
O'Keefe, Mark
O'Neill, Jeanne E.
Odell, David
Odell, James E.
Odmark, Ted P.
Ohl, Glenn M.
Olason, Matt
Olive, Gilda
Olive, Max
Olsen, Ed
Olson, James W.
Olson, Steve R.
Orndoff, David
Oset, Bob
Owen, Cora Rust
Owens, Dustin
Paddock, De De
Paddock, Lance J.
Paddock, Lynette
Paddock, Todd
Palin, Dave
Palin, George & Cecilia
Palmer, Dennis
Palmer, Dorothy
Park, Terry
Parker, John P.
Parshall, Mr. & Mrs. Max
Pearce, Mr. & Mrs. John
Peirano, Margret
Peirano, Nicholas

Perkins, Naomi
Perry, Earl
Perry, John
Peterson, Leonard
Pettit, Alvin
Pettit, Mrs. Alvin
Pettit, Robert
Phelps, James
Pickens, Jim
Pierce, Larry
Pierce, Everett
Pieroni, Carol
Pile, Delbert W. & Mildred A.
Pines, Edward J.
Plakke, Terrill
Porter, Alta
Porter, Donald E.
Porter, Ronald M.
Porter Russell
Porter, Wanda
Posewitz, Jim
Potter, Rachel & Jack
Powell, Naomi
Powers, Elizabeth M.
Preikszas, O. J.
Preston, John
R&R Financial Services
Rainbolt, Wynn M., III
Rall, Merri Ann
Rall, Merry Jo
Rall, Roger
Ralston, Kelly
Ralston, Scott
Ralston, Steve
Rankin, Joseph N.
Rassmussen, Willard
Ratcheson, Peggy
Raymond, Michael
Reed, Beth
Reed, N.
Reeves, John T.
Regan, Margaret
Reiman, Robert T.
Renn, Aunita
Rennaker, Dale
Rennaker, Donna
Rennaker, Margarie
Rennaker, Mick
Rennaker, Millard
Rennaker, Paul
Rennaker, Randy
Richards, Belle
Richards, Paul
Richie, Ronald H.
Rickett, Barbara
Ridenour, Alice M.
Rider, Mr. Gaile
Rider, Mrs. Gaile
Ring, Gerald
Rister, Carla J.
Robinson, Catherine A.
Robinson, F. Philpse
Robinson, John
Robinson, John B.
Robinson, Larry
Robinson, Lee
Robinson, Olive & Roger
Roe, Bert
Roff, Donald
Rosa, Marion H.
Rosetta, Noel
Roszell, Hope
Roy, Tom
RT. K.
Ruark, Todd
Ruffatto, Tom
Rummel, Clyde
Rummel, Verda
Rupp, G. L.
Ryan, Wayne H.
Ryman, Dale
Sain, Dorene
Sain, Richard
Saladin, Evelyn
Salisbury, John
Saltus, John L.
Saltus, Patricia A.
Sanford, William T.
Satterlee, Royce
Scheffler, Ralph
Schmid, John
Schmitt, Dorothy
Schmitt, Larry D.
Schmitz, Peter J.
Schneiter, Steve
Schoeneman, Cheryl
Schoeneman, Christopher
Schoeneman, Samantha
Schott, Joseph C.
Schuldberg, David
Schultz, Alan E.
Sewell, Robin
Sewell, Tom R.
Sexton, Mary
Shallenberger, Ed
Shapley, Mark D.
Shrier, Mary
Siebert, Sue H.

Simkins, Mark
Simkiss, Kym
Simpson, Robert & Mary
Sipma, Astrid
Sipma, Janette
Sipma, John
Sitbon, Marc
Skari, Arlo
Sliper, John
Smaus, Mr. & Mrs. Roy
Smith, Andy
Smith, Bettye
Smith, Cot
Smith, Peg
Smith, R. E.
Smith, Robert F.
Smith, Roy K.
Smith, Scot
Smith, Shirley
Smith, Susan G.
Snyder, David & Sandy
Snyder, Elaine
Solberg, Ray W.
Soll, Herman & Mildred
Sparks, Ed
Sparks, Nan
Springer, Fred
Springer, John
Starkey, Bill
Steckel, Roy
Steckel, Ruth W.
Steele, Barbara
Steele, Gary
Steele, Mike
Steinbrugger, Jeane
Steinbrugger, Martin L.
Steiner, Beverly
Steiner, Robert
Stephani, Barbara J.
Stephens, Roxie L.
Stewart, Randy L., M.D.
Stoltz, Gail M.
Story, Jim
Stromme, Kenneth H., Jr.
Strong, Sandra
Strout, Jan
Strub, J. W.
Strub Mrs. J. W.
Stults, John E.
Sullivan, Bertha
Sullivan, George
Summers, Jani
Sunderman, Mr. & Mrs. W. J.
Suttell, Steve
Swanson, John R.
Swift, B. A.
Swift, Betty
Taylor, Cynthia E.
Taylor, Michael E.
Taylor, Phil
Taylor, Terry Y. & Samuel R.
Teller, Otto H.
Tessicini, Loreto
Thomas, Julie M.
Thomas, William, A.
Thompson, David R.
Thurman, Shellia
Thurston, Bill
Thurston, Patty
Thurston, Edward L.
Tingle, Marion & Eugene
Tintzman, Steve
Torre, Richard
Tout, Evelyn
Trautman, Mike
Tripp, Norman
Trowbridge, Dennis M.
Turk, Butch
Turner, Bob
Turner, Ray A.
Twardoski, Ric
Tweten, Marlen
Underwood, Ardith
Untermyer, Elise S.
Utzinger, Charles
Vadheim, Kirsten L.
Vallance, Barbara
Vallance, Geneara
Vallance, Mr. & Mrs. De Loss
Vallance, Jack
Vallance, May
Vansaher, Ernest & Dorothy
Veeder, Ben
Vekony, Natalie
Vickers, Leila
Vining, C. E.
Vining, Alma Rose
Vogel, Bill
Vogt, George
Volk, Christopher
Voth, Darrell
Wadsworth, Connie
Wadsworth, Dallas
Wadsworth, Mabel
Waliser, James D.
Walker, Donna M.
Walker, James C.
Walker, Marc

Walkins, Nancy G.
Wallace, Stephen
Walley, Dorothy
Wanstrath, Don
Wanstrath, Winston
Ward, Mary
Ward, Mike
Washburn, David
Watson, Vicki
Wawra, Brian
Webber, Douglas
Webster, T. R.
Wedell, Jacelyn
Wehrly, Kathy
Weinstoin, Dan
Weiss, Dr. & Mrs. Martin
Wells, Allen E.
West, Manning
West, Mike
West, Winnifred L.
Westerlund, Lilly
Wetzsteon, Gene
Wetzsteon, William & Lois
White, Robert L.
Whitesitt, David D.
Whitlow, Floyd M.
Whitney, Hannah L.
Wiederspan, C. A.
Wilcox, Terri
Wildey, Ann
Wildey, Art
Wildey, Jerry
Wildey, Russell W.
Wildey, Sherry
Williams, Jennifer
Williams, Lucille
Williard, Rollen
Willson, Gib
Wilson, Reginald A., Jr.
Winters, Donald
Wiseman, Dan
Wiseman, Sheila
Wissenbach, Charles E.
Wolf, James R.
Wood, Floyd
Wood, William G.
Woodgerd, Joann
Woodgerd, Wes
Woodhull, Wilma
Wright, Charles & Lena
Wright, Earl & Marjorie
Wrobel, Jean
Wuerthner, George
Wurster, Mr. & Mrs. Scott
Yanishevsky, Rosilind
Yenne, Mrs. Anne
Yenne, Harry
Zabel, Gary L. & Clarice
Zackheim, Hugh
Zeiler, Philip
Zeiler, Sylvia
Zimmerly, Enid A.
Zulauf, Jonette R.

E. Agencies, Organizations, Groups, and Individuals to Whom the Environmental Impact Statement was Sent

Abbey, Donald F.
Abbot, Bill
Abbot, Charlene
Abbott, Ray
Abell, Russell Mr. & Mrs.
Advisory Council on Historic Preservation
Adza, John
Alameda, Craig
Aldrich, Donald
Allison, Janet R., PHD.
Almquist, Marty
Alt, Dave & Sandy
Althen, Phillip C.
Ambelang, Linda
American Motorcyclist Association
American Smelting & Refining Company
American Wilderness Alliance
AMFAC
AMOCO Production Company (Denver Region)
Anaconda Leader
Anaconda Pintler Wilderness Association
Anaconda Sportsmen's Club
Anderson, Hal
Anderson, Elaine I.
Anderson,Edie
Anderson, Walter A. & Janice
Angle, Ross

American Fisheries Society (Missoula, MT)
American Fisheries Society (Kalispell, MT)
American Forestry Association
Arco Exploration Company
Armstrong, Robert R.
Arrington, George
Arnold Arnett & Associates
Associated Press
Arno, Steve
Atwood, Craig
Atwood, Richard
Austin, Alice
Ayers, Geni
Azzarello, Jayne
Backcountry Horseman (Bitterroot)
Backcountry Horseman (Missoula)
Backcountry Horseman (Mission Valley)
Bacon, George
Bailey, Carl
Bailey, Dana
Bailey, Gail
Bailey, Mary
Bailey, Jeanine
Bain, Russ
Baird, Dennis
Baker, Dale
Baker, Darcy
Baldwin, Carl & Florence
Bandy, Bob
Banner, Welder LG
Barker, Robert & Robin
Barneson, June Roth
Barnett, Phillip
Barngrover, Jim
Barrett, Sanford & Maxine
Barringer, Bill
Barringer, Elaine
Barringer, Lyle D.
Barringer, Brad
Barrow, G. M.
Bartholomew, Robert C.
Bartlett, Roy Dan
Batt, Roger
Battaion, Mark
Baucus, Senator Max
Bauer, Mrs. Bonita
Zeason, Dennis A.
Beck, Bob
Bedey, Frank W., Jr. & Bette J.
Bedey, Mike
Bedey, Robert E. & Arlene M.
Beebe, Teddye L.
Beer, Mary S.
Behling, Gerald A.
Behrman, Mark & Susan
Bell, Dr. Fritz
Bell, Marvin
Benche, Errol D.
Bennett, Sue
Bergren, Philip
Bergren, Terry
Bernofsky, Jo Ann
Bielenberg, Mary
Billings, Sam T.
Bingaman, Alan & Bonnie
Bingaman, Fred & Maxine
Biship, Bill
Bishop, Richard T.
Bitter Root Gem & Mineral Society
Bitterroot Bark Company
Bitterroot Chamber of Commerce
Bitterroot Community Federal Credit Union
Bitterroot Conservation District
Bitterroot Log Homes
Bitterroot Operators Group
Bitterroot Video
Bjornigner, Randy
Blair, Danny
Blair, David
Blair, Debra
Blanchard, R.W.
Blank, Debby
Blevins, Sally
Block, Daniel G.
Blood, W. A.
Bloom, Marshall, Dr.
Bloom, Jerry I. & Tama
Blun, Richard
Boesch, Mark
Boese, Richard
Bohannon, Raymond F.
Boland, John
Bolle, Dr. Arnold W.
Bonnett, Ivan E. & Elsie R.
Boody, Bruce
Bopp, Kevin
Borkoski, J. F.
Borniger, Randy
Boulter, Don S.
Bove, Cliff
Bowler, Donna
Bowler, Stephen W.
Bowles, Ray
Bowman, Warren & Edith
Boyer, Robert A.
Braach, Edward E.
Braden, Byron

Brader, Tom & Joyce
Bradley, Homer L.
Bradshaw, Memil
Bradt, William C.
Brandborg, Ruth M.
Brandon, Earl
Brasel, Carol
Brehner, Jamie
Briggs, Phil
Brist, Wilma
Broadwater, M.
Broadway Splicing & Supply
Brock, Janet M.
Bromley, Doug
Brookman, Robert L.
Brookshire, David S.
Brosseau, Mark
Browman, Ludvig G.
Brown, Alex
Brown Bill
Brown, Cathy
Brown, Faye
Brown, Lon
Brown, Rick
Brown, Reed & Karen
Brown, Rod
Brown, Scott
Brundige, Harold E.
Bruno, Earl R.
Brutto, Frank & Sallie
Bryan, Susan Miles
Buchanan, Rick
Buentemeier, Barbara
Bully, Richard
Burk, Dale
Burke, Pat
Burt, Bob & Lavon
Busa, Mr. & Mrs. Hugo
Bush, Larry
Butler, Gene
Butler, Henry E.
Butte Library
Butterwood, Jack
Byrd, Mrs. Milton D.
Byrne, G.T.
Byron, Robert O.
Cabill, Sandra C
Cadenas-Kelly, Barbara
Callan, Arthur D. & Nancy W.
Caluori, Pete
Calvart, Ruth E.
Campbell, Larry
Cargile, Betty
Carpenter, Susan
Carpita, Jim
Carr, David
Carricker, Robert C.
Carruther, David B.
Cartier, Kenn
Casey, William V., Jr.
Casper, Elizabeth A.
Cathey, Charles E.
Centers, Charles & Ruth
Chaffin, Clyde
Chaffin Creek Ranch
Champion Timberlands
Champlin, Mrs. Albert
Chandler, Michael
Chaney, Clifford
Chappuis, Albert
Chessin, Meyer
Chinn, Larry
Christensen, Dean
Christopherson, Gary & Karlakay
Citizens Against Clearcutting
City Electric
Cizewski, Mr. & Mrs. Ronald
Cizewski, Julie Renee
Clark, Dwayne
Clark, Richard
Clausen, Jeff
Clearwater Economics Development Assoc.
Clearwater-Potlatch Protective Assoc.
Clouter, Mr. & Mrs. R. B.
Coates, Jay
Coeur D'Alenes Company
Coffman, Douglas G. & Peggy G.
Cogswell, Ida M.
Cole, Floyd C. & Phylis
Colorado State University Library
College of Mineral Science & Technology
Columbia River Inter-Tribal Fish Commission
Community Gas & Oil
Compton, Glenn
Congdon, Wally
Conklin, Joyce L.
Connell, Patrick
Conner, Bruce
Conner, Mike & Esther A.
Conner, Pat
Conner, Mrs. Wes (Nellie B.)
Conoco Incorporated
Conroy, Mike & Tari R.
Conroy, D'Arcy V.

