Final Environmental
Impact Statement

THE GALLATIN NATIONAL FOREST
LAND AND RESOURCE MANAGEMENT PLAN

Type of Action — Administrative

Responsible Federal Agency — Forest Service, USDA

Responsible Official

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Abstract

This Final Environmental Impact Statement describes the Preferred Alternative and alternatives, including a "current management" alternative for managing the land and resources of the Gallatin National Forest. The land area administered is the 1,735,412 acres of the Gallatin. This includes Forest land in portions of Madison, Gallatin, Park, Sweet Grass, Meagher, and Carbon Counties, Montana. The alternatives provide different mixes of management prescriptions, resulting in different levels of outputs, goods, and services. The environmental consequences for the Proposed Action and alternatives are displayed.

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SUMMARY

A. Purpose and Need

This FEIS describes a proposed action and alternative actions for management of the land and resources of the Gallatin National Forest. It describes and documents the analysis of each alternative, and discloses the environmental consequences of its implementation. The proposed action is the basis of the proposed Gallatin National Forest Land and Resource Management Plan, which is a separate document.

This FEIS was developed under direction from the National Forest Managment Act (NFMA), the National Environmental Policy Act (NEPA), and their implementing regulations.

1. Planning Area

The Gallatin National Forest contains 1,735,412 acres and is located in the Rocky Mountains of southern Montana. The Forest occupies parts of Gallatin, Madison, Meagher, Park, and Sweet Grass counties. Blue Ribbon trout streams, native and migratory elk herds, and habitat for the threatened grizzly bear are all of national significance.

The Forest contains the major part of two wildernesses, the Absaroka-Beartooth and the Lee Metcalf. These wildernesses cover about 41 percent of the Forest and consist of 715,674 acres on the Forest. The Gallatin Forest also manages the 36,708-acre, Congressionally designated Cabin Creek Recreation and Wildlife Management Area. Within the Gallatin are 637,659 acres of roadless lands in 12 different roadless areas.

2. Issues, Concerns, and Opportunities

The following issues, concerns, and opportunities (ICO's) were developed through a public participation program. Public workshops were held during December 1980 in Bozeman, West Yellowstone, Livingston, Big Timber, and Gardiner, Montana. Brochures were mailed to the public listing tentative issues and inviting public response. Meetings of Forest employees in the Supervisor's Office and on the Ranger Districts were used to identify management concerns. Additional public involvement was initiated in September of 1983 to aid in resolution of the roadless management question.

The issues, concerns, and opportunities addressed in the Forest Plan are:

1. How will the Gallatin Forest provide a broad spectrum of recreation opportunities to meet identified demands?

2. How should the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area be managed?

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

4. What will be the management direction for the Absaroka-Beartooth and Lee Metcalf wildernesses, and the Cabin Creek Recreation and Wildlife Management Area?

5. How will fish and wildlife habitats be managed to maintain viable populations of indicator species to meet fish and wildlife objectives established in cooperation with the Department of Fish, Wildlife, and Parks?

6. What will be done to maintain or improve important habitat of threatened or endangered species?

7. What lands are suitable for grazing, and how will the range resource be managed to provide for grazing?

8. What should be the level of timber harvest that can be scheduled on lands available, suitable, and capable for timber production? What mix of products best meets this schedule? What range of vegetative management (i.e., silvicultural systems) practices will be used on various forest types?

9. What should be done to protect water quality and soil productivity?

10. What special attention will be given to the use and management of riparian areas?

11. What will be the effects between use of renewable resources and the management of geothermal, oil, gas, and mineral activities?

12. How should National Forest lands in intermingled ownership be managed? How will landownership problems be resolved to support land management goals?

13. Where should public access to National Forest lands be acquired and what transportation facilities should be constructed, operated, and maintained?

14. Where and under what conditions should fire be used as a tool for land management?

New Issues Since the Draft EIS

1. How should the activities of the various land management agencies within the Greater Yellwstone Area be coordinated?

2. What should be done to reduce below-cost timber sales?

3. Does the Forest contain rivers and streams which should be considered for classification under the Wild and Scenic Rivers Act?

B. Alternatives

1. Introduction

This chapter presents the description and effects of alternative ways of managing land and resources on the Gallatin National Forest. The alternative preferred for further development as the Final Forest Plan is identified as Alternative 7.

2. Alternative Development Process

Alternatives were developed that are responsive to issues and concerns and the opportunities that are available on the Gallatin. Each alternative was formulated so that multiple use of the resources would occur. Each alternative harvests timber, provides grazing for livestock and habitat for big game and other wildlife, manages wilderness, provides recreation opportunities, makes lands available for minerals, and provides wildfire protection. The differences between alternatives are reflected in the amount and emphasis placed on the individual resources.

a. Alternative 1

This alternative was based on the current management direction for the Forest. The alternative portrays what would happen if current direction were to continue as presently set through law, policy, existing unit plans, and project environmental analysis.

Current trends would continue for recreation, livestock grazing, and wildlife. The timber harvest would increase somewhat. No new developed recreational facilities would be constructed, and some deterioration would continue in existing facilities. The Lionhead, Reef, and Republic Mountain roadless areas would be recommended for wilderness. This would add 25,494 acres of the Gallatin National Forest to the existing 715,674 acres of wilderness.

b. Alternative 2

This alternative emphasizes production of timber, livestock forage, and minerals. It attains the highest outputs of salable commodities from the Forest of any alternative. Costs would be high with this alternative because of the amount of resource investment and road construction required.

Recreation is not emphasized and big game numbers would decline. This alternative requires the greatest amount of roading. Public access to the Forest would improve under this alternative, but there would be increased sedimentation of streams with a loss to fish habitat. The Hyalite-Porcupine-Buffalo Horn Study Area would be recommended for nonwilderness. No additional wilderness would be established by this alternative.

c. Alternative 3

This alternative reduces costs of present management by 20 percent. Investments in timber and range programs would be low, which would cause a

reduction in timber harvest and livestock grazing. Few new roads would be constructed.

Reduced investments for recreation management would cause congestion at existing campgrounds and popular dispersed recreation areas such as lakes or easily accessed scenic areas. Trail construction and maintenance would decline.

Within the Hyalite-Porcupine-Buffalo Wilderness Study Area, 64,200 acres of National Forest land would be recommended for wilderness. This area would also encompass 16,100 acres of private lands which the Forest Service would attempt to acquire through land exchanges. Also within the boundary of the proposed wilderness there is about 3,700 acres of State of Montana land which is administered by the Department of Fish, Wildlife and Parks as a wildlife range. This would probably not be acquired.

The capacity to produce elk would increase slightly by reducing livestock grazing on winter ranges. Low levels of development under this alternative would create some indirect benefits for wildlife, such as less disturbance.

d. **Alternative 4**

This alternative was designed to meet the 1980 program targets set for the Forest through the Resourse Planning Act. These targets cover most of the goods, services, and public benefits produced by the Forest. They include priced commodities like timber as well as less tangible benefits such as viable populations of grizzly bear. Higher Forest budgets than at present would be required by Alternative 4 because of the resource investments required.

Most RPA targets could be met. Increases would be apparent in elk forage, livestock grazing, timber harvest, stream trout, and in other areas. The part of the Hyalite-Porcupine-Buffalo Horn Study Area consisting of solid National Forest ownership--about 22,100 acres--would be recommended for wilderness under this alternative. The Lionhead, Reef, and Republic Mountain roadless areas would also be recommended for wilderness. This alternative would add an additional 47,594 acres to the wilderness system.

e. **Alternative 5**

This alternative was designed to manage the Forest with an emphasis on economic efficiency. Management policies would maximize the value of the Forest's resources. Economic efficiency was attained by controlling the timing, mix, and intensity of resource activities on the Forest. This scheduling is consistent with Forest Service policy and legal requirements.

Timber management would take place on 239,300 acres of suitable timberland--about a 4 percent decrease over the present timber base. The annual timber harvest over the next 10 years would be about one half the present, with increases in future decades.

Livestock grazing would not change much in the next 10 years. Elk habitat capacity on the Forest would remain constant. All of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area would be recommended for wilderness. This

would close motorized recreation in the area. The Crazy Mountains, Lionhead, Reef, and Republic Mountain roadless areas, along with a portion of the North Absaroka roadless area, would be recommended for wilderness. This alternative would include an additional 341,400 acres within the wilderness system on the Gallatin. Approximately 82,200 acres of this area is private land and 6,600 is State and City of Bozeman ownership. The resource outputs identified for this alternative are based on the assumption that the National Forest lands outside of the proposed wilderness additions would remain National Forest and not be exchanged for the acres of private lands inside the proposed wildernesses.

f. Alternative 6

In this alternative, most of the present unroaded lands would remain unroaded while roaded lands would be intensively managed. No new wilderness would be created. Timber production, livestock grazing, and motorized recreation use would be concentrated within the roaded areas. Timber harvest would decrease slightly from present levels while livestock grazing would increase due to improved pasture management. Channel erosion and siltation of streams would exceed acceptable levels in some drainages as a result of intensive timber harvest on a small timber base.

Elk numbers would increase over present levels, due partly to habitat improvement projects carried out on roaded lands. Generally, access to nonroaded lands for recreation would be limited to the Forest's trail system. No new developed recreation sites would be built and existing sites would continue to deteriorate.

g. Alternative 7 (Preferred Alternative)

This alternative was chosen as the preferred alternative and is the basis for the proposed Forest Plan. Alternative 7 proposes somewhat more livestock grazing than at present and current levels of timber harvest. These activities will be carefully managed to assure high water quality, good elk/deer winter range conditions, and a broad diversity of recreation opportunities. Alternative 7 would be the most favorable for grizzly bear recovery. Roads constructed into stands of bug-killed timber would provide good opportunities for firewood gathering.

In this alternative, 21,461 acres of the Lionhead and 480 acres of the Republic Mountain roadless areas would be recommended as wilderness. In the Hyalite-Porcupine-Buffalo Horn Study Area, 23,102 acres of National Forest ownership would be managed as a recreational and scenic area and 33,260 acres in the Porcupine and Buffalo Horn drainages would be given special management emphasis for wildlife.

h. Alternative 8

This alternative recommends 78 percent of the presently unroaded lands outside of existing wilderness as wilderness. A high degree of economic efficiency would be practiced on the remainder of the Forest.

The following roadless lands would be recommended for Wilderness: The Hyalite-Porcupine-Buffalo Horn Wilderness Study Area plus adjacent roadless

lands; the Chico, Reef, Republic Mountain, Crazy Mountains, Bridger Mountains, Lionhead, Dry Canyon, and a major portion of the North Absaroka roadless areas. This alternative would provide an additional 473,900 acres within the wilderness system on the Gallatin Forest. About 86,900 acres of this area is private land and 6,600 acres is owned by the State of Montana and City of Bozeman.

The following comments assume that National Forest lands outside of the proposed wilderness additions would remain National Forest and not be exchanged for private lands inside the proposed wildernesses.

Primitive recreation opportunities would be enhanced due to the increased amount of wilderness. Off-road motorized recreation such as snowmobiling and trailbiking would be curtailed in the wilderness areas.

Elk winter range, if not exchanged to private owners, would be managed to increase capacity with a decrease in livestock grazing.

Timber harvest would be about one-half of the present situation and would adversely impact the area's timber industry. Opportunities to gather firewood would be greatly reduced.

i. Alternative 9

This alternative recommends that all of the existing roadless area of the Forest become wilderness. A high degree of economic efficiency would be practiced on the remainder of the Forest. This alternative would provide an additional 589,600 acres within the wilderness system. This increase includes 94,500 acres of private lands and 6,600 acres of State and City of Bozeman ownership.

The following comments assume that National Forest lands outside of the proposed wilderness additions would remain National Forest and not be exchanged for private lands inside the proposed wildernesses.

Primitive recreation opportunities would increase due to the large amount of wilderness. Off-road motorized recreation such as snowmobiling and trailbiking would be curtailed in the wilderness areas.

Elk winter range, if not exchanged to private owners, would be managed to increase capacity with a decrease in livestock grazing.

Timber harvest would be about one half of the present level and would adversely impact on the timber industry of the area. Opportunities to gather firewood would be greatly reduced.

j. Alternative 10 (Departure)

This alternative is similar to Alternative 7 in most respects except that it exceeds the level of nondeclining timber flow, increasing timber harvest above the levels of Alternative 7. The departure situation starts about 70 years into the future and beyond.

The acreage managed for timber on the Forest would be the same as for Alternative 7, and management of the Forest would be identical to Alternative 7 until the increased harvesting begins.

4. Alternative Comparisons

The following table summarizes the major outputs asssociated with each alternative. A more complete listing of outputs and activities can be found in Chapter 2 of the FEIS.