Dembisky, Mike M.
Dembisky, Chad
Dietrich, Tom
Dilley, John
Dir. West Reg. Pks. Canada
Diversified Business & Tax Service
Diversified Plastic
Dodge, Don
Don Hatch River Exp. Inc.
Donnelley, Thomas E.
Donofrio, Mac
Doolittle, James
Dowdy, Nathan W.
Dowell, D. L.
Downen, Jay
Downing, Sam
Drake, Art & Natalie
Duckworth, Bill
Duff, Duane R.
Dunbar, M. & Cary N.
Dunbar Sawmill
Duncan, E. M. (Gene)
Duncan, Gail
Duncan, John L.
Duus, James M.
Eakin Ridge Outfitters
Earth First
Eastern Montana College
Eastern Montana College Library
Eastern Wasington Dirt Riders
Eckert, Terry L.
Efferding, Alice L.
Efken, David A.
Egenhoff, Terry
Eitel, Billie
Elliott, Mr. & Mrs. Eddie
Ellis, Stephen S., M.D.
Ellis, Guy R.
Elser, Arnold "Smoke"
Elwood Masoner's
EMC Outdoor Program
Engel, A. E.
Engel, Celeste G.
Environmental Information Center
Environmental Protection Agency
Erickson, Kirby & Pamela
Erickson, Lill
Ermatinger, Dan
Essig, Don A.
Estes, Russell E.
Eustace, Rene
Eustace, Mr. R.
Evans, Mr. & Mrs. Keith J.
Evans, Mark
Continental Divide Trail Society
Converse, Leander D.
Cook, Fred
Cook, Mr. & Mrs. Del
Cook, Philip W.
Cooley, Earl
Coombs, Robert H.
Cooper, Sandi
Cooper, Carl
Cooper, Stanton
Cory, Jack C.
Couture, William F.
Cox, Charlene M.
Cox, Mrs. Dorothy B.
Cox, Ellie
Cox, Harold & Marion
Cox, Violet
Cox, Wade
Craig, Representative Larry
Craft, A. R.
Craft, John J.
Craft, William
Crandall, Doug
Crawford, Donald L.
Crawford, W. L.
Crick, Bob
Crismore, Carol
Crockford, Mary Ellen
Crosley, Ray
Crozer, Al
Cummings, Clifford
Cummins, Leo
Cunningham, Bill
Curtis, James F.
D Bar 6 Outfitters
Danelz, Greg
Darby Library
Darby Lumber, Incorporated
Davidson, Mrs. Ray
Davis, Barbara
Davis, Caroline Hare
Davison's Service Station
Daw, Del
Day, Mr. & Mrs. Arthur J.
Day, Kerri
Day, Martin
Day, Willis
De Bates, Susan
Dean, Rosalie
Decker, Patricia
Decker, William H.
Defenders of Wildlife
Dehner, Ray
Dello-Russo, Robert

Evans, Thomas E.
Evers, Bonnie
Evers, Lawrence
Evers, Robert
Exxon Company USA
Fahey, Dr. Timothy J.
Falk, Ron & Sue
Fallon-Baker, Fay
Federal Energy Regulatory Commission
Feisty, Russ
Felice, Pat
Fetterhoff, Mr. & Mrs. Joe
Fickbohm, Caren Lynn
Fiehrer, Mary Ann
Fifield, Charles & Evelyn
Finley, Ray
Fisher, Tana
Fisher, Keith
Fix, Robert H. & Florence
Flathead Culture Commission
Flormann, Florence
Fogel, Karen Marvin
Ford, Alene
Ford, Daryl L.
Ford, Suzanne
Ford, Thomas A.
Forehand, Dick
Forest Planning
Forsgaard, Karl
Fort Lewis Library
Foss, Edward L.
Foss, Esther L.
Foster, Jackie
Foust, John
Fowler, Harry & Bertie
Fox Lumber Sales
France, David & Susan
Francisco, Bret
Fraser, Joe
Frazier, Walter
Frechette, Joe & Nancy
Frechette, Mary
Frederick, Dennis
Fredericks, Paul E.
Frey, Richard J.
Frost, Dean & Betty
Frost, Jane
Frost, Terry
Fruitland Farms
Furhman, Ms. Marilyn
Funsch, Daniel
Furtney, Debby
Furtney, Jerry
Galipeau, Colleen
Garnellia, Pauline E.
Gehrke, George E.
Gensemer, Pauline
George, Clem E.
Gerloff, Robert K.
Getty Mining Company
Bigson, Arnold R.
Gidel, Art
Gilliland, E. B.
Glacier-Two Medicine Alliance
Glazer, Rachel
Gloege, H. B.
Godfrey, Al
Goheen, Stephen
Golay, John
Gold Cup Expl. Inc.
Goldfield Mining Company
Goldsmith, Ken
Good, Bill
Goode, Mr. & Mrs. Dan
Goodhart, David T., Jr.
Goodwin, Albert E. & Chris
Goodwin, John & Dan
Gordon, Mrs. G. A.
Goss, Steven Lee
Gover, Kelvin
Governor's Planning Task Force
Grace, Stan & Betty
Grace, T. S.
Grace, Viola
Graham, Sharon
Grainger, Carl
Grangeville Library
Grant, Don
Grant, Ken
Grant, R. H. & Pamela L.
Greenly, M. L.
Greenup, Dana K.
Greenup, A. Glade & G. JoAnn
Greenup, Dana
Greenup, Kenneth & Sylvia
Greenup, Rodney, Karen and Tara
Greenup, Scott
Greer, Mildred F.
Gregas, Norman P.
Greeg, Pat
Gregory, Gordon
Gretner, Carrie
Grimes, Edward & Catherine
Grove, John D.
Grover, George & Hazel
Guhrt, George
Gulf Oil Products Company
Guthrie, Diane

Gutkoski, Joseph
Haagensen, David
Habeck, Dr. James
Hadden, David
Hadley, J.
Hagdorn, Bill
Hagen, Don
Hale, Jean A.
Hall, David O.
Hall Lumber Company
Hall, Susan
Halm, Glen
Hamilton, Allen
Hamilton, Eric & Karen
Hamilton City Council
Hamilton City Library
Hammer, Bill
Hammett, John F.
Hammond, Jerome
Hancock, Scott & Julie
Hanneman, Rodney & Janet
Hanson, Doris M.
Hanson, Mr. & Mrs. Mike
Happy Saddle Tramps
Harbaugh, Alice R.
Harbaugh, De Anne
Hargett, M. V., M.D.
Hargett, Overton
Hargrove, Mr. & Mrs. Jay
Harmeson, James K.
Harmeson, Kimberly
Harper, C. J.
Harris, Elsie Owen
Hart, Arnold
Hartley, Miss Zelma Jean
Hartwell, David
Hasenclever, Joan L.
Hatch, Kevin J.
Hauis, Paul E.
Hawkinson, Sharon
Hayes, John A. & Florence
Haynes, James A.
Hays, Samuel
Hayword, William
Hearst Free Library
Heberling, Jon L.
Hedditch, Mr. & Mrs. Kenneth
Hedman, Wayne A.
Heller, Harland H.
Hellickson, Mrs. Delbert
Hendrickson, Graig
Henk, William E.
Henry, George K.
Herman, Wayne
Hettrick, Gary R.
High Country News
Hilander, Sally K.
Hilgren, Cari
Hilgren, Carla
Hilgren, Sally
Hill, O. D.
Hoblitt, Arron L.
Hocker, Philip M.
Hoefle, H. C.
Hoffman, Don L.
Hoffman, John
Hoffman, Retta
Holland, Samuel
Holman, George H.
Holsapple, Haven & Margaret
Holsapple, Pen H.
Homan, Forrest E.
Honda of Hamilton
Honey, Paul
Honey, Gene
Honican, Mr. Albert E.
Hoppie, Katherine K.
Hopwood, Barbara
Hopwood, Harold
Hopwood, Hugh L., Jr.
Hopwood, Hugh L., Sr.
Horak, George C.
Hornerkamp, Mary Anne
Horrax, David G.
Horsens, Kevin
Hotchkiss, Jack
Hoth, Dale
Houghton, Edward E.
Houghton, W.
House, Robert S.
Hovendeck, Stan C.
Howard, Robert W. & Linda
Howe, Duane
Howe, George
Hoyt, Tony
Hudson, Susan
Huggans, Eric
Huls, Dave
Humphrey, Georgia
Humphreys, Mr. & Mrs. James
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Hunter, Sylvia
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Hydro-Point Engineering Company
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Idaho Attorney General
Idaho Bureau of Water Quality

Idaho Conservation Lg.
Idaho County Commissioners
Idaho Department of Agriculture
Idaho Department of Fish & Game
Idaho Department of Lands
Idaho Department of Parks & Recreation
Idaho Department of Water Resources
Idaho Division of Economic & Community Affairs
Idaho Division of Environment
Idaho Division of Aeronautics & Public Transportation
Idaho Environmental Council
Idaho Free Press
Idaho National Resource Legal Foundation
Idaho State Historical Society
Independent Record
Inland Forest Resource Council
Inland Reg. Coun of NCap
Intermountain Forestry Service
J., David
Jackson, Jon A.
Jackson, Laura
Jacobsen, Lowell
Jacobsen, Norman
Jamison, Jean L.
Jasmin, Chip & Amy Dittmaier
Jayne, Jerry
Jellison, William L.
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Jenkins, Mr. & Mrs. James
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Jimenez, Charles
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Johnson, Janet
Johnson, Michael
Johnson, Paul A.
Johnson, Sherri
Jones, Cedron
Jones, Chris
Jones, Lt. Col. & Mrs. B. D.
Joron, Andrew
Joron, Leo P.
Joron, Patricia
Joslin, R. W.
Julio's Painting
John Jump Trucking, Inc.
Kane, Martin
Kantor, Mike
KDXT 93 - KGRZ Radio
Kearney, Mickey
Kearney, Tim
KECI Television
Kellett, Michael
Kelly Logging
Kelly, Robert
Kendrick, George
Kennedy, Richard & Billie
Kennedy, Stanley R.
KGVO Radio
Khayami, J.
Kidd, A. William & Joan C.
Kidd, Tim
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Kirkness, Kim
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Klapwyk, Mr. & Mrs. William
Kleese, Michael
Kline, Robert & Judy
Klinger, Daniel
KLYQ Radio
Knez, Edward R.
Kock, John
Koch, Ruth M.
Kohls, Dr. & Mrs. Glen M.
Kohrt, Agnes
Kohrt, Eric
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Kohrt, Sara
Kolb, Al
Kostow, Kathryn
Kowack, Mark & Dianne
KPAX Television
Kramis, Nick
Kratofil, Rudy
Kremer, John G.
Krueger, Jan
KUFM
Kuspa, George M. & Roberta M.
KYLT Radio
KYSS Radio
Laaksoharju, Teresia
Lackman, David B.
Lafond, Lloyd
Lagerstrom, Dean H. & Maxine
Lagerstrom, Mark
Lakes, Greg
Lamar, Sharon
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Lambutus, F. A.
Langenderfer, M.
Langley, Jeff
Laque, Curt
Laque, Merrill

Larkin, Bud & Shirley
Larson, J. Lyn
Lawrence, Russell W.
Lay, George & Margaret
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Leach, Earl
Leach, Leona E.
League of Women Voters
Leavens, Don & Suzanne
Leffingwell, Annie M.
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Lemhi Soil & Water Conservation District
Lenthold, Pam
Lere, Mark
Lester, George
Lewing, Mark
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Lewis, Robert
Lewis, Roger D.
Liefer, Bonnie R.
Lienemann, John
Likes, Charles
Lindquist, Chris
Lindsey, Roy
Liss, Barbara
Little, Warren
Livingston, Mrs. Ed
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Locke, Gary
Locke, Mary
Locke, Steve
Lockhart, Richard J.
Lodmell, Donald L.
Loftis, Dennis F.
Logan, Leon D.
Long Machinery
Lossing, Dulmas
Lotan, James
Loucks, Kenneth M. & Patrice
Louis, Paulette
Lovitt, Pauline T.
Lu, Joseph
Lubke, Bill
Lucas, Bob
Luedecke, Robert B.
Lukes, Andy
Lundberg, Dean
Lydig, Dean A.
Lynch, Skip
Lynes, John (Brad)
Lyons, Don
Mabbott, Charles
Mac Lachlan,Shirley
Mackie, Terry H.
Mackin, Carole
Maclay, Bruce H.
Maclean, Priscilla
Maentz, Frances R.
Main, William
Majors, Dave
Malahowski, Randy
Maloit, Bill
Mann, Richard L.
Marathon Letourneau Sales
Marcum, Les
Marehitto, Kevin S.
Mares, Mr. & Mrs. Barney
Marino, Joe
Marks, Ken
Marks, Selena
Marlenee, Representative Ron
Marshall, Hal & Marylou
Martin, Bud
Martin, Lilli Ann
Martin, Lisa
Mason, Gary
Masterlog Homes, Inc.
Mathews, Neil
Matteson, George
Matteson, Mollie Y.
Matthews, Jean M.
Mauer, Jack
Maughan, Ralph
Maxwell, Randy
Maxwell, Carol
Maydole, Jerry
Maydole, John & Elizabeth
Maydole, Shirley
Mayer, Doug
McKinney, Gordon
McArthur, Bruce
McArthur, Thomas
McCall, Glenn
McCaulay, Carley
McClure, Senator Jame
McConnell Industries
McCoy, Dwight
McCoy, Mary
McCoy, Mr. & Mrs. Ralph
McCready, Mr. & Mrs. Bill
McCulley, James H.
McDonald, James P.
McDougal, Susan
McEntee, Pamela
McFarland Cascade
McFredrick, Jack