ALTERNATIVE OUTPUT SUMMARY

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Developed Recreation	M RVD	683												
Decade 1			803	803	803	803	803	803	803	803	803	803	803	803
Decade 3			922	922	922	1245	1132	922	1132	1168	1132	1132	1132	0
Decades 5, 10, 15			922	922	922	1245	1244	922	1244	1168	1244	1244	1244	0
Motorized Recreation	M RVD	700												
Decade 1			705	706	587	673	575	620	600	552	541	600	634	690
Decade 3			886	914	822	900	801	845	810	773	761	810	880	881
Decade 5			1059	1115	1036	1108	1007	1057	1004	973	960	1004	1085	1057
Decade 10			1459	1570	1497	1554	1438	1503	1421	1386	1377	1423	1530	1439
Decade 15			1874	2087	1897	2037	1869	1940	1875	1792	1778	1875	1965	1739
Non-Motorized Recreation	M RVD	400												
Decade 1			364	378	423	393	331	409	392	290	261	392	405	370
Decade 3			450	519	644	557	493	601	555	432	387	555	605	444
Decade 5			448	517	662	562	501	614	560	439	393	560	611	451
Decade 10			416	459	613	499	444	556	499	385	345	500	544	438
Decade 15			447	504	601	527	455	563	526	392	353	526	546	430
Primitive Recreation	M RVD	190												
Decade 1			189	272	288	274	352	285	308	373	391	308	310	186
Decade 3			248	356	377	359	457	374	399	484	508	399	402	244
Decade 5			318	456	483	460	591	479	516	626	657	516	520	313
Decade 10			462	663	702	668	647	696	539	698	743	529	544	455
Decade 15			462	663	702	668	647	696	539	698	743	539	544	455
Wilderness Management	M Acres	715.7	741.1	715.7	779.9	763.3	968.2	715.7	737.7	1096.1	1204.1	739.0	715.7	715.7
Roadless Management														
Decade 1	M Acres	637.7	572.1	596.4	573.3	556.6	370.4	631.4	584.1	257.4	149.3	583.1	637.7	637.7
Decade 15			466.8	488.2	569.6	468.8	331.8	615.3	512.0	229.1	135.5	500.7	633.9	637.7
Visual Quality Objectives														
Preservation	M Acres	716	741	716	780	763	968	716	739	1097	1204	739	716	716
Retention	M Acres	31	125	107	188	93	101	238	131	64	60	131	151	235
Partial Retention	M Acres	558	531	386	657	418	337	472	462	214	199	444	672	784
Modification	M Acres	368	289	451	95	395	281	264	342	309	233	360	144	0
Maximum Modification	M Acres	62	49	76	16	67	47	45	61	52	39	61	53	0

ALTERNATIVE OUTPUT SUMMARY (Cont'd)

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Wildlife Habitat Improvement Targets	Acres	720	720	420	403	1500	932	935	600	935	403	950	300	0
Elk Habitat Potential	M Elk	5.6												
National Forest Lands														
Decade 1			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 3			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 5			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 10			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 15			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Hunting Opportunity Index	5th Dec.	.72	.69	.65	.74	.68	.70	.70	.71	.72	.73	.71		
Grizzly Bear Emphasis	M Acres		454	457	641	536	457	495	818	641	641	754		
Stream Fish Habitat	M Fish	509												
Without Improvements														
Decade 1			504	493	517	511	494	511	509	516	516	508	515	523
Decade 3			495	472	502	493	509	516	511	516	520	509	520	523
Decade 5			493	491	471	491	516	516	509	516	517	514	494	523
Decade 10			516	515	518	503	516	516	516	516	519	516	501	523
Decade 15			516	514	520	508	494	503	517	511	511	516	510	523
Livestock Grazing Use	MAUM	43.4												
Decade 1			43.4	44.9	31.8	44.9	44.9	44.9	44.5	44.9	40.0	44.9	59.0	0
Decade 3			43.7	65.1	29.9	57.2	45.6	49.3	45.0	45.0	40.0	50.0	57.0	0
Decade 5			45.7	67.8	28.8	59.7	45.6	49.8	45.0	45.0	40.0	50.0	57.0	0
Decade 10			47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	56.0	0
Decade 15			47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	59.0	0
Allowable Sale Quantity	MMBF	19.2												
Decade 1			25	31	12	16	11	17	21	12	12	21	6	0
Projected Sale Schedule	MMBF													
Decade 3			25	35	6	26	11	17	21	8	8	24	6	0
Decade 5			25	35	9	35	30	17	27	27	25	27	8	0
Decade 10			27	39	10	35	30	25	27	27	25	33	8	0
Decade 15			27	39	10	35	30	25	27	27	25	33	8	0
Decade 1	MMCF	4.7	7	8	4	4	3	4	6	4	4	6	2	0
Decade 3			7	9	2	6	3	4	6	2	2	6	2	0
Decade 5			7	9	2	9	7	4	7	6	6	7	2	0
Decade 10			7	10	3	9	7	7	7	6	6	8	2	0
Decade 15			7	10	3	9	7	6	7	6	6	9	2	0

ALTERNATIVE OUTPUT SUMMARY (Cont'd)

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Long-Term Sustained Yield	MMBF	30.6	30	43	10	35	30	25	27	25	23	33	8	0
	MMCF	7.5	7.4	10.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.4	2.6	0
Suitable Timberland	M Acres	394.9	246.7	367.6	84.8	310.2	239.3	228.6	305.0	216.0	198.6	314.0	64.5	0
Reforestation	Acres	2041												
Decade 1			3120	3620	695	1370	940	2000	1960	415	456	1844	430	0
Decade 3			3190	4270	730	3080	930	2240	2160	512	527	2277	717	0
Decade 5			2630	3520	940	3590	2460	2090	2190	2192	1995	2355	837	0
Decade 10			2500	3140	660	3130	2320	1980	2160	2157	1973	2092	1372	0
Decade 15			2310	3300	950	2830	1730	2260	1660	1656	1409	2206	1724	0
Timber Stand Improvement	Acres	1680												
Decade 1			4110	4110	114	4110	2990	2986	2153	2990	2990	2153	1252	0
Decade 3			3063	2242	326	1083	710	736	1345	352	352	1326	430	0
Decade 5			3126	3851	565	2677	898	1184	2245	512	527	2277	717	0
Decade 10			1626	2042	774	2356	1739	2296	3017	1707	1493	2528	256	0
Decade 15			1483	2025	736	2695	1801	1091	1604	1405	1334	3078	788	0
Water Yield Increase (Base = 2028)	M Ac.Ft.													
Decade 1			6	6	1	2	2	3	3	1	1	3	1	0
Decade 3			14	16	2	9	5	9	10	3	3	10	3	0
Decade 5			15	20	4	14	9	11	13	7	7	13	4	0
Decade 10			14	17	4	17	12	11	13	11	10	14	4	0
Decade 15			12	15	5	17	12	11	13	11	10	15	5	0
Road Construction	Miles/Yr	20												
Decade 1			21.5	28.7	8.7	16.3	13.2	13.6	21.5	10.3	10.2	19.2	4.7	0
Decade 3			30.7	40.2	8.8	25.7	15.3	15.3	23.8	10.6	10.7	27.0	5.8	0
Decade 5			23.6	29.0	4.0	22.7	11.7	7.5	25.7	9.2	7.8	15.3	6.3	0
Decade 10			10.7	16.9	4.3	19.6	11.4	9.5	16.1	10.1	9.1	12.8	5.7	0
Decade 15			11.7	16.6	3.3	17.2	11.4	7.3	18.1	8.9	8.4	17.7	5.5	0
Local Forest-Related Employment	Jobs	2575												
Decade 1			2506	2766	2247	2501	2563	2444	2665	2458	2427	2685	2574	2009
Decade 2			2745	3089	2626	2897	2954	2784	3079	2846	2809	3099	3003	2292

ALTERNATIVE OUTPUT SUMMARY (Cont'd)

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Local Forest-Related Income	$MM	37												
Decade 1			37	42	31	36	36	35	39	35	34	39	39	27
Decade 2			40	46	36	42	41	40	44	39	39	44	41	30
Total Costs	$M	5800												
Decade 1			5768	7695	4756	6290	6035	6038	6354	5652	5545	6442	4909	2599
Decade 3			5985	8166	4830	6860	5957	5963	6778	5368	5262	6892	5071	2676
Decade 5			5872	7764	4835	7281	6420	5781	6838	6106	5866	6884	5050	2727
Decade 10			5327	7679	5146	7501	6833	6337	7392	6613	6305	7180	5126	2727
Decade 15			5689	8024	5007	7524	6648	6357	6709	6355	6071	6995	5170	2727
Returns to US Treasury	$M	804												
Decade 1			1389	1573	432	883	713	897	885	543	535	905	478	115
Decade 3			2618	3341	704	2450	1264	1673	2180	909	902	2231	762	115
Decade 5			3903	5496	1704	6058	5276	2751	4422	4753	4347	4217	1719	115
Decade 10			5390	7159	2033	6531	5543	4706	4044	5127	4621	5299	1719	115
Decade 15			7150	10031	2665	8148	6741	6520	5125	6373	5775	9157	1420	115
Present Net Value 4%	$MM		236	249	292	289	272	278	276	270	259	272	309	208

C. Affected Environment

This chapter describes the environment that may be changed by the implementation of the proposed action or alternative plans considered.

1. Physical, Biological, Social, and Economic Setting

a. Physical Setting

The Gallatin National Forest consists of 1,735,412 acres of National Forest system lands, with 415,826 acres of other ownership within the Forest boundary. The Forest consists of six mountain ranges and one high-altitude plateau. Slopes on the Forest are characteristically steep. Climatic zones vary with altitude from the semi-arid and relatively warm valley bottoms through a broad range of cool, moist coniferous forests to the subalpine and alpine regions characterized by high altitude rocklands.

b. Biological Setting

About 1.3 million acres of the Gallatin's total 1.7 million acres are forested. Primary commercial tree species on the forest are lodgepole pine, Douglas-fir, alpine fir, and spruce. Whitebark pine stands occur on the Forest near the timberline. Bunchgrass, forbs, and related species of flora comprise the more valuable forage on the Forest's rangelands. Elk, deer, and commercial livestock all use these rangelands in different places or at different times. Riparian vegetation along streams or wetlands is of high value on the Gallatin to provide habitat, forage, and browse for wildlife and domestic livestock; to reduce sedimentation in streams; and to retard runoff that might otherwise contribute to flooding. (Wildlife and fisheries on the Forest will be discussed in the next section.)

c. Social and Economic Setting

The Gallatin National Forest exerts a significant economic influence on Gallatin, Park, and Sweet Grass counties. Towns that are affected by activities on the Forest include Bozeman, Livingston, West Yellowstone, Gardiner, and Big Timber. The area-of-influence of the Forest had a population of 63,000 persons in 1980.

2. Current Resource Situation

a. Recreation

In 1980, 2,022,000 recreation visitor days were recorded on the Forest. Thirty-four percent of this use was at developed recreation sites and 66 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.

b. Wilderness, Roadless, and Special Areas

The Gallatin National Forest contains the greater part of two wilderness areas, the Absaroka-Beartooth and Lee Metcalf wildernesses. The Forest also

contains the congressionally designated Cabin Creek Recreation and Wildlife Area.

In addition, 12 roadless areas totaling 637,600 acres had been inventoried on the Forest as of September 1984.

c. **Wildlife and Fish**

The Gallatin Forest provides habitat for approximately 330 wildlife species. Elk herds, both resident and migratory, and a large native population of mule deer are the most abundant big game species. The Forest also has stable populations of moose, bighorn sheep, mountain goats, black bear, and white-tailed deer. The Forest contains habitat occupied by one endangered species--bald eagle--and one threatened species--grizzly bear.

Fish found on the Gallatin include cutthroat, rainbow, brown, golden, and brook trout, rainbow-cutthroat hybrids, arctic graylings, and mountain whitefish. The Forest contains 1,052 miles of fishing streams. Three major rivers that cross the Forest--the Gallatin, Madison, and Yellowstone-- receive national attention as "Blue Ribbon" trout streams.

d. **Range**

At present, 164 permittees are grazing livestock on 148 active grazing allotments on the Gallatin National Forest. These allotments constitute approximately 165,800 acres of rangeland. The current domestic livestock grazing level on the Forest is 38,920 Animal Unit Months per year from permanent range.

e. **Timber**

At present, about 440,000 acres of the Gallatin Forest are classified as available and capable for timber management activities. The Forest now has 395,000 acres in the timber base. About 33,600 acres of productive forest land are presently unavailable for timber and other wood products because they are being studied for wilderness suitability under the Montana Wilderness Study Act. The annual harvest of sawtimber from the Gallatin within the past 15-year period has ranged from 7 to 35 million board feet, averaging 16.3 MMBF cut per year. The annual sell in recent years has increased due to efforts to salvage lodgepole pine killed or threatened by a mountain pine beetle epidemic.

f. **Watershed**

The Gallatin National Forest produces about 2,028,000 acre-feet of water annually. This water yield is greatest during the period of spring runoff. The ability of watersheds to moderate this runoff is important for controlling erosion, assuring water quality, and reducing the hazard of flooding. Riparian vegetation on the Gallatin is important in stabilizing streambanks and achieving these benefits.