McGowan, Grace
McGowan, Tom
McKay, Tim L.
McKelvey, Mavis
McKinley, William & Thelma
McKinney, Gordon W. & Nancy G.
McNinch, Ted
McQuaid, Shirley
Meis, Rick
Melcher, Senator John
Melnarik, Leonard
Melts, Harry
Merritt, Gary D.
Merritt, William D. & Vella V.
Merritt, William J. & Theresa
Mikesell, John
Miles, Joan
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Miller, Charles B.
Miller, Pete & Yvonne
Miller, Stewart E.
Miller, Tom
Milner, Eric C. B.
Milner, Doris H.
Minerals Exp. Coalition
Missoula County Conservation District
Missoula County Library
Missoula County Planning Office
Missoula Snowgoers
Missoula White Pine Sash
Missoulian
Mitchell, Gary
Mitchell, Robert & Norma
Mitchell, William
Modern Machinery
Modrall, Ronald
Mohlenbrock, Robert
Mohn, Carl M.
Moncure, Peyton
Monroe, B. K.
Montagne, Joan W.
Montagne, Phoebe
Montana 4x4 Association
Montana Advisory Commission
Montana Association of Conservation Districts
Montana Bold Company
Montana Bow Hunter's Association
Montana Department of Agriculture
Montana Department of Commerce
Montana Department of Fish, Wildlife & Parks, (Helena)
Montana Department of Fish, Wildlife & Parks (Missoula)
Montana Department of Forestry
Montana Department of Health & Environmental Sciences
Montana Department of Natural Resources & Conservation
Montana Department of State Lands (Helena)
Montana Department of State Lands (Missoula)
Montana Historic Preservation Office
Montana Logging Association
Montana Lumber Sales
Montana Mining Association
Montana Petroleum Association
Montana Pole & Treating Plan
Montana Power
Montana Snowmobile Association
Montana Standard
Montana State Clearinghouse
Montana State University Library
Montana Wilderness Association (Hamilton)
Montana Wilderness Association (Helena)
Montana Wildlife Federation
Montana Women in Timber
Montana Wood Products Association
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Morris, Floyd
Morris, Joyce
Morris, Pat
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Murray, Fred & Clara
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National Forest Products Association
National Marine Fisheries Service
National Off-Road Bicycle Association
National Wildlife Federation
National Woolgrowers Association
Natural Resource Def. Council
Nature Conservancy
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Olive, Max & Gilda
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Olson, James W.
Olson, Steve R.
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Oset, Bob
Osterheld, Keith
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Paddock, Lynette
Paddock, Lance J. & De De
Paddock, Todd & Lynette
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Palin, George & Cecilia
Palmer, Clyde
Palmer, Dennis
Palmer, Dorothy
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Parker, John P.
Parshall, Mr. & Mrs. Max
Pascucci, Mike & Bonnie
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Peterson, Ernest
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Porter, Donald E.
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Ravalli Republic
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Recorder Herald
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Richards, Paul
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Rister, Carla J.
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Robinson, Lee
Robinson, Roger & Olive
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Roe, Bert
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Rosa, Marion H.
Rosetta, Noel
Roszell, Hope
Rouse, Jon
Rouse, Kevin
Roy, Tom
RT, K.
Ruark, Todd
Ruffatto, George
Ruffatto, Tom
Rummel, Mr. & Mrs. Clyde
Rupp, G. L.
Ryan, Wayne H.
Sain, Dorene
Sain, Richard
Saladin, Evelyn
Salem Equipment
Salfen, Dion
Salisbury, John
Salmon Library
Salmon Search & Rescue
Saltus, John L. & Patricia A.
Sanchez, J.
Sanders, T.
Sanford, William T.
(Francis) Sargent Logging Co.
Satterlee, Royce
Sayen, Jamie
Scheffler, Claudia
Scheffler, Ralph
Schlegel, Louis W.
Schmid, John
Schmitt, Alvin F.
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Schneiter, Steve
Schoeneman, Cheryl
Schomaker, Dr. John
Schuldberg, David
Schultz, Alan E.
Schurman Machine Incorporated
Scott, Bob
Senn, Kenneth
Severson, Senator Elmer
Sewell, Tom R. & Robin
Sexton, Mary
Shallenberger, Ed
Shannon, Dr. Richard
Shapley, Mark D.
Shelton, Mike
Shew, Dr. Richard
Shiffman Industrial Service
Shrier, Mary

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Sierra Club, Leg. Defense Inc. (Denver, Colorado)
Sierra Club, North Plains Region (Sheridan, Wyoming)
Sierra club, River of No Return Task Force (Boise, Idaho)
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Simkins, Ron & Colleen
Simms, Senator Steve
Simpson, Robert D. & Mary
Sipma, John & Astrid
Sipma, Janette
Sitbon, Marc
Sizer, Bob
Skari, Arlo
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Sleeping Child Planning Group
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Slocumb, Steve & Donna
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Smith, Peg
Smith, R. E.
Smith, Richard
Smith, Robert F. & Bettye
Smith, Roy
Smith, Scott
Smith, Shirley A.
Smith, Susan
Snyder, David & Sandy
Snyder, Elaine
Snyder, John E.
Snyder, Stanley
Solberg, Ray W.
Soll, Herman & Mildred
Spannuth, Ed
Sparks, Ed
Sparks, Nan
Spieth, Chuck
Spokane Resident Physicians
Springer, Fred
Springer, John
Stallings, Representative Richard
Stanton, David
Starkey, Bill
Steele, Gary & Barbara
Steele, Mike
Steinbrugger, Martin L. & Jeane
Steiner, Robert & Beverly S.
Stephani, Barbara J.
Stephens, Ron H. & Roxie L.
Stevensville Library
Stewart, Randy L., M.D.
Stockholm, Parker
Stoltz, Gail M.
Stoltze-Conner Lumber Company
Story, Jim
Stout, Dr. Ben
Stromme, Kenneth H., Jr.
Strong, Sandra
Strout, Jan
Strub, Mr. & Mrs. J. W.
Stults, John E.
Sullivan, Bertha
Sullivan, George
Summers, Jani
Sunderman, Mr. & Mrs. W. J.
Suttell, Steve
Suzuki, Kevin
Swanson, John R.
Sweet, Donald
Taggart, Gary
Taylor, Cynthia E.
Taylor, Michael E.
Taylor, Mildred
Taylor, Philip
Taylor, Samuel & Terry
Teller, Otto H.
Terramin, Mike
Tessicini, Loreto
Texaco, Denver Division
Thoft, Representative Robert
Thomas, Representative Fred
Thomas, Julie M.
Thomas, William
Thompson, David R.
Thompson, Lisa
Thrailkill, Dave
Thurman, Shellia
Thurston, Bill
Thurston, Edward L.
Timberline Log Homes
Tingle, Eugene & Marion
Tintzman, Steve
Torque-A-Matic
Torre, Richard
Tout, Evelyn
Townsend, Ernest
Trautman, Mike
Tripp, Norman R.
Trobaugh, Allen
Trogdon, Spence

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Tucker, Peter
Tucker, Pat
Turk, Butch
Turner, Bob
Turner, Ray A.
Twardoski, Ric
Tweten, Marlen
U.S. Corp of Army Engineers
U.S. Department of Agriculture:
  Agricultural Stabilization & Conservation Service, Washington, D.C.
  Extension Service, Washington, D.C.
  Forest Service
    Beaverhead National Forest
      Wisdon Ranger District
    Boise National Forest
    Clearwater National Forest
      Powell Ranger District
    Custer National Forest
    Deerlodge National Forest
      Philipsburg Ranger District
    Flathead National Forest
    Forest Products Laboratory
    Gallatin National Forest
    Helena National Forest
    Idaho-Panhandle National Forest
    Intermountain Forest & Range
      Experiment Station
    Intermountain Regional Forester
    Kootenai National Forest
    Lewis & Clark National Forest
    Lolo National Forest
      Missoula Ranger District
    Modoc National Forest
    Nezperce National Forest
      Moose Creek Ranger District
    Payette National Forest
      Krassel Ranger District
    Rocky Mountain Forest & Range
      Experiment Station
    Salmon National Forest
      North Fork Ranger District
    Tonto National Forest
  Soil Conservation Service
    (Bozeman, MT; Boise, ID;
      Washington, D.C.)
U.S. Department of Commerce:
  National Oceanic & Atsmospheric
    Administration (Portland, OR;
    Washington, D.C.)
U.S. Department of Energy
  (Washington, D.C.)
Bonneville Power Administration
Environmental Protection Agency
U.S. Department of Interior
  (Washington, D.C.)
  Bureau of Land Management
    (Butte, MT; Missoula, MT)
  Bureau of Indian Affairs
  Fish & Wildlife Service
    (Boise, ID; Billings, MT;
    Helena, MT)
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U.S. Department of Transportation
  Assistant Secretary for Policy &
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Underwood, Ardith
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University of Idaho
University of Idaho Library
University of Michigan
University of Montana
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Utzinger, Charles
Vadheim, Kirsten L.
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Voth, Darrell
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Wadsworth, Dallas & Mabel
Waldheim, Edward H.
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Walker, David
Walker, Dick
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Warner, Mr. & Mrs. Glyde
Warren, Greg
Washburn, David
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Webster, T. R.
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Wehrly, Kathy
Weinstoin, Dan
Weisenberg, William
Weiss, Dr. & Mrs. Martin
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Welty, Laety
Wemple, Jack, Shirley & Rick
West Electric Distributors, Inc.
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West, Manning & Winnefred
Westerlund, Lilly
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Western Forest Industry
Western Interstate Energy
Western Montana Fish & Game Assoc.
Western Reserve Oil Company
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Wetzsteon, Gene
Wetzsteon, Paul H.
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Wheat, Charles & Shirley
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Whitehead, Tom
Whitesitt, David D.
Whitlow, Floyd M.
Whitman, Marilyn
Whitney, Hannah L.
Wicks, George & E. R. Bechtold
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Wilcox, Monroe & Ruth
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Williams, Representative Pat
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Wilnau Logging
Wilson, Reginald A. & Mavis
Winters, Donald
Wirth Associates
Wise, Judy
Wiseman, Dan & Sheila
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Wood, Floyd
Wood, Gordon L.
Wood, William G.
Wood Science Laboratory, Inc.
Woodgerd, Wesley & JoAnn
Woodhouse, Earl
Woodhull, Wilma
Woods, Bill
Wornath, Violet
Worf, Bill
Workal, Larry
Wright, Captain Douglas
Wright, Charles & Lena
Wright, Earl & Marjorie
Wrobel, Jean
Wuerthner, George
Wurster, Mr. & Mrs. Scott
Yanishevsky, Rosilind
Yenne, Mrs. Anne
Yerger, Rus
Zabel, Gary L. & Clarice
Zackheim, Hugh
Zeiler, Mr. & Mrs. Philip
Zelazny, John
Zulauf, Jonette R.
Zwanefeld, Pete

VII. GLOSSARY

-40	Symbol for landtype group; all soils on slopes less than 40 percent.
ACCESS	See Public Access.
ACRE-EQUIVALENT	A unit of habitat output related to fish or wildlife habitat improvement projects. Acre equivalents are based on the number of acres of habitat that are influenced by one habitat acre actually modified by the habitat improvement project.
ACRE-FOOT	A measure of water or sediment volume equal to the amount which would cover an area of 1 acre to a depth of 1 foot (325,851 gallons or 43,560 cubic feet).
ACTIVITY	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and range land outputs or achieve administrative or environmental quality objectives.
ACTIVITY FUELS	Debris generated by a Forest activity that increases fire potential such a firewood gathering, precommercial thinning, timber harvesting, and road construction.
ACTIVITY TYPE	The further description of the actions, measures, or treatments within an activity.
ADFLUVIAL	Freshwater fish that migrate from freshwater lakes to freshwater streams to spawn.
ADMINISTRATIVE FACILITIES	Those facilities, such as Ranger Stations, work centers and cabins, which are used by the Forest Service in the management of the National Forest.
AIRSHED	Basic geographic units in which air quality is managed.
AFFECTED ENVIRONMENT	The biological and physical environment that will or may be changed by actions proposed and the relationship of people to that environment.
ALLOTMENT	See Range Allotment.
ALLOWABLE SALE QUANTITY	The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity".
ALTERNATIVE	A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decisionmaking. An alternative need not substitute for another in all respects.