Major storage reservoirs on the Forest include Hyalite, Mystic, and Hebgen lakes. There are three municipal watersheds on the Gallatin Forest. Bozeman is the largest municipality served from waters originating on the Forest. The

Forest also has 91 special use permits for water-related facilities, such as water lines, stock watering facilities, reservoirs, and irrigation ditches. Streamflow arising on the Forest is used to irrigate 439,000 acres of cropland and hayland in five counties.

g. Minerals, Oil/Gas

The Gallatin has some known areas of significant minerals potential and some areas of high interest for oil, gas, and geothemal exploration. In recent years increasing value of some minerals has caused a renewed interest in mining on the Forest. At present, the greatest potential for hardrock minerals development is related to exploratory and pilot activities in the Boulder River area for platinum and chromium, and near Jardine for gold. These projects, if developed into major mines, could generate many jobs in the Big Timber and Gardiner/Jardine areas.

Oil and gas activity on the Gallatin is presently limited to seismic and leasing activity. The leasing has taken place in the Madison, Gallatin, Bridger, and Bangtail ranges.

h. Facilities

The Forest currently has 807 miles of Forest development roads on its inventoried system. Approximately 250 miles are maintained annually by the Forest Service. The Forest makes available 1,853 miles of trails for riders and hikers. About 28 percent of the trail system is presently in need of repair or relocation. Developed recreation facilities on the Forest include campgrounds (37), picnic areas (14), developed downhill ski areas (2), boat launches (5), and a visitor information center at Earthquake Lake. The Forest also has a number of existing powerline corridors crossing Forest Service land. These corridors include powerlines through Flathead Pass, a powerline up the Gallatin Canyon, and several powerlines in the Hebgen area serving the town of West Yellowstone.

i. Protection

The Forest presently conducts fire suppression activities to protect timber and other resource values. The impact of past fire protection is most pronounced in the build-up of forest fuels. Fire protection has allowed forest stands to become more even-aged and thus susceptible to natural disease and insect epidemics. The subsequent epidemics allow fuels to build up and create conditions where resistance to fire control is rather high.

Insect and disease pests that affect present management of the Forest, or which could affect future management, include the following: (1) mountain pine beetle in lodgepole and whitebark pine; (2) western spruce budworm in Doublas-fir, subalpine fir, and Engelmann spruce; and (3) dwarf mistletoe in lodgepole pine. At present the most serious problem is posed by an epidemic of mountain pine beetle in lodgepole pine stands. The epidemic is presently most severe on the western side of the Forest but is moving east. Spruce budworm is currently defoliating Douglas-fir in drier habitat types at low to mid-elevations. Dwarf mistletoe is widespread. A 1978 survey suggested that about 42 percent of lodgepole pine on the Forest is infected with dwarf

mistletoe. Control measures for these pests are currently limited to silvicultural techniques.

D. Environmental Consequences

Environmental consequences are the expected 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 designation of additional wilderness would result in lands being left undisturbed. Primitive recreation opportunities would be maintained in these areas, as well as big game security and old growth habitat. Wilderness designation would result in less timber available for harvest and would preclude mineral development in these areas. The opportunity for direct habitat improvement would be eliminated, although some habitat variety could be maintained by wildfires.

2. Roadless Areas

The designation of specific areas for roadless recreation management would essentially keep the areas as they are today. Motorized use by off-road vehicles such as trail bikes or snowmobiles could continue. If access were needed for mining or oil and gas exploration, it could be granted. There would be greater opportunities for wildlife habitat improvements than under wilderness designation.

3. Recreation

Generally, dispersed recreation activities do not have major effects on other resources. However, in areas of heavy use, some resource damage can occur. Recreational use beyond the land's carrying capacity can damage fragile terrain such as high alpine meadows.

The developed recreation sites on the Forest occupy 5,400 acres; these sites have little or no effect on other resources.

4. Threatened and Endangered Species

No alternative is expected to adversely affect a threatened or endangered species. Minimum management requirements, forestwide standards, and management area standards ensure habitat protection for the grizzly bear and bald eagle, the only two threatened or endangered species now known to occur on the Gallatin National Forest. Standards for Management Situation Area 1 grizzly bear areas place first priority on grizzly bear recovery. (These are the areas considered necessary for grizzly recovery.)

5. Wildlife and Fish Habitat

Timber harvest and prescribed burning are the two principal activities scheduled to improve wildlife habitat. Improved livestock grazing practices, particularly in elk winter ranges and riparian areas, also improve wildlife

habitat. Timber harvest and prescribed burns result in increased forage production, with an accompanying reduction in the security cover habitat component. Improved livestock grazing practices result in more forage being available for wintering big game.

Improvement of fish habitat on the Forest is brought about by building of pool development structures and installation of aeration devices to prevent fish winterkill. In addition, culverts that impede fish passage are replaced or altered to enable fish to return upstream for spawning. Effects on other resources would be nil.

6. Minerals

The potential for extensive locatable mineral production appears to be high in the Stillwater Complex, and in the Jardine and Cooke City areas. Development activities would have a significant effect on the onsite environment, but disturbances would occupy a very small area on the Forest because underground mining techniques are anticipated.

The potential for oil and gas production exists. As of May 23, 1984, applications to lease oil and gas rights on over 57,463 acres have been received. Leases have been issued on more than 255,716 acres. Extensive seismic exploration activity has occured but no development has been started. If exploratory or development drilling were to occur, lease stipulations are available to minimize impacts on surface resources. Possible impacts could include additional roading on the Forest. Any future drilling activities could result in impacts on visual quality.

7. Fire Management

Fire suppression activities have a favorable effect in areas where timber management is prescribed because they protect 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. Protection from burning will lead to accumulations of fuels above natural levels and can result in large, damaging fires with burning conditions that 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.

A prescribed burning program can increase forage production and reduce fuel buildup with little attendant risk to soils and watershed.

8. Livestock Grazing

Livestock grazing can affect elk ranges if not carefully managed. When elk and domestic livestock both use elk winter range--even at different times of the year--there is a potential for adverse impacts on both species. This comes through diminished levels of forage on the range when the elk need it and from reducing plant vigor for good forage production in subsequent growing seasons. This adverse effect can be limited by controlling livestock grazing through stocking levels and use of fencing.

Riparian areas can be affected by heavy grazing as streambanks break down and the stream is subject to increased sediment and nutrient levels affecting fisheries. These impacts can be avoided by controlling stocking levels and by use of range improvements such as fencing.

9. Timber Harvest

Clearcutting and shelterwood cutting systems, which produce even-aged timber stands, are the main harvest systems used on the Gallatin. These systems account for over 90 percent of the volume harvested. Uneven-aged harvest systems will be practiced on a limited basis in special areas because it is very difficult to successfully employ this in the timber types on this Forest.

The even-aged harvest that will predominate on the Gallatin has adverse effects on visual quality that are greater in the high harvest alternatives. Water yield from Forest lands would increase with even-aged harvest, but potential for erosion would be mitigated by limits on the equivalent clearcut area allowed in any one drainage. Clearcutting reduces big game security cover, but increases habitat diversity and creates transitory forage that can benefit wildlife. The increased habitat diversity creates conditions where more different wildlife species will be found on the Forest.

Clearcutting can have adverse effects on riparian areas and fisheries habitat, but these effects would mitigated by forestwide standards. Generally, roadless recreation opportunities are reduced in areas where timber harvest occurs, with a corresponding increase in motorized and roaded forms of recreation.

10. Road System

Road construction and management have a greater impact on other resources than any other Forest management activity. Primary effects are the displacement of large amounts of soil, reduced big game security, and decreased visual resource. The wilderness potential of existing roadless areas is eliminated by road construction within those areas. Road construction increases roaded recreation opportunities while decreasing unroaded recreation opportunities.

The public presently encounters serious access problems along some parts of the Forest boundary. Roads that allow the public to reach the Forest boundaries from highways or county roads increase opportunities for recreation and other activities like firewood gathering. The presence of roads can also reduce the difficulty and expense of minerals exploration or development projects. Forestwide standards for road construction and maintenance can reduce some of the negative effects of roading.

CHAPTER I: PURPOSE AND NEED FOR ACTION

A. Introduction

This Final Environmental Impact Statement (FEIS) documents the analysis and discloses the significant environmental effects of Alternative 7 (Preferred Alternative) and other alternatives for the future management of land and resources of the Gallatin 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. This analysis and the Forest Plan are designed to ensure multiple use, address public issues and management concerns, and provide a sustained yield of goods and services from the Forest to maximize long-term Net Public Benefits in an environmentally sound manner. The analysis in the FEIS projects outputs and effects for up to 150 years to indicate the long-term implications of continuing with the Plan. The Forest Plan will guide the management of the Forest for the next 10-15 years unless conditions or demands significantly change. While the long range effects have been estimated, the Plan is valid only until it is revised, committing the Forest to a course of action no longer than 15 years.

Development of this EIS and Forest Plan follows direction from the Forest and Rangeland Renewable Resources Planning Act (RPA), the National Forest Management Act (NFMA), and the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) regulations. Further direction was given by the implementing regulations of NFMA (36 CFR 219) and NEPA (40 CFR 1500-1508). Projects implementing the Forest Plan are subject to the NEPA process. However, environmental effects can be tiered from the broader environmental statements of the RPA program, Regional Guide, and Forest Plan. Actions not covered by the hierarchy of planning levels will require additional environmental analysis.

Development of this EIS and Forest Plan also follows the direction from the Lee Metcalf Wilderness and Management Act of 1983 which requires the Forest Service to establish management direction for motorized travel within the Cabin Creek management area.

B. National, Regional, and Forest Planning

The analysis and the resultant Forest Plan will supersede all previous land and resource management plans prepared by the Forest. This Plan has a direct link to other planning - National and Regional. 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 its 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 for each Forest is based on detailed information furnished by the Forest. Thus the Forest Plan includes direction provided by RPA, NFMA (including the implementing regulations) and the Regional Guide.

The EIS results from the first 7 of 10 planning actions required by NFMA (36 CFR 219). These seven planning action 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.

Planning Records, the documents and files which chronicle the first seven planning steps, are available for inspection at the Forest Supervisor's office, Federal Building, Bozeman, Montana. Reference is made to the planning records in both the EIS and Forest Plan. 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, if necessary, the Forest Plan. The Final EIS and Forest Plan will then be used by the Regional Forester as the information base for a record of decision to complete the planning steps:

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

C. Planning Area

The Forest is located in the Rocky Mountains of southern Montana, extending about 100 miles from east to west and about 125 miles north to south. The Forest shares a long, common border with Yellowstone National Park on the south. The Forest occupies portions of Gallatin, Madison, Meagher, Park, and Sweet Grass counties.

There are 1,735,412 acres of National Forest lands within the Forest boundary. National Forest system land is generally in large blocks with 415,826 acres of other ownership inside the boundary. The Gallatin is adjacent to Yellowstone National Park which, along with Grand Teton National Park and 6 National Forests, makes up the majority of the Greater Yellowstone Area.

For purposes of analysis, the Gallatin's planning area was divided into six geographical areas: The Bridger, Crazy, Gallatin, and Madison ranges, the Absaroka-Beartooth ranges, and the Hebgen Plateau. (See Vicinity Map, Figure I-1.)

About 415,826 acres of nonfederal land are within the Gallatin Forest boundary. About one-third of these inholdings are owned by Burlington Northern Railroad Company. These inholdings were originally landgrants from Congress to the railroads. Some of the railroad grants have passed into other

ownerships over the years, especially in the eastern Gallatin Range and the Crazy mountains. Present or former railroad acreage tends to be in a checkerboard pattern, with sections alternating with National Forest land. Other ownerships within the Forest include homesteads, patented mining claims, State lands, and City of Bozeman lands.

Two designated wilderness areas cover about 41 percent of the Forest. There are 580,562 acres of the Absaroka-Beartooth Wilderness on the Gallatin, with an additional 345,589 acres on the Custer National Forest and 23,750 acres on the Shoshone National Forest. The Gallatin also manages 135,112 acres of the Lee Metcalf Wilderness, with an additional 97,426 acres of this wilderness on the Beaverhead National Forest.

In addition to designated wilderness, the Forest manages the 36,752-acre Cabin Creek Recreation and Wildlife Management Area. This Congressionally designated area will be managed in a roadless condition.

Within the Gallatin are 637,659 acres of other National Forest lands that are presently unroaded. This roadless acreage includes one area covered under the provisions of the Montana Wilderness Study Act (MWSA) (PL. 95-150): the Hyalite-Porcupine-Buffalo Horn area. In the Madison Range there are 149,259 acres of roadless that have been "released" through the Lee Metcalf Wilderness Bill. These will not be re-evaluated now for wilderness. This leaves 488,400 acres of roadless land which will be evaluated for wilderness.

Six roadless areas on the Gallatin National Forest have contiguous portions on other National Forests. These are the Lionhead, extending onto the Targhee National Forest; Reef, on the Shoshone; the Crazies and Box Canyon, on the Lewis & Clark; and the North Absaroka and Beartooth, on the Custer. See Appendix C for the evaluation of roadless areas.