ALTERNATIVE, NO ACTION	An alternative that maintains established trends or management direction.
AMENITY VALUES	Resource use for which market values (or proxy values) are not or cannot be established.
ANADROMOUS FISH	Fish which spend much of their adult life in the ocean, returning to inland waters to spawn; e.g., salmon, steelhead.
ANALYSIS AREA	One or more capability areas combined for the purpose of analysis in formulating alternatives and estimating various impacts and effects.
ANALYSIS OF THE MANAGEMENT SITUATION	A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.
ANALYSIS PERIOD, LONG TERM	A time horizon of expenditures in an analysis that is two or more 5-Year RPA planning periods in duration. RPA, program, Regional Guide, and Forest plan analyses have long-term periods.
ANALYSIS PERIOD, SHORT TERM	A time horizon of expenditures in an analysis that is only several years in duration. A budget analysis is short-term.
ANIMAL UNIT MONTH (AUM)	The quantity of forage required by the equivalent of a 1000 lb. mature cow for one month.
ANNUAL FOREST PROGRAM	The summary or aggregation of all projects for a given year that for a given level of funding, make up an integrated (multi-functional) course of action on a Forest planning area.
AQUATIC ECOSYSTEM	A stream channel, lake or estuary bed, the water itself, and the biotic communities that occur therein.
ARTERIAL ROADS	Roads comprising the basic access network for National Forest System administrative and management activities. These roads serve all resources to a substantial extent, and maintenance is not normally determined by the activities of any one resource. They provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standards are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually they are developed and operated for long term land and resource management purposes and constant service.
ASSESSMENT	The Renewable Resource Assessment required by the Resource Planning Act.

ASSET, CAPITAL	A natural resource, manmade structure, facility, or improvement in natural resources used as an input in production processes.
ASSET, RESIDUAL	The remaining value of a capital asset at the end of the time horizon of the planning or analytical process.
AUM	See Animal Unit Month.
AVAILABLE FOREST LAND	Land that has not been legislatively or administratively withdrawn from timber production by the Secretary of Agriculture or Forest Service Chief.
AVERAGE ANNUAL CUT	The volume of timber harvested in a decade, divided by 10.
AVOIDANCE AREA	Areas where utility corridor establishment and use conflict with land use and management objectives, the effects of which would be difficult or impossible to mitigate. Examples include semiprimitive recreation designations, research natural areas, retention visual quality objectives, Wild and Scenic Rivers.
BASE SALE SCHEDULE	A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity.
BENCHMARK	Reference points that define the bounds within which feasible management alternatives can be developed. Benchmarks may be defined by resource output or economic measures.
BENEFIT-COST RATIO	Measure of economic efficiency, computed by dividing total discounted primary benefits by total discounted economic costs.
BENEFIT, DIRECT	A primary benefit that fulfills specified objectives of the policy, program, or project.
BENEFIT, DISCOUNTED	Benefit values adjusted so that future benefit values are reduced to the present time for comparison purposes. In this analysis, these are timber, range, recreation, mineral and special-use benefit values.
BENEFIT, INDUCED	A primary benefit from an output that is incidental to the objectives of the policy, program, or project.
BENEFIT, PRIMARY	A benefit accruing to resource owners from a primary output, which may be direct or induced, or a residual asset. Primary benefits are components of net public benefits.
BENEFIT, SECONDARY	A benefit accruing to parties other than the resource owners, including effects on local, Regional, and national economies and on consumers of outputs. Secondary benefits are not necessarily included in net public benefits.

BENEFIT (VALUE)	Inclusive terms to quantify the results of a proposed activity, project or program expressed in monetary or nonmonetary terms.
BEST MANAGEMENT PRACTICES (BMP)	The set of practices in the Forest Plan which, when applied during implementation of a project, ensures that water related beneficial uses are protected and that State water quality standards are met. BMP's can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the States. Others are defined by the Forest interdisciplinary planning team for application Forest-wide. Both of these kinds of BMP's are included in the Forest Plan as Forest-wide Standards. A third kind are identified by the interdisciplinary team for application to specific management areas; these are included as Management Area Standards in the appropriate management areas. A fourth kind, project level BMP's, are based on site specific evaluation and represent the most effective and practicable means of accomplishing the water quality and other goals of the specific area involved in the project. These project level BMP's can either supplement or replace the Forest Plan standards for specific projects.
BIG GAME	Those species of large mammals normally managed as a sport hunting resource.
BIG GAME SUMMER RANGE	Land used by big game during the summer months.
BIG GAME WINTER RANGE	The area available to and used by big game through the winter season.
BIOLOGICAL POTENTIAL	The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.
BIOLOGICAL GROWTH POTENTIAL	The average net growth attainable in a fully stocked natural forest stand.
BOARD FOOT	A unit of measurement represented by a board one foot square and one inch thick.
BROADCAST BURN	Allowing a controlled fire to burn over a designated area within well-defined boundaries, for reduction of fuel hazard, as a silvicultural treatment, or both.
BOARD FOOT/ CUBIC FOOT CONVERSION	The mathematical ratio of the board feet contained in one cubic foot of timber. This ratio varies with tree species, diameter, height and form factors.
BROWSE	Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

CANOPY — The more or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

CAPABILITY — The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fires, insects, and disease.

CAPABILITY AREA — A geographic delineation used to describe characteristics of the land and resources in integrated Forest planning. Capability areas may be synonymous with ecological land units, ecosystems or land response units.

CAPITAL INVESTMENT — Investment in facilities such as roads and structures with specially-appropriated funds.

CARRYING CAPACITY — 1 (recreation): the amount of recreation use an area can sustain without deterioration of site quality; 2 (wildlife): the maximum number of animals an area can support during a given period of the year; 3 (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.

CATCHABLE TROUT — Game fish 6 inches or longer.

CAVITY — A hollow in a tree that is used by birds or mammals for roosting and reproduction.

CEQ — See Council of Environmental Quality.

CFR — Code of Federal Regulations.

CHARGEABLE VOLUME — Chargeable volume is all volume that is included in the growth and yield projections for the selected management prescriptions used to arrive at the "allowable sale quantity," based on Regional utilization standards.

CLEARCUTTING — Harvesting of all trees in one cut. It prepares the area for a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as separate age class in planning. Regeneration is obtained through natural seeding, or through planting or direct seeding.

CLASS I DESIGNATION	An air quality classification in which the maximum allowable increase in concentration of sulfur dioxide over the baseline is 2 micrograms per cubic meter for the annual arithmetic mean, 5 micrograms per cubic meter in a 24 hour period, and 25 micrograms per cubic meter in a 3 hour period. The annual geometric mean of particulate matter shall not increase more than 5 micrograms per cubic meter above the baseline and the 24 hour maximum shall not increase more than 10 micrograms per cubic meter over the baseline.
CLIMAX PLANT COMMUNITY	The final or stable biotic community in a developmental series.
CLOSURE	The administrative order that does not allow specified uses in designated areas or on Forest development roads or trails.
CMAI	See Culmination of Mean Annual Increment.
COEFFICIENT (COST, VALUE, YIELD)	The numeric units used to include costs, values, and outputs in the analysis model used in the formulation of the Forest Plan.
COLLECTOR ROADS	Roads constructed to serve two or more elements but which do not fit into the other two road categories (arterial or local). Construction costs of these facilities are prorated to the respective element served. These roads serve smaller land areas and are usually connected to a Forest arterial or public highway. They collect traffic from local Forest roads or terminal facilities. The location and standard are influenced by both long term multi-resource service needs and travel efficiency. Forest collector roads are operated for constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.
COMMERCIAL FOREST LAND (SUITABLE TIMBER LAND)	Land that is producing, or is capable of producing, crops of industrial wood and (1) has not been withdrawn by Congress, the Secretary of Agriculture or the Chief of the Forest Service; (2) where existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity or watershed conditions; and (3) where existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be obtained within 5 years after final harvesting.
COMMERCIAL THINNING	Any type of thinning producing merchantable material at least to the value of the direct cost of harvesting.
COMMERCIAL TIMBER SALES	The selling of timber from National Forest lands for the economic gain of the party removing and marketing the trees.
COMMODITIES	Resources with commercial value; all resource products which are articles of commerce, such as timber, range forage and minerals.

COMMON MATERIALS	See Minerals, Common Variety.
COMMUNITY COHESION	The degree of unity and cooperation within a community in working toward shared goals and solutions to problems.
COMMUNITY STABILITY	The capacity of a community to absorb and cope with change without major hardship to institutions or groups within the community.
COMPACTION	An increase in soil bulk density. Compaction is considered detrimental when increased by 20 percent or more over the undisturbed level in volcanic ash soils and 15 percent or more over the undisturbed level in other soils.
CONCERN	See Management Concern.
CONDITION CLASS	A descriptive category of the existing tree vegetation as it relates to size, stocking and age.
CONFINE	To restrict a fire within determined boundaries established either prior to the fire, during the fire, or in an escaped fire situation analysis. Surveillance may be appropriate when the fire will be self-confined with a defined perimeter.
CONGRESSIONALLY DESIGNATED AREAS	Areas established by Congressional legislation, such as National Wildernesses, National Wild and Scenic Rivers, and National Recreation Areas.
CONSTRAINT	A confinement or restriction on the range of permissible choices.
CONSUMPTIVE USES	Uses of a resource that reduce the supply. Examples of some consumptive uses of water are irrigation, domestic and industrial water use, grazing, and timber harvest.
CONTAIN	To surround a fire, and any spot fires with control lines, so that there is a reasonable expectation the fire spread will be checked under prevailing and predicted conditions.
CONTINENTAL DIVIDE	The drainage divide between waters flowing to the Atlantic Ocean and the Pacific Ocean.
CONTROL	To complete the control line around a fire, any spot fires, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control line; and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions.
CORD	A unit of gross volume measurement for stacked roundwood based on external dimensions, generally implies a stack of four feet by four feet vertical cross section and eight feet long, contains 128 stacked cubic feet.

CORDUROY	A method of subgrade reinforcement often used on trails and for some roads whereby logs are placed perpendicular to the traveled way to support a surfacing material.
CORRIDOR	A linear strip of land identified for the present or future location of transportation or utility right-of-ways within its boundaries.
COST	The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical or environmental in nature.
COST, DISCOUNTED	Costs adjusted so that future costs are reduced to the present time for comparison purposes. In this analysis, these are fixed and variable Forest Service and cooperator costs.
COST EFFICIENCY	The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specific levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates of return may be appropriate.
COST-SHARE	Refers to the process of cooperating in the joint development of a road system. The document executed through this process, called "Road Right-of-Way Construction and Use Agreement," specifies the terms of developing the transportation system for a specified land area.
COUNCIL ON ENVIRONMENTAL QUALITY	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.
COVER/FORAGE RATIO	The ratio of tree cover (usually conifer types) to foraging foraging areas (natural openings, clearcuts, etc.)
CRITICAL HABITAT	Specific areas within the geographical area occupied by the species on which are found those physical and biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection. Critical habitat shall not include the entire geographic area which can be occupied by the threatened and endangered species.
CUBIC FOOT	The amount of wood volume equivalent to a cube 1 foot by 1 foot by 1 foot.

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI)	The point at which the volume increment for a tree or stand of trees has achieved it's highest mean value. Mean annual increment is expressed in cubic feet measure and is based on expected growth according to the management intensities and utilization standards assumed in the Forest Plan. The CMAI is calculated by dividing the attained growth (volume) by it's corresponding age.
CULTURAL RESOURCES	The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.
CUT SLOPE	Road construction slopes that are made by excavation.
CUTTING CYCLE	For a crop or stand, the planned interval of time between the beginning of one cutting period and the beginning of the succeeding cutting period.
DBH	See Diameter Breast Height.
DEMAND	The amount of output that users are willing to take at a specific price, time period, and conditions of sale.
DEMAND ANALYSIS	A study of the factors affecting the schedule of demand for a good or service, including the price-quantity relationship, if applicable.
DEPARTURE	A schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future.
DEPENDENT COMMUNITIES	Communities whose social, economic, or political life would become discernibly different in important respects if market or non-market outputs from the National Forests were cut off.
DESIRED FUTURE CONDITION	A description of what the Forest will be like after implementing the Forest Plan goals, objectives and standards for a specified period.
DEVELOPMENT	Preparing the mineral deposit or reservoir for production once the general shape, extent, quality and quantity have been established in the exploration phase. An economic resource has been identified and an analysis is being made to determine the best means of extraction and processing. Operations, processing and storage sites are constructed. Surface disturbance may be site intensive but not widespread.
DEVELOPED RECREATION	Recreation that occurs where improvements enhance recreation opportunities and accommodate intensive recreation activities in a defined area.

DEVELOPED RECREATION SITES — Relatively small, distinctly defined area where facilities are provided for concentrated public use, i. e., campgrounds, picnic areas and swimming areas.

DIAMETER BREAST HEIGHT (DBH) — The diameter of a tree measured 4 1/2 feet above the ground.

DIRECT EFFECTS — Effects on the environment which occur at the same time and place as the initial cause or action.

DISCOUNT RATE — An interest rate that reflects the cost or time value of money. It is used in discounting future costs and benefits.

DISCOUNTING — An economic adjustment for the time value of money; mathematical reduction of costs and/or benefits which occur in the future to the present time for purposes of comparison.

DISPERSED RECREATION — That portion of outdoor recreation use which occurs outside of developed sites in the unroaded and roaded Forest environment i.e., hunting, backpacking and berrypicking.

DISPLACEMENT — The removal of the topsoil or nutrient enriched soil horizons. Removal is detrimental when more than 50 percent of the topsoil or nutrient enriched A or AC horizons or A and B horizons of volcanic ash enriched soils is displaced from an area of 100 square feet or more which is at least 5 feet in width. Mixing of surface soil layers is not considered as detrimental displacement.

DISTRICT RANGER — The official responsible for administering the National Forest System Lands on a Ranger District.