Alternatives for the Hyalite-Porcupine-Buffalo Horn MWSA area are presented in this EIS. Recommendations for this area will not be a part of the Forest Plan record of decision. A separate report and record of decision with the Administration's recommendation to Congress will be prepared. This recommendation is a preliminary administrative recommendation 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. Final decisions on wilderness designation have been reserved by the Congress for itself. The Hyalite-Porcupine-Buffalo Horn Area, subject to existing private rights, will be managed to protect its wilderness character pending review of the recommendations and final action by Congress. This area occupies about 155,011 acres within the Gallatin along the Gallatin Divide. Approximately one third of the area is not National Forest land. The nonfederal land is intermingled in a checkerboard ownership pattern and held by private landowners, the State of Montana, and the City of Bozeman.

Recommendations for any addition to the wilderness system will be included in a separate report and record of decision transmitted by the administration to Congress.

D. Issues, Concerns, and Opportunities

The first of the 10 planning steps involves identification of issues, concerns, and opportunities. Identification of these components determines what benefits people want in terms of goods, services, uses, and environmental conditions. To aid in this step, public workshops were held during December 1980 in Bozeman, West Yellowstone, Livingston, Big Timber, and Gardiner, Montana. This was followed by a mailing of 2,000 brochures listing tentative issues and inviting public response. These brochures were sent to adjacent and intermingled landowners, livestock permittees, trade groups, sportsman's groups, an others who had expressed an interest in Forest planning. Two hundred and sixty-three persons attended the public workshops and 335 other persons submitted response forms after receiving the brochures. Responses from the meetings and the mailing were used to develop a listing of issues for the Forest Plan. See Appendix A for more detail on the issues and concerns that were addressed in the Forest Plan.

Additional public involvement was initiated in September 1983 to aid in resolution of the roadless area question. 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 the Hyalite-Porcupine-Buffalo Horn MWSA area. The Forest had relied on earlier evaluations and recommendations made in the RARE II (Roadless Area Review and Evaluation) Final EIS. Responding to new NFMA regulation 219.17, the Forest is now including an evaluation of roadless areas for wilderness in the Forest Planning process.

A cross-section group of people representing a broad range of interests was organized during the early part of this planning process to provide advice and to act as a sounding board throughout the process. This group of interest leaders has met with the Forest Supervisor and members of the planning organization several times in workshop efforts to provide assistance in the major planning steps.

Changes Since the Draft EIS

Following the publication of the Draft EIS in March 1985, the Forest solicited public comment. Open houses were held in various locations within the planning area, public meetings were held with interested groups, articles appeared in local and regional newspapers and Forest staff made personal contact with interested parties and groups. As a result of these efforts, the Forest received over 2,000 letters during the public comment period addressing a variety of subjects covered in the Draft EIS and Proposed Forest Plan. A general analysis of public comment received is located in Chapter VI. All public comment and Forest Service response is located in unbound Appendix D, available for public review at the Gallatin National Forest Supervisor's Office in Bozeman, MT and the Northern Region Office in Missoula, MT.

The issues, concerns, and opportunities addressed in the Forest Plan are:

1. **New Issues and Concerns**

Greater Yellowstone Area Coordination

In the last few years, the concept of managing the Greater Yellowstone Area (which consists of Yellowstone and Grand Teton National Parks, the six adjacent National Forests, and other state and federal lands) as a single unit has gained support from some of the public. At issue is the cumulative impacts of management activities on the resources of this area which has national recognition because of the tourism attracted by Yellowstone National Park, the grizzly bear as a threatened species, elk and other big game, and the Blue Ribbon fisheries of the Park and National Forests.

Much of the public comment received on the Proposed Forest Plan that dealt with this issue focused on the need to manage the Gallatin National Forest within the concept of the Greater Yellowstone Ecosystem. This included recognizing the unique values of the area and minimizing effects on these values. Part of this should be done through better coordination of activities among the various agencies that manage the land.

Below-Cost Timber Sales

The below-cost sales issue has emerged as a national issue within the last two years. At issue is whether the costs of the timber sale program and necessary road development should be covered by the receipts from these sales. If costs are not covered by receipts and below-cost sales are planned, then what are the other objectives to be met which justify going ahead with the program?

The comments received on the Proposed Forest Plan indicated that because the Gallatin is a "marginal" timber Forest and because it has high recreation and wildlife values which could be affected by timber harvest, many of the public did not want tax dollars spent on producing timber from this Forest. Another facet of the issue is the jobs provided by timber harvest and the effect of reduced sales on employment and industry stability.

Wild And Scenic River Eligibility

This issue was added to the FEIS because of public input on several Region I Plans. Direction has been set to include a preliminary evaluation of rivers on the Forest for their eligibility to be studied for inclusion in a Wild and Scenic River classification.

2. **Recreation**

How will the Gallatin Forest provide a broad spectrum of recreation opportunities to meet identified demands?

Comments from the public on this issue centered on the importance of the Gallatin as a recreation Forest. Some said, "The Plan should recognize the recreational values of the forest land and plan for greater recreational activities and support facilities. It is time the Gallatin realized it is not a timber forest. It is recreation that keeps our economy going." Another

important aspect is the conflict between motorized and non-motorized recreation users.

Representative pro and con comments on this aspect are:

> "Demanding access with motorized vehicles to the more pristine and wild areas of the forest, is like demanding to drive your car over the golf course because you CHOOSE not to walk. Motorized vehicles should be banned at certain times of the year to protect the trails and ensure quiet in calving and fawning areas."

> "When proposals call for restrictions, motorized vehicles are first in line for the cut. Mechanized recreation is important to the elderly, the handicapped, and those individuals who don't have time for extended visits. A reduction of areas available for motorized recreation would severely affect local tourist revenues, especially in the winter, and in certain areas like West Yellowstone and Cook City."

> "One of the unique qualities of our forests is the solitude. That solitude is shattered far and wide by screaming motorcycles. Motorcyclists have failed to demonstrate care and concern for our forest and other forest users."

Other comments suggested the Forest should have separate use areas for motorized and non-motorized users in order to reduce the conflicts.

People also commented on dude ranching and outfitting, such as, "We should not increase backcountry use at the expense of dude ranching, which has existed for years and provides employment and income to the local community." Others objected to the undue influence of private interests concerning land use policies on public land, "By closing or locking up access points, the commercial user controls the public land behind his property."

3. **Roadless and Wilderness**

How should the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area be managed?

How should undeveloped (roadless) areas be managed including recommendations for wilderness or non-wilderness?

What will be the management direction for the Absaroka-Beartooth and Lee Metcalf Wildernesses and the Cabin Creek Management Area?