DIVERSITY — The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

ECONOMICS — The study of how limited resources, goods, and services are allocated among competing uses.

ECOSYSTEM — A complete, interacting system of organisms considered together with their environment (for example; a marsh, a watershed, or a lake.)

ECOTONE — A transition or junction zone between two or more diverse communities (ecosystems).

EDAPHIC — The influence of soils on living organisms, particularly plants, including man's use of the land for plant growth.

EFFECTS — Physical, biological, social and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect and cumulative.

EFFICIENCY, ECONOMIC — The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit-cost ratios and rates-of-return may sometimes be appropriate.

ELK HABITAT EFFECTIVENESS — An index of the capability of an area to provide security for elk. It is based on hiding and thermal cover present and roads open to public motorized use.

ELK HIDING COVER — Vegetation, primarily trees, capable of hiding 90 percent of an elk seen from a distance of 200 feet or less.

ELK SECURITY AREA — Security is a function of space, topography, and hiding cover, influenced by human access. The size of the area necessary to provide security will vary with the degree of access and hiding cover characteristics. In this analysis, areas of 5,000 to 8,000 acres below 7,000 feet elevation that provide high-use fall habitat for elk are security areas.

ELK SECURITY COVER (EFFECTIVE ELK SECURITY COVER) — Elk hiding cover modified by open roads. The greater the density of open roads within an area, the less effective is the hiding cover in providing security for elk.

ENDANGERED SPECIES — Any species, plant or animal, which is in danger of extinction throughout all or a significant portion of its' range. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

ENDING INVENTORY CONSTRAINT (EIC) — Constraint to ensure that the total timber volume left at the the end of the planning horizon will equal or exceed the volume that would occur in a managed Forest.

ENERGY RESOURCES — See Minerals, Locatable.

ENVIRONMENTAL ANALYSIS — An analysis of alternative actions and their predictable short and long-term environmental effects which include physical, biological, economic, social, and environmental design factors and their interactions.

ENVIRONMENTAL ASSESSMENT — A concise public document for which a Federal agency is responsible that serves to:

(1) Briefly provide sufficient evidence and analysis for determining whether to prepare and environmental impact statement or a finding of no significant impact.

(2) Aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.

(3) Facilitate preparation of an environmental impact statement when one is necessary.

ENVIRONMENTAL IMPACT STATEMENT, DRAFT (DEIS) — A detailed written statement as required by Sec. 102(2)(C) of the National Environmental Policy Act.

ENVIRONMENTAL IMPACT STATEMENT FINAL (FEIS) — The final version of the public document required by NEPA (see above).

EPHEMERAL STREAMS — Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

EROSION — The group of processes whereby earth or rocky material is worn away by natural sources such as wind, water or ice and removed from any part of the earth's surface.

ESCAPEMENT — The number of adult anadromous fish escaping past commercial and recreational harvest fisheries and other sources of mortality, to upstream spawning areas.

EVEN-AGED MANAGEMENT — The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. Managed even-aged Forests are characterized by a distribution of the stands of varying ages (and, therefore, tree sizes) throughout the Forest area. The difference in age between trees forming the main canopy level of the stand does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

EXCLUSION AREA — Areas where utility corridors are not allowed, for example, wilderness, recommended wilderness and Congressionally designated wilderness study areas.

EXPLORATION — Establishing the nature (that is, shape, extent, quality, quantity and value) of the target identified in the prospecting phase. In addition to the techniques in prospecting, subsurface examinations may be made by drilling wells, boring holes, digging trial pits or renovating underground mine workings. Economic resources may be identified and reserves demonstrated. Surface disturbance may be widespread but not site intensive.

EXTENSIVE TIMBER MANAGEMENT	The practice of forestry on a basis of low operating and investment costs per acre.
EXTRACTIVE USE	Use of natural resources that removes them from their natural setting.
FAMILY UNIT	A camp or picnic spot with table, fireplace, tent pad, and parking spot.
FEE SITE	A Forest Service recreation area in which users must pay a fee. Fee sites must meet certain standards and provide certain facilities as specified in the Forest Service Manual.
FILL SLOPE	Road construction slopes that are made by depositing soil from excavated areas.
FINAL CUT	Removal of the last seed bearers or shelter trees after regeneration is considered to be established under a shelterwood system.
FLOOD PLAIN	The lowland and relatively flat area adjoining inland waters, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.
FORAGE	All browse and nonwoody plants available to livestock or wildlife for feed.
FORB	Any herbaceous plant other than true grasses, sedges or rushes.
FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT OF 1974	An act of Congress which requires the assessment of the Nation's renewable resources and the periodic development of a national renewable resources program. It also requires the development, maintenance and, as appropriate, revision of land and resource management plans for units of the National Forest System (e.g. National Forest).
FOREST LAND	Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use. Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width. The term "occupied" when used to define forest land, will be measured by canopy cover of live forest trees at maturity. The minimum area for classification of forest land will be 1 acre or greater. Unimproved roads, trails, stream and clearings in forest areas are classified as forest if they are less than 120 feet in width.

FOREST LOCAL ROADS — Roads constructed and maintained for, and frequented by, the activities of a given resource element. Some uses may be made by other element activities, but normally maintenance is not affected by such use. These roads connect terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard, usually are determined by the requirement of a specific resource activity rather than by travel efficiency. Forest local roads may be developed and operated for constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

FOREST SUPERVISOR — The official responsible for administering the National Forest System lands in a Forest Service Administrative unit, which may consist of one or more National Forests or all the Forests within a State.

FOREST SYSTEM ROAD — A road wholly or partly within or adjacent to and serving the National Forest System and which is necessary for the protection, administration and utilization of the National Forest System and the use and developments of it's resources.

FORPLAN — A linear programing system used for developing and analyzing Forest planning alternatives.

FOREST-WIDE MANAGEMENT GUIDELINES — An indication or outline of policy or conduct dealing with the basic management of the Forest. Forest-wide management guidelines apply to all areas of the Forest regardless of the other management prescriptions applied.

FSH — Forest Service Handbook.

FSM — Forest Service Manual.

FUELBREAK — A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: Natural barriers, constructed fuelbreaks, manmade barriers.

FUELS — Include both living plants; dead, woody vegetative materials; and other vegetative materials which are capable of burning.

FUELS MANAGEMENT — Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

FUELS TREATMENT — The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

FULL-SERVICE MANAGEMENT	The administration, operation and maintenance of developed recreation sites to established standards with the objective to provide a pleasant recreation experience for the visitor and exceed the minimum health and safety needs of the visitors.
FULL BENCH	Roads that are built entirely by excavation, usually in steep terrain. The road surface is entirely on undisturbed material.
GAME SPECIES	Any species of wildlife or fish for which seasons and bag limits have been prescribed, and which are normally harvested by hunters, trappers, and fisherman under State or Federal laws, codes, and regulations.
GOAL	A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.
GOODS AND SERVICES	The various outputs, including onsite uses, produced from forest and rangeland resources.
GRAZING ALLOTMENT	See Range Allotment.
GROUP SELECTION CUTTING	A cutting method to develop and maintain uneven-aged stands by the removal of small groups of trees to meet a predetermined goal of size distribution and species composition in remaining stands.
GROWING STOCK LEVEL	A relative stand density measure used to guide a management objective such as maximizing timber volume yields or optimizing big game thermal cover.
GUIDELINE	See Standard and Guideline.
HABITAT TYPE	An aggregation of all land areas potentially capable of producing similar plant communities at climax.
HABITAT TYPE GROUP	A logical grouping of habitat types to facilitate resource planning and public presentations.
HIDING COVER	Trees of sufficient size and density to conceal animals from view at 300 feet.
HT123	Vegetative habitat type working group containing most Douglas-fir climax habitat types.
HT4	The working group that equates to the subalpine fir/beargrass vegetative habitat type.
HT567	The working group that equates to moist site vegetative habitat types, mostly subalpine fir/menziesia.

IMPACT ANALYSIS AREA — The delineated area subject to significant economic and social impacts from Forest Service activities included in an economic or social impact analysis.

IMPROVEMENT CUTTING — Removing trees of undesirable species, form, or condition from the main canopy in stands past the sapling stage to improve the composition and quality.

INDICATOR SPECIES — Species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish including those that are socially or economically important.

INDIRECT EFFECTS — Secondary effects which occur in locations other than the initial action or significantly later in time.

INDIVIDUAL TREE SELECTION HARVEST — A cutting method to develop and maintain uneven-age stands by the removal of selected trees from specified age classes over the entire stand area in order to meet a predetermined goal of age distribution and species in the remaining stand.

INDUSTRIAL WOOD — All commercial roundwood products except fuelwood.

INSTREAM FLOWS — The minimum water volume (cubic feet per second) in each stream necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality, recreational opportunities and other uses.

IN-MIGRATION — The movement of human population into an area.

INTEGRATED PEST MANAGEMENT — A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

INTENSIVE GRAZING — Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season.

INTER-DISCIPLINARY TEAM (ID TEAM) — A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view to bear on the problem.

INTERMEDIATE HARVEST	Any removal of trees from a stand between the time of its formation and the regeneration cut. Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage.
INTERMITTENT STREAM	A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow.
INTERPRETATIVE SERVICES	Visitor information services designed to inform and educate Forest visitors improving their understanding, appreciation and enjoyment of National Forest resources.
INVENTORY DATA	Recorded measurements, facts, evidence, or observations on Forest resources such as soil, water, timber, wildlife, range, geology, minerals, and recreation which was used to determine the capability and opportunity of the Forest to be managed for those resources.
ISSUE	See Public Issue.
JACKPOT BURNING	Burning areas of fuel concentrations to reduce fire hazard.
"KEY REACHES" OF WATERSHED SYSTEM	A representative stream segment that can be expected to be sensitive to water resource changes and which adequately reflects the effects of management of the stream channel, the water, and their beneficial uses.
KEY SUMMER RANGE	An area that is potentially capable of supporting big game during the summer use period.
KEY WINTER RANGE	The portion of the yearlong range where big game find food and/or cover during severe winter weather.
LAND EXCHANGE	The conveyance of non-Federal Land or interests to the United States in exchange for National Forest System land or interests in land.
LANDLINE LOCATION	The legal identification, accurate location, and description of property boundaries.
LANDTYPE	An inventory map unit with relatively uniform potential for a defined set of land uses. Properties of soils, landform, natural vegetation and bedrock are commonly components of landtype delineation used to evaluate potentials and limitations for land use.
LANDTYPE GROUP	A logical grouping of landtypes that facilitate resource planning.
LEASABLE MINERALS	See Minerals, Leasable.

LEVEL I FIRE ANALYSIS	General fire management analysis to provide historical information that assists the interdisciplinary team in the analysis of the management situation and formulation of alternatives for the Forest Plan.
LEVEL II FIRE ANALYSIS	An analytical process which guides the implementation of fire management activities of the Forest Plan.
LINEAR PROGRAMMING	A mathematical method used to determine the optimal distribution of limited resources between competing demands when both the objective (e.g., profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities (e.g., y=a+bx).
LIMITED SURFACE USE STIPULATION	A mineral lease clause, which, if attached to a mineral lease, prohibits surface disturbing activities on the lease pending submission of a surface use and operations plan which is satisfactory to the BLM and the surface management agency for protection of special existing or planned uses. This stipulation may, when site-specific operations are proposed and analyzed, be modified if other less stringent mitigation is determined to be sufficient to protect the other resources.
INDUCED EFFECT OR IMPACT	See Benefit, Induced.
INTENSIVE TIMBER MANAGEMENT	The practice of forestry so as to obtain a high level of volume and quality of outturn per unit of area, through the application of the best techniques of silviculture and management.
LOCAL DEPENDENT INDUSTRIES	Local industries relying on National Forest outputs for economic activity.
LOCAL ROAD	See Forest Local Road.
LOCATABLE MINERALS	See Minerals locatable.
LOESS	A uniform and unstratified fine sand or silt transported by wind.
LONG-TERM SUSTAINED YIELD CAPACITY (LTSY)	The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple use objectives.
LTSY	See Long-term Sustained Yield.
M	Thousand
MM	Million

MAUM	Thousand Animal Unit Months.
MBF	Thousand Board feet.
MMBF	Million Board feet.
MMCF	Million Cubic feet.
MN+40	Symbol for landtype group; moderately- to non-sensitive soils on 40-60 percent slopes.
MANAGEMENT ACTION	Any activity undertaken as part of the administration of the Forest.
MANAGEMENT AREA	An aggregation of capability areas which have common management direction and may be noncontiguous in the Forest. Consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.
MANAGEMENT CONCERN	An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process.
MANAGEMENT DIRECTION	A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.
MANAGEMENT EFFECTS	Physical, biological, social and economic responses to management practices.
MANAGEMENT EMPHASIS	A management practice or combination of management practices designed to stress production of a particular type of output or mix of outputs.
MANAGEMENT INTENSITY	A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.
MANAGEMENT OPPORTUNITY	A statement of general actions, measures, or treatments that address a public issue or management concern.
MANAGEMENT PRACTICE	A specific activity, measure, course of action, or treatment. Proposed management practices are those scheduled in the first decade of Forest Plan implementation. Probable management practices are those scheduled in the second decade of Forest Plan implementation.
MANAGEMENT PRESCRIPTION	Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.

MANAGEMENT STANDARDS AND GUIDELINES	See Standard and Guideline.
MARKET VALUE	The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay as evidenced by market transactions.
MATURE TIMBER	Individual trees or stands of trees that in general are at their maximum rate in terms of the physiological processes expressed as height, diameter, and volume growth.
MAXIMUM MODIFICATION	See Visual Quality Objective.
MAXIMUM RESOURCE POTENTIAL	The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.
MEAN ANNUAL INCREMENT	The total volume increase in a tree or stand of trees up to a given age, divided by that age.
MINERAL ENTRY	The filing of a mining claim on Federal land to obtain the right to mine any locatable minerals it may contain. Also the filing for a mill site on Federal land for the purpose of processing off-site locatable minerals.
MINERAL WITHDRAWAL	A formal designation by the Secretary of Interior which precludes entry or disposal of mineral commodities under the mining and/or mineral leasing laws.
MINERAL EXPLORATION	The search for valuable minerals.
MINERAL PRODUCTION	The extraction of mineral deposits.
MINERAL RESOURCE POTENTIAL	The characteristic attributed to a geologic terrain that suggests the possible presence of mineral resources - metalic, nonmetallic, or energy.
MINERALS, COMMON VARIETY	Deposits of sand, stone, gravel, etc. of widespread occurrence and not having distinct or special value. These deposits are used generally for construction and decorative purposes and are disposed of under the Materials Act of 1947.
MINERALS, LEASABLE	Those minerals which are disposed of under authority of the various mineral leasing acts. Minerals include coal, oil, gas, phosphate, sodium, potassium, oil shale, sulfur (in Louisiana and New Mexico), and geothermal steam.
MINERALS, LOCATABLE	Those minerals which are disposed of under the general mining laws. Included are minerals such as gold, silver, lead, zinc and copper which are not classed as leasable or salable.

MINIMUM MANAGEMENT REQUIREMENTS — Standards for resource protection, vegetative manipulation, silviculturist practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives (see 36 CFR 219.27).

MINIMUM RESOURCE STANDARDS — Specific conditions of individual resources which must be maintained in order to meet minimum management requirements (36 CFR 219.27) and/or other legal requirements.

MINIMUM VIABLE — See Viable Population.

MINING CLAIMS — A geographic area of the public lands held under the general mining laws in which the right of exclusive possession is vested in the locator of a valuable mineral deposit. Includes lode claims, placer claims, mill sites and tunnel sites.

MITIGATE — To lessen the severity.

MITIGATION — *Avoiding or minimizing impacts by limiting the degree or magnitude* of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.

MODIFICATION (VQO) — See Visual Quality Objective (VQO).

MONITORING AND EVALUATION — The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied.

MONTANA WILDERNESS STUDY ACT AREAS — Those areas that are required to be studied for their wilderness suitability under the Montana Wilderness Study Act of 1977 (Public Law 95-150).

MOUNTAIN PINE BEETLE — A species of bark beetle that spends the major portion of their life cycle in a tree's cambium layer. Through a combination of the insect feeding on the cambium layer and the introduction of fungi which stop the resin flow, the tree is girdled and killed.

MULTIPLE USE — *The management of all the various renewable surface resources of* the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, *without impairment of the productivity of the land, with* consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

MWSA	Montana Wilderness Study Act.
MWSA AREAS	See Montana Wilderness Study Act Areas.
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)	An act which encourages productive and enjoyable harmony between man and his environment; promotes efforts to prevent or eliminate prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality.
NATIONAL FOREST LANDSCAPE MANAGMENT SYSTEM	The planning and design of the visual aspects of multiple use land management in such ways that the visual effects maintain or upgrade man's psychological welfare.
NATIONAL FOREST MANAGEMENT ACT (NFMA)	A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest plans and the preparation of regulations to guide that development.
NATIONAL FOREST SYSTEM	All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under Title III.
NATIONAL RECREATION TRAILS	Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the National system of trails authorized by the National Trails System Act. National recreation trails provide a variety of outdoor recreation uses.
NATIONAL REGISTER OF HISTORIC PLACES	A listing maintained by the National Park Service of areas which have been designated as being of historical significance. The Register includes places of local and State significance as well as those of value to the Nation as a whole.
NATIONAL WILD AND SCENIC RIVER SYSTEM	Rivers with outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition.
NATIONAL WILDERNESS PRESERVATION SYSTEM	All lands covered by the Wilderness Act and subsequent wilderness designations, irrespective of the department or agency having jurisdiction.
NDY	See Nondeclining Flow.
NONDECLINING YIELD	See Nondeclining Flow.

NEPA	See National Environmental Policy Act.
NFMA	See National Forest Management Act.
NET PUBLIC BENEFITS	An expression used to signify the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield.
NO ACTION ALTERNATIVE	The management direction, activities, outputs, and effects most likely to exist in the future if the current plan would continue unchanged.
NON-INTER-CHANGEABLE COMPONENTS	Non-interchangeable Components (NICS) are defined increments of the suitable land base and their contribution to the allowable sale quantity (ASQ) that are established to meet Forest plan objectives. NICS are identified as parcels of land and the type of timber thereon which are differentiated for the purpose of Forest plan implementation. The total ASQ is derived from the sum of the timber volumes from all NICS. The NICS cannot be substituted for each other in the timber sale program. Some conditions which may characterize a particular NIC are: (1) species marketability; (2) dead or live timber; (3) timber size class; and (4) operability.
NONCHARGEABLE VOLUME	All volume that is not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity. It also includes all volume removed from nonsuitable lands.
NONCOMMODITY OUTPUTS	See Output, Nonmarket.
NONCONSUMPTIVE USE	Those uses of resources that do not reduce the supply. Nonconsumptive uses of water include hydroelectric power generation, boating, swimming, etc.
NONDECLINING FLOW	The principle that the quantity of timber planned for sale or harvest for any future decade must be equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity.
NONENERGY RESOURCES	See Minerals, Locatable.
NONEXTRACTIVE USE	Use which does not remove a resource from its natural setting.

NONGAME — Species of animals which are not managed as a sport hunting resource.

NONMARKET OUTPUT — See Output, Nonmarket.

NONMARKET VALUE — The unit price of a nonmarket ouput not normally exchanged in a market at any stage before consumption, and thus the input must be from other economic information.

NONPOINT SOURCE POLLUTION — Sources from which the pollutants discharged are: (1) induced by natural processes, including precipitation, seepage, percolation, and runoff; (2) not traceable to any discrete or identifiable facility and (3) better controlled through the utilization of Best Management Practices, including process and planning techniques. This includes natural pollution sources not directly or indirectly caused by man.

NONPRICED BENEFIT — See Output, Nonmarket.

NONSTOCKED — A stand of trees or aggregation of stands that have a stocking level below the minimum specified for meeting the prescribed management objectives.

NO-SURFACE OCCUPANCY STIPULATION — A mineral lease clause which, if attached to a mineral lease, prohibits the lessee from constructing roads, well pads or otherwise occupying the land surface unless, upon site-specific review, it is determined by the authorized officer that the requirements of the stipulation can be modified if other less stringent mitigation is determined to be sufficient to protect the other resources.

OBJECTIVE — A concise time-specific statement of measurable planned results that respond to preestablished goals. An objective forms the basis for further planning, to define the precise steps to be taken and the resources to be used in achieving identified goals.

OBJECTIVE FUNCTION — A term used in linear programming describing the criteria to be optimized. Examples of objective functions are: maximize present net value, minimize cost or maximize timber.

OFF-ROAD VEHICLE — Any vehicle capable of being operated off an established road or trail, e.g., motorbikes, four-wheel drives, and snowmobiles.

OLD GROWTH — A forest stand with 15 trees per acre greater than 20 inches dbh (6 inches in lodgepole pine) and canopy closure that is 75 percent of site potential. The stand is uneven-age or multistoried. There should be 1.5 snags per acre greater than 6 inches dbh; 0.5 snags per acre greater than 20 inches dbh; and 25 tons per acre of down material greater than 6 inches diameter. Heart rot and broken tops are common and mosses and lichens are present.

OLD GROWTH TIMBER	See Overmature Timber and Old Growth.
OPPORTUNITY COST	An opportunity cost is value foregone. In this analysis it is a cost calculated as the difference between present net value of the alternative and the present net value of the maximum PNV increment.
OPTIMUM	The greatest level of production that is consistent with other resource requirements as constrained by environmental, social and economically sound conditions.
OUTPUT	A good, service, or on-site use that is produced from forest and rangeland resources. Definitions of Forest and rangeland output definitions, codes and units measure are contained in the Management Information Handbook (FSH 1309.11). Examples are: X06-Softwood Sawtimber Production - MBF; X80-Increased Water Yield.- Acre Feet; W01-Primitive Recreation Use - RVD's.
OUTPUT, CONTROLLED	The amount of an output which management has the legal and practical ability to control with management activities.
OUTPUT, DIRECT	An output that fulfills specified objectives of the policy, program, or project being evaluated.
OUTPUT, INDUCED	A good, service, or on-site use which is incidental to the objectives of the resource activity. An example is the timber harvest activity which produces a primary output of board feet of timber and an induced output of acres of improved wildlife habitat because of the harvest activity.
OUTPUT, MARKET	A good, service, or on-site use that can be purchased at a price.
OUTPUT, NON-CONTROLLED	The amount of an output which will occur regardless of management activity.
OUTPUT, NONMARKET	A good, service, or on-site use not normally exchanged in a market.
OUTPUT, PRIMARY	A good, service, or on-site use that results from the completion of an activity, project or program that meets the specific objectives of the resource. Examples are board feet of timber, recreation visitor days, etc.
OVER-THE-COUNTER SALE	The selling of Forest products without bidding, as requested by the general public, usually for products such as fuelwood, corral poles, ornamental shrubs, etc.
OVERMATURE TIMBER	Individual trees or stands of trees that in general are past their maximum rate in terms of the physiological processes expressed as height, diameter and volume growth.

OVERSTORY	That uppermost canopy of the forest when there is more than one level of vegetation.
OVERTHRUST BELT	A complex geologic feature, extending from Alaska to Mexico, which resulted from compressional stresses within the earth, and which is characterized by abundant thrust faults. This zone passes through and includes all of western Montana.
PARTIAL RETENTION (VQO)	See Visual Quality Objective (VQO).
PARTICULATES	Small particles suspended in the air and generally considered pollutants.
PATENTED MINING CLAIMS	A patent is a document which conveys title to land. When patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Mining Law or implementing regulations.
PERENNIAL STREAMS	Streams that flow continuously throughout most years.
PAYMENT IN LIEU OF TAXES	Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing. Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976 by the U.S. Department of the Interior.
PERMITTED GRAZING	Use of a National Forest range allotment under the terms of a grazing permit.
PERSON YEAR (WORK YEAR)	A person year equals 2,087 hours of work time. A person year may be one person working yearlong or several persons filling seasonal positions.
PLAN OF OPERATIONS	A written plan describing mining and mineral processing activities that will likely cause a significant surface disturbance. The plan is prepared by those engaged in activities, such as prospecting, exploration or mining, in the National Forest. This plan must be approved by a Forest Officer.
PLANNING AREA	The area of the National Forest System covered by a regional guide or forest plan.
PLANNING CRITERIA	Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based.

PLANNING HORIZON	The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions. In the National Forest planning process, this is 150 years.
PLANNING PERIOD	One decade. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits.
PLANNING RECORDS	Documents and files that contain detailed information and decisions made in developing the Forest Plan. Available at the Forest Supervisor's Office.
PNV	See Present Net Value.
POLETIMBER TREES	Live trees of commercial species at least five inches in diameter at breast height but smaller than sawtimber size, and of good form and vigor.
POLICY	A guiding principle upon which is based a specific decision or set of decisions.
POTENTIALLY (TENTATIVELY) SUITABLE LAND	Forest land (as defined in CFR 219.3) for which technology is available that ensures timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is reasonable assurance that such lands can be restocked (CFR 219.14); and which is available for timber management.
PRACTICE	See Management Practice.
PRECOMMERCIAL THINNING	The selective felling, deadening, or removal of trees in a young stand primarily to accelerate diameter increment on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain.
PREDATOR	One that preys, destroys, or devours - usually an animal that lives by preying on other animals.
PREPARATORY CUT	Removal of trees near the end of a rotation so as to permanently open the canopy and enlarge the crowns of seed bearers, with a view to improving conditions for seed production and natural generation, as typically in shelterwood systems.
PRESCRIBED BURNING	The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, etc.).

PRESCRIBED FIRE — A fire burning under specified conditions which will accomplish planned objectives in strict compliance with an approved plan and the conditions under which the burning takes place and the expected results are specific, predictable, and measurable.

PRESCRIPTION — See Management Prescription.

PRESENT NET VALUE (PNV) — The difference between the discounted value (benefits) of all outputs to which monetary value or established market prices are assigned and the total discounted costs of managing the planning area.

PRESENT NET WORTH — The discounted value of price times quantity less cost.

PRESERVATION (VQO) — See Visual Quality Objectives (VQO).

PRESUPPRESSION — Activities required in advance of fire occurrence to ensure effective suppression action. Includes (1) recruiting and training fire forces; (2) planning and organizing attack methods; (3) procuring and maintaining fire equipment; and (4) maintaining structural improvements necessary for the fire program.

PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY (PSD) — A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act (42 U.S.C. 1875 et 15q.).

PRICED BENEFIT — See Output, Market.

PRICED OUTPUTS — Resource outputs that have market or assigned dollar values.

PRIMITIVE RECREATION SETTING — A classification of the recreation opportunity spectrum that that characterizes an essentially unmodified natural environment of a size or remoteness that provide significant opportunity for isolation from the signs and sounds of man and a feeling of vastness of scale. Visitors have opportunity to be part of the natural environment, encounter a high degree of challenge and use a maximum of outdoor skills but have minimum opportunity for social interaction.