Changes Since the Draft EIS

Cabin Creek Management Area

Since the release of the Draft EIS and Proposed Forest Plan, public motorized use in the Cabin Creek management area has emerged as an important issue. Public comments received dealt with interpretation of language in the Lee Metcalf Wilderness and Management Act of 1983 and the effects of trail bike use on the protection and propagation of wildlife. Some of the public would

prefer no motorized use within the area while others would prefer that the area be open to motorized use.

Typical comments on the wilderness issue are:

> "Undisturbed wilderness is the most precious thing we can pass on to our children. It is not a renewable resource. Our unspoiled lands are the key to the outdoor and tourist industries in our state. The long term value of wilderness in this area will increase as other places lose their natural areas."

> "There is more than enough wilderness for all. We need timber for progress. Wilderness and no jobs is a very sad outlook. The forests are for everyone. Don't lock up any more of our lands, so that only an outspoken minority can use them."

The input was very evenly divided between wanting much more and wanting no more wilderness.

Roadless areas that received the most comment were the Hyalite-Porcupine-Buffalo Horn Study Area, Cabin Creek, Crazy Mountains, Cherry Creek, and areas adjacent to the Absaroka-Beartooth Wilderness. People that mentioned specific areas generally recommended that they be made wilderness. Although the wilderness decision for Cabin Creek and Cherry Creek has already been made by the Lee Metcalf Wilderness Act, the conflict between motorized and non-motorized use of the area remains.

4. **Fish and Wildlife**

How will fish and wildlife habitats be managed to maintain viable populations of indicator species to meet fish and wildlife objectives established in cooperation with the Montana Department of Fish, Wildlife, and Parks?

What will be done to maintain or improve important habitat of threatened or endangered species?

Many comments indicated that the Proposed Forest Plan does not adequately address the problem of fisheries and water quality. This should be a priority. "Absolutely no further degradation of our fisheries can be permitted." The loss of tourist income due to the degradation of the fisheries would have widespread economic impact. Another common comment was that no stocking should be done, that the trout population should be kept wild.

There was a wide range of public comment on elk, deer, and big game in general.

> "Take the timbering and grazing off big game winter range. You are risking the death and continual decline of wild animals when you take away their food for the cattle and timber industries. Big game is important to bring in hunters and recreationalists, therefore, important to the local economy. The plan should emphasize the protection of aesthetic values, and wildlife habitat as its primary goals."

"Hunting is important to the recreational income of the area. Large elk are an indicator of prime habitat, which should be preserved. Roads, grazing, and timbering affect hunting quality."

Several people said that the Cooperative Elk/Logging Study guidelines should be implemented, but not used in managing deer habitat.

The grizzly bear was one of the highest concerns expressed by the public. Timber harvest, road building, grazing, and recreational development were seen as adversely affecting the bear. "The bear will only survive in the Yellowstone Ecosystem if it is given top priority in undisturbed habitat." Some people thought that bear was being given too much emphasis. Some petitioners wanted all grizzly bear studies to cease.

Grizzly bears were the key species in the Threatened and Endangered category. However, several individual letters mentioned the wolf, bald eagle, peregrine falcon, and trumpeter swan. Comments were both for and against reintroduction of the gray wolf. Comments on other Threatened and Endangered species supported habitat protection.

5. Range

What lands are suitable for grazing, and how will the range resource be managed to provide for grazing?

There were several comments regarding the level of grazing. Some felt the amount of grazing should be increased. However, the majority of the comments wanted reductions in grazing areas with increased emphasis on wildlife. Comments generally opposed reintroducing sheep into the Windy Pass area and Grizzly Bear Situation 1 and 2.

6. Timber

What should be the level of timber harvest that can be scheduled on lands available, suitable, and capable for timber production? What mix of products best meets this schedule? What range of vegetative management (i.e., silvicultural systems) practices will be used on various forest types?

Changes Since the Draft EIS

A public issue that has emerged since the DEIS is the supply of timber to Montana mills, particularly to local mills. The issue is that the local mills are dependent on both private timber and National Forest timber and the supply of private timber is projected to decline in the near future. If this is so, what could or should the Forest Service do to respond, especially in those communities which are dependent upon the employment provided by the mills.

Another issue which is new since the DEIS is the process used to identify suitable timber lands. The question is whether the suitable base is adequate to meet the objectives of the Plan and meet future timber demands.

Typical comments pro and con timber management are:

> "The Forest Service is obligated to provide timber harvest to provide jobs. Reducing the harvest would affect economic stability due to loss of jobs in wood products related industries, especially in Livingston. The survival of Brand S mill is dependent upon your decisions regarding timber production. You can't just take away our livelihood."

> "The Gallatin is not a timber forest. I protest the obvious overemphasis being placed on resource extraction, particularly timber cutting at a deficit and associated accelerated road-building. The product is substandard, and this is a fragile ecosystem with shallow soils, difficult terrain, a short growing season, and slow regeneration. The best use of the forest is not logging but recreation. There are too many overpriced roads. Logging companies should be responsible for costs of roading and regeneration. The timber base is too broad. Too many areas are affected."

> "Timber sales should pay for themselves, including the costs of roading and regeneration. Don't use my tax money to destroy the forests."

Comments other than below-cost sales and the amount of timber harvest were on clearcutting practices, alternatives to clearcutting, and maintaining the availability of firewood.

7. **Water Quality**

What should be done to protect water quality and soil productivity?

What special attention will be given to the use and management of riparian areas?

> "Water quality (purity of supply, purity for wildlife and fish) should be a priority and must be adequately addressed in the plan. Degradation of water quality from timbering, grazing, roading, overuse by humans, etc., would adversely affect tourism and the economy. Water quality should be closely monitored, and damaging forest practices stopped immediately."

These were typical overall comments on water quality.

Many people had special concerns about riparian area management. Some said we need a buffer zone on either side of streams to protect them from adverse impacts. Others said undamaged riparian areas are vital to healthy fisheries and good water quality.

8. **Minerals**

What will be the effects of the management of geothermal. oil, gas, and minerals on renewable resources?

The public expressed some concern over minerals, oil, and gas activity, mostly their adverse impacts. Some said it should not be allowed, there is plenty of private land that can be used. Another concern expressed was the potential effect of geothermal development on the geysers of Yellowstone National Park.

A new issue with oil and gas leasing on the Gallatin is the Connor vs. Burford courtcase. See Chapter III for more detail on the effects of this case.

9. **Access and Land Ownership**

How should National Forest lands in intermingled ownership be managed? How will landownership problems be resolved to support land management goals?

Where should public access to National Forest lands be acquired and what transportation facilities should be constructed, operated, and maintained?

Land ownership concerns expressed by the public dealt mostly with the checkerboard ownership pattern.

> "Land exchanges