PRIMITIVE ROADS — Roads that came into existence with little regard for grade or drainage control, or were abandoned facilities from some prior use. They are sometimes created merely by repeated driving over an area. Such roads are rarely, if ever, maintained and then only by users. These roads are single lane, usually with native surfacing, and sometimes passable with four-wheel drive vehicles only, especially in wet weather.

PRODUCTION	Extracting and transporting the recovered mineral resources from mine or field to mill, refinery or market. Facilities constructed in the development phase are utilized. Additional surface disturbance will usually be limited to waste disposal facilities, for example, tailing dams and ponds.
PRODUCTION POTENTIAL	The capability of the land or water to produce life-sustaining features (forage, cover, aquatics).
PRODUCTIVITY	See Site Productivity.
PROGRAM DEVELOPMENT AND BUDGETING	The process by which activities for the Forest are proposed and funded.
PROPOSED ACTION	In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency intends to implement or undertake and which is the subject of an environmental analysis.
PROSPECTING	The searching of an area which is thought to contain mineral resources. Investigative techniques such as geologic reconnaissance or mapping, geochemical sampling, photogeology, and geophysical prospecting are used. Economic resources cannot be identified but information is gained which indicates a greater or less probability of their being present. Surface disturbance is usually non-existent or negligible.
PRUNING	The removal of live or dead branches from standing trees.
PUBLIC ACCESS	Usually refers to a road or trail route over which a public agency claims a right-of-way available for public use.
PUBLIC INVOLVEMENT	A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) Informing the public about Forest Service activities, plans, and decisions, and (2) Encouraging public understanding about and participation in the planning processes which lead to final decision making.
PUBLIC ISSUE	A subject or question of widespread public interest relating to management of the National Forest System.
PUDDLING	Soil puddling is a physical change in soil properties due to shearing forces that destroy soil structure and reduce porosity. Detrimental puddling is observed as vehicle tracks when soil is molded and when depth of rutting has reached 6 inches or more in depth.
PURCHASER CREDITS	Credits timber purchasers receive applied toward the sale of timber in exchange for building the roads needed for access.

RANGE ALLOTMENT — A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

RANGE, TRANSITORY — See Transitory Range.

RANGELAND — Land on which the climax vegetation (potential natural plant community) is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities. It also includes areas species that are managed like native vegetation.

RANGER DISTRICT — Administrative subdivision of the Forest supervised by a District Ranger.

RARE II — See Roadless Area Review and Evaluation II.

REAL DOLLAR VALUE — A monetary value that compensates for the effects of inflation.

RECEIPT SHARES — The portion of receipts derived from Forest Service resource management that is distributed to state and county governments, such as the Forest Service 25 percent fund payments.

RECEIPTS — Money collected from timber stumpage, livestock grazing, campgrounds, special use permits, and oil and gas lease rentals and royalties, and returned to the federal treasury.

RECLAMATION — The process which may take place after mineral exploration, development, or production. The land is made suitable for other uses by reshaping, filling, seeding, fertilizing, and/or irrigating.

RECORD OF DECISION — A document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.

RECREATION CAPACITY — The number of people that can take advantage of a recreation opportunity at any one time without substantially diminishing the quality of the experience sought after.

RECREATION EXPERIENCE LEVEL — A concept used in recreation management to delineate the range of opportunities for satisfying basic recreation needs of people. A scale of five experience levels ranging from "primitive" to "highly developed" is planned for the National Forest System.

RECREATION INFORMATION MANAGEMENT (RIM)

The Forest Service system for recording recreation facility condition and use.

RECREATION LIVESTOCK USE

The use of an area by animals, such as horses and mules, which are used primarily in conjunction with recreation activities.

RECREATION OPPORTUNITIES

The combination of recreation settings, activities, and experiences provided by the Forest.

RECREATION OPPORTUNITY GUIDE

A catalogue describing the recreation activities available on a particular Ranger District.

RECREATION OPPORTUNITY SPECTRUM (ROS)

A system for planning and managing recreation resources that that recognizes recreation activity opportunities, recreation settings, and recreation experiences along a spectrum or continuum.

RECREATION PREFERENCE TYPE (RPT)

A term used to indicate the types of recreation experiences sought after by Forest users. They are overlapping portions of the total recreation preferences spectrum that the public may express demands for.

RPT I. Orientations toward using natural, unmodified environment for the appreciation and understanding of natural phenomena; as a source of intellectual and/or physical challenges; for seeking solitude; and for esthetic stimulations.

RPT II. Orientations toward using natural or semiprimitive environment in searching for and extraction of indigenous fish and/or game species, rocks, minerals, edible plants, etc., and for enjoyment of the physical surroundings in which such extractable objects are found.

RPT III. Orientations toward using semiprimitive, lightly developed areas for relaxing in natural surroundings; as a source of tranquility and freedom from tension; and for esthetic stimulation.

RPT IV. Orientation toward using moderately developed areas and surrounding environment for intentional social interaction and group learning experiences.

RPT V. Orientations toward using highly developed areas for social interactions with many other people and for pursuits which allow for the expression of learned physical abilities.

RECREATION RESIDENCE

A house or cabin on National Forest land for seasonal recreational use that is not the primary residence of the owner.

RECREATION TYPES

Developed Recreation - The type of recreation that occurs where modifications (improvements) enhance recreation opportunities and accommodate intensive recreation activities in a defined area.

Dispersed Recreation - That type of recreation use related to and in conjunction with roads and trails that requires few if any improvements and may occur over a wide area. Activities tend to be day-use oriented and include hunting, fishing, berrypicking, off-road vehicle use, hiking, horseback riding, picnicking, camping, viewing scenery, snowmobiling, and many others.

RECREATION VISITOR DAY (RVD)

One visitor day equals 12 hours (one person for 12 hours, or 12 people for 1 hour, or any combination thereof).

REDUCED SERVICE MANAGEMENT

The administration, operation and maintenance of developed recreation sites to established standards with the objective to meet minimum health and safety needs of the visitor and keep the site open to public use.

REFORESTATION

The renewal of forest cover by seeding, planting, and natural means.

REGENERATION

The renewal of a tree crop, whether by natural or artificial means. This term may also refer to the crop itself.

REGIONAL FORESTER

The official responsible for administering a single Region of the Forest Service.

REGIONAL GUIDE

A document developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and established management standards and guidelines for National Forest System lands of a given Region to the Forests within a given Region. It also disaggregates the RPA objectives assigned to the Region to the Forests within that Region.

REGULATED

The commercial forest land that is organized for timber production under the principle of sustained yield. The harvest of timber from this land is regulated to achieve multiple long range objectives, such as maintaining setting for recreational activities, rotating forage production areas and wildlife habitat, increasing water production yield, and increasing the growth and utilization of timber for the Nation's supply.

REGULATIONS

Refers to the Code of Federal Regulations for implementing the National Forest Management Act, 36 CFR, Part 219.

RENEWABLE RESOURCES — Resources that are possible to use indefinitely, when the use rate does not exceed the ability to renew the supply. However, in the RPA program, the term is used to describe those matters within the scope of responsibilities and authorities of the Forest Service as required by the Forest and Rangeland Renewable Resources Planning Act of 1974. Consequently, the renewable resources include: timber, range, minerals, wildlife and fish, water, recreation, and wilderness.

RENEWABLE RESOURCES ASSESSMENT — An appraisal of the Nation's renewable resources that recognizes their vital importance and the necessity for long-term planning and associated program development. The Assessment meets the requirements of Section 3 of the Forest and Rangeland Renewable Resources Planning Act and includes analysis of present and anticipated uses, demands, and supplies of the renewable resources; a description of Forest Service programs and responsibilities; and a discussion of policy considerations, laws, and regulations.

RENEWABLE RESOURCES PROGRAM — The program for management and administration of the National Forest Service System, for Research, for Cooperative State and Private Forest Service programs, and for conduct of other Forest Service activities in accordance with Section 4 of the Forest and Rangeland Renewable Resources Planning Act.

RESOURCE ALLOCATION MODEL — A mathematical model using linear programing which will assign prescriptions to land areas and schedule implementation of those prescriptions simultaneously. The end purpose of the model is to find a schedule and prescription assignment that meets the goals of the Forest and optimizes some objective function such as "maximize PNV".

RESOURCE ELEMENT — A collection of activities from the various operating programs required to accomplish the Forest Service mission and which fulfill statutory or Executive requirements. There are seven resource elements: Recreation, Wilderness, Wildlife and Fish, Range, Timber, Water, and Minerals.

RESEARCH NATURAL AREA — An area in as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and acquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.

RETENTION (VQO) — See Visual Quality Objectives (VQO).

RETURNS — Undiscounted value of dollar receipts to the Federal Government, including timber stumpage receipts, grazing fees, and recreation fees.

RIGHT-OF-WAY — Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project facility passing over, upon, under, or through such land.

RIM — See Recreation Information Management.

RIP — Vegetative working group symbol for the habitat types that occur in riparian areas.

RIPARIAN AREAS — Areas with distinctive resource values and characteristics that are comprised of an aquatic ecosystem and adjacent upland areas that have direct relationships with the aquatic system. This includes floodplains, wetlands, and all areas within a horizontal distance of approximately 100 feet from the normal high water line of a stream channel, or from the shoreline of a standing body of water.

RIPARIAN ECOSYSTEM — A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. It is identified by soil characteristics and by distinctive vegetative communities that require free or unbounded water.

RNA — See Research Natural Areas.

ROAD CREDITS — Credits earned by timber purchasers and which are applied toward the sale price of timber in exchange for building the roads needed for access.

ROAD MAINTENANCE LEVELS — Road maintenance levels are as follows:

Level 1: Basic custodial care as required to protect the road investment and to see that damage to adjacent land and resources is held to a minimum. The road is not normally open to traffic.

Level 2: Same basic maintenance as Level 1 plus logging out, brushing out, and restoring the road prism as necessary to provide passage. Route markers and regulation signs are in place and useable. Road is open for limited passage of traffic, which is usually administrative use, permitted use, and/or specialized traffic.

Level 3: Road is maintained for safe and moderately convenient travel suitable for passenger cars. Road is open for public travel, but has low traffic volumes except during short periods of time (e.g. hunting season).

Level 4: At this level, more consideration is given to the comfort of the user. Road is usually surfaced with aggregate or is paved and is open for public travel.

Level 5: Safety and comfort are important considerations for these roads which are open to public traffic and generally receive fairly heavy use (100 Average Daily Traffic or more). Roads have an aggregate surface or are paved.

ROAD MANAGEMENT	The combination of both traffic and maintenance management operations. Traffic management is the continuous process of analyzing, controlling and regulating uses to accomplish National Forest objectives. Maintenance management is the perpetuation of the transportation facility to serve intended management objectives.
ROADED NATURAL RECREATION SETTING	A classification on the recreation opportunity spectrum where timber harvest or other surface use practices are evident. Motorized vehicles are permitted on all or parts of the road system.
ROADLESS AREA	A National Forest area which (1) is larger than 5000 acres or, if smaller than 5000 acres, contiguous to a designated wilderness or primitive area; (2) contains no roads and (3) has been inventoried by the Forest Service for possible inclusion in the wilderness preservation system.
ROADLESS AREA REVIEW AND EVALUATION (RARE) II	A comprehensive process, instituted in June 1977, to identify roadless and undeveloped land areas in the National Forest System and to develop alternatives for both wilderness and other resource management.
ROS	See Recreation Opportunity Spectrum.
ROTATION	The planned number of years between the formation or generation of trees and their harvest at a specified stage of maturity.
ROUNDWOOD	The volume of logs or other round products required to produce lumber, plywood, woodpulp, paper, or other similar products.
RPA	See Forest and Rangeland Renewable Resources Planning Act of 1974
RPA PROGRAM	The recommended national direction for long-range management of renewable resources on National Forest System lands.
RURAL RECREATION SETTING	A classification on the recreation opportunity spectrum that is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high.
RVD	See Recreation Visitor Day.
S40M60	Symbol for landtype group; moderate to nonsensitive soils on slopes over 60 percent and sensitive soils on 40 to 60 percent slopes.
SS+60	Symbol for landtype group; sensitive soils on slopes over 60 percent.

SALE SCHEDULE — The quantity of timber planned for sale by time period from an area of suitable land covered by a forest plan. The first period, usually a decade, of selected sale schedule provides the allowable sale quantity. Future periods are shown to establish that long-term sustained yield will be achieved and maintained.

SALVAGE HARVEST — The cutting of trees that are dead, dying, or deteriorating (e.g., because they are overmature or materially damaged by fire, wind, insects, fungi, or other injurious agencies) before they lose their commercial value as sawtimber.

SANITATION HARVEST — The removal of dead, damaged, or susceptible trees, essentially to prevent the spread of pests or pathogens and so promote forest hygiene.

SAWTIMBER — Trees containing at least one 8-foot piece with a 5.6 inch diameter inside bark at the small end and meeting the Regional specification for freedom from defect. Softwood trees must be at least 8 inches in diameter at breast height for all species except lodgepole pine which will be 7 inches at breast height.

SCENIC EASEMENT — A legal interest in the land of another which allows the easement holder specified uses or rights without actual ownership of the land; in this case, control of the use of land adjacent to public highways, parks, and rivers. It may provide something attractive to look at within the easement area, an open area to look through to see something attractive beyond the easement itself, or a screen to block out an unsightly view beyond the easement area.

SCOPING PROCESS — An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and deemphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly. (Ref. CEQ regulations, 40 CFR 1501.7).

SEDIMENT — Solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site of origin by air, water, gravity, or ice.

SEED TREE CUTTING — The removal in one cut of most of the mature trees from an area, leaving only a small number of desirable trees to provide seed for regeneration.

SEEDLING/ SAPLING — A size category for forest stands in which trees less than 5 inches in diameter are the predominant vegetation.

SEISMIC EXPLORATION

Seismic exploration is used to map underground geological features to obtain information on the earth's subsurface and to locate areas where accumulations of oil and gas might occur.

Seismic waves, generated at or near the surface, penetrate the earth's crust and reflect from subsurface rock layers back to the surface. The geophysicist receives a printed record or seismograph from which is measured the depth to various strata and from which subsurface structures with a potential for oil and gas accumulation can be determined such as faults, anticlines, and folds.

Portable - Where access limitations, topography, or other restraints prevent use of trucks, portable operations can be performed. Two portable techniques exist for collecting data.

These are:

(1) Surface charge programs involve the detonation of a series of as much as 50 to 100 pounds of explosives at shot points located at intervals along the seismic line. Surface charges can be placed directly on the ground, on snow, or on a variety of stakes or platforms. All necessary equipment to conduct the operation is transported by helicopters and then conveyed by foot travel.

(2) Various kinds of portable drills can be backpacked or delivered by helicopter to the area. A shallow subsurface portable program would involve drilling a pattern of approximately 16 holes about 4 inches in diameter up to 50 feet deep per mile of line. At this depth, a 10 to 40 pound charge of explosive is placed and detonated. Recording cables and geophones are laid out by foot travel.

With both of these portable techniques, shock waves generated by detonation are received and transmitted via geophones and cable to a recording device. Portable methods are generally used on the Forest.

Conventional - The conventional method of collecting seismic data includes the use of truck-mounted drills and vehicle-supported crews and generally involves off-road travel. This technique involves drilling 5 to 18 5-inch diameter holes per mile to a depth of 180 to 200 feet. At this depth, a 10 to 100 pound explosive charge is placed and detonated. Shock waves are received and transmitted via geophones and cable to a truck-mounted recording device. Due to terrain restrictions, this method has limited application on the Forest.

Vibroseis - The vibroseis technique involves using truck-mounted hydraulic pads which generate energy waves through vibration rather than explosives. The vibrator method typically consists of four large trucks each equipped with a vibrator (a steel slab weighing about three tons) mounted between the front and back wheels. The vibrator pads (about 4 feet square) are lowered to the ground and vibrators on all trucks are triggered electronically from the recorder truck. Energy waves are received and transmitted via cable and geophones to a recorder truck. After the information is recorded, the trucks move forward a short distance and the process is repeated. The vibroseis operation is usually limited to roads and gentle terrain.

SELECTION CUTTING — The annual or periodic removal of trees as part of an uneven-age silvicultural system. Cutting can involve individual trees or small groups of trees to meet a predetermined goal of size and species composition in the remaining stand.

SEMIPRIMITIVE RECREATION SETTING — A classification on the recreation opportunity spectrum that characterizes a predominately natural or natural appearing environment of a moderate to large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but are subtle.

SENSITIVE SPECIES — Those plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations.

SEQUENTIAL BOUNDS — A set of constraints used in linear program models to establish the relationship of the quantity of an output to preceding and succeeding quantities of that output (e.g. the forage production in one time period cannot increase or decrease over ten percent from the forage production of the previous time period).

SERAL — A biotic community which is developmental; a transitory stage in an ecologic succession.

SEVERELY BURNED SOILS — Soils are severely burned when the top layer of mineral soil has been significantly changed in color, usually to red, and the next one-half inch blackened from organic matter charring by heat through the top layer.

SHELTERWOOD CUTTING — The removal of a stand of trees through a series of cuttings designed to establish a new crop with seed and protection provided by a portion of the stand.

SIDE CAST — Road construction where the excavated soil is deposited on the downhill side.

SILVICULTURAL EXAMINATION — The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a forest area such as a stand.

SILVICULTURAL SYSTEMS	A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.
SITE PREPARATION	A general term for a variety of activities that remove competing vegetation, slash, and other debris that may inhibit the reforestation effort.
SITE PRODUCTIVITY	Production capability of specific areas of land.
SLASH	The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees.
SLOUGH WIDENING	Additional road widening to allow for loss of soil on the downhill side.
SMALL GAME	Birds and small mammals normally hunted or trapped.
SNAG	A standing dead tree usually greater than 5 feet in height and 6 inches in diameter at breast height.
SOCIAL ORGANIZATION	The structure of a society described in terms of institutions, community cohesion, and community stability.
SOCIAL VARIABLE	A variable that measures the social impact of Forest Service management alternatives. Examples include population statistics, types of institutions, and personal opinion as reflected in attitudes or as demonstrated by behavior.
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 and nutrients 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 land for some special purpose.
STAGNATION	A condition where plant growth is markedly reduced or even arrested through, e.g., competition, state of the soil, or disease.
STAND	A community of trees or other vegetative growth occupying a specific area and sufficiently uniform in composition (species), age, spatial arrangement, and conditions as to be distinguishable from the other growth on adjoining lands, so forming a silvicultural or management entity.

STANDARD AND GUIDELINE — An indication or outline of policy or conduct.

STIPULATIONS — Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources and uses.

STOCKING — A measure of timber stand density as it relates to the optium or desired density to achieve a given management objective.

STREAM ORDER — A measure of the position of a stream in the hierarchy of tributaries. (Stream as referenced here refers to perenniel streams.)

First-order streams are unbranched streams, that is they have no tributaries.

Second-order streams are formed by the confluence of two or more first-order streams. They are considered second-order until they join another second-order or larger stream.

Third-order streams are formed by the confluence of two or more second-order streams. They are considered third-order until they join another third-order or larger stream.

SUBDIVISIONS — Areas of previously undeveloped land divided into individual homesites and/or blocks of lots with streets or roads and open spaces.

SUCCESSIONAL STAGE — A phase in the gradual supplanting of one community of plants by another.

SUITABILITY — The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

SUITABILITY ANALYSIS — Process of identifying National Forest lands to be managed for timber production. Stage I identifies the biologically capable, administratively available, and technically suitable lands. Stage II consists of an economic analysis of costs and benefits of timber management on the lands identified in Stage 1. Stage III provides the final assignment of suitable lands based on Forest objectives and economic efficiency.

SUITABLE FOREST LAND	Forest land (as defined in CFR 219.3) for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.14); and for which there is management direction that indicates that timber production is an appropriate use of that area.
SUITABLE TIMBERLAND	See Suitable Forest Land.
SUPPLY	The amount of an output that producers are willing to provide at a specific price, time period, and conditions of sale.
SUPPORT ELEMENT	A collection of major Forest Service activities which complement the resource elements. There are five support elements: Protection, Lands, Soils, Facilities and Rural Community and Human Resources.
SUPPRESSION (FIRE SUPPRESSION)	Any act taken to slow, stop, or extinguish a fire. Examples of suppression activities include fireline construction, backfiring and application of water or chemical fire retardants.
SYSTEM ROADS	See Forest System Road.
TARGET	A quantifiable output assigned to the Forest.
TEMPORARY ROAD	Those roads needed only for the purchaser or permittee's use. The Forest Service and the purchaser or permittee must agree to the location and clearing widths. Temporary roads are used for a single, short-term use, e.g. to haul timber from landings to Forest development roads, access to build water developments, etc.
TENTATIVELY SUITABLE TIMBERLAND	See Potentially Suitable Land.
THERMAL COVER	Cover used by animals to ameliorate chilling effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure of 70 percent or more.
THINNING	An intermediate cutting made to maintain acceptable growth rates of remaining trees.
THREATENED & ENDANGERED SPECIES	Any species, plant or animal, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its' range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

THREE-STEP SHELTERWOOD — An even-aged silvicultural system in which the old crop (the shelterwood) is removed in three successive cuttings in order to provide a source of seed and/or protection for regeneration.

TIERING — Refers to the elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement of broader scope. For example, a project environmental assessment could be tiered to the Forest Plan EIS.

TIMBER — A general term for the major woody growth of vegetation in a forest area.

TIMBER BASE — The lands within the Forest that are suitable for timber production.

TIMBER PRODUCTION — The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For purposes of this subpart, the term "timber production" does not include production of fuelwood.

TIMBER STAND IMPROVEMENT (TSI) — All noncommercial intermediate cuttings and other treatments to improve composition, condition, and volume growth of a timber stand.

TRAILHEAD — The parking, signing, and other facilities available at the terminus of a trail.

TRANSITORY RANGE — Land that is suitable for grazing use for a period of time. For example, on particular disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

TREE OPENING — An opening in the Forest cover created by the application of even-aged silvicultural practices. The Northern Regional Guide established size limitations and guidelines to determine when cut areas are no longer considered openings.

TRESPASS — The act of going on another's land or property unlawfully.

TWO-STEP SHELTERWOOD — An even-aged silvicultural system in which the old crop (shelterwood) is removed in two successive cuttings in order to provide a source of seed and/or protection for regeneration.

UNDERBURNING — Burning fuels under a forest canopy.

UNDERSTORY — The trees and other woody species which grow under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

UNEVEN-AGED MANAGEMENT

The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

Individual Tree Selection Cutting - The removal of selected trees from specified size and age classes over the entire stand area in order to meet a predetermined goal of size or age distribution and species composition in the remaining stand.

Group Selection Cutting - The removal of small groups of trees to meet a predetermined goal of size distribution and species in the remaining stand.

UNREGULATED HARVEST

This harvest is not charged against the allowable sale quantity. It includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products. It also includes all volume removed from unsuitable areas. Harvests from unsuitable areas will be programmed as needed to meet multiple use objectives other than timber production and for improvement of administrative sites.

UNSUITABLE TIMBERLAND

Lands not selected for timber production in Step II and III of the suitablility analysis during the development of the Forest Plan due to (1) the multiple-use objectives for the alternative preclude timber production, (2) other management objectives for the alternative limit timber production activities to the point where management requirements set forth in 36 CFR 219.27 cannot be met and (3) the lands are not cost-efficient over the planning horizon in meeting forest objectives that include timber production. Land not appropriate for timber production shall be designated as unsuitable in the Forest Plan.

UTILITY CORRIDOR

See Corridor

UTILIZATION STANDARDS

Standards guiding the use and removal of timber. They are measured in terms of diameter at breast height (d.b.h.) and top of the tree inside the bark (top d.i.b.) and the percentages of "soundness" of the wood.

VALUE, MARKET

The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay as evidenced by market transactions.

VALUE, NONMARKET — The unit price of an output not normally exchanged in a market after at least one stage before consumption, and thus must be imputed from other economic information.

VEGETATION TREATMENT — Any activities undertaken to modify the existing condition of the vegetation.

VIABLE POPULATION — A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population in the planning area.

VISITOR INFORMATION SERVICE (VIS) SITE — A site which provides interpretative information, (directional, historical, statistical) located at Forest historical sites, overlook sites, or special interest areas.

VISUAL MANAGEMENT SYSTEM — Forest Service system for identifying visual characteristics of the landscape and analyzing potential visual effects of resource management actions.

VISUAL QUALITY OBJECTIVE (VQO) — A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

Preservation: In general, human activities are not detectable to the visitor.

Retention: Human activities are not evident to the casual Forest visitor.

Partial Retention: Human activities may be evident, but must remain subordinate to the characteristic landscape.

Modification: Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in middle-ground or background.

Maximum Modification: Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Enhancement: A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

VISUAL RESOURCE — The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO — See Visual Quality Objective.

WALLOW	A depression, pool of water, or wet area produced or utilized by elk or moose during the breeding season.
WATER YIELD	The measured output of the Forest's streams.
WATER YIELD INCREASE	Additional water released to the Forest streams as a result of Forest management activities.
WEEDING	Generally a cultural operation eliminating or suppressing undisturbed vegetation, mainly herbaceous, during the seedling stage of a forest crop, thus reducing competition with the seedling stand.
WET AREAS	Sites, often occurring at the heads of drainages, such as wet sedge meadows, bogs, or seeps. They are often referred to as "moist sites" and are very important components of elk summer range. Sites near water are important because the forage they produce is highly nutritious and heavily utilized by elk.
WETLANDS	Those areas that are inundated by surface or ground water with a frequency sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs.
WILDERNESS	Federal land retaining its primeval character and influence without permanent improvements or human habitation as defined under the 1964 Wilderness Act. It is protected and managed so as to preserve its natural conditions which (1) generally appear to have been affected primarily by forces of nature with the imprint of man's activity substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and confined type of recreation; (3) has at least 5,000 acres or is of sufficient size to make practical its preservation, enjoyment, and use in an unimpaired condition, and (4) may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.
WILDERNESS ATTRIBUTE	One of four attributes required or mentioned in the Wilderness Act, i.e. natural integrity, apparent naturalness, outstanding opportunity for solitude, and primitive recreation. Supplemental attributes are outstanding ecological, geological, scenic, and historical features.
WILDERNESS STUDY	An analysis to determine an area's appropriateness, cost, and benefits for addition to the National Wilderness Preservation System.
WINDOWS	Usually short, narrow passageways through constrained areas which are the most feasible potential locations for utility corridor facilities. Examples include mountain passes, restricted passages between exclusions and or avoidance areas.

WINTER RANGE	See Big Game Winter Range.
WITHDRAWAL	An order removing specific land areas from availability for certain uses.
WORK YEAR EQUIVALENTS	This is 2,087 working hours. May be accomplished by one person working yearlong or several people filling seasonal positions.
YARDING	The operation of hauling timber from the stump to a collecting point.
ZONE OF INFLUENCE	A delineated geographic area within which the present and proposed actions exert an important influence on residents and visitors.

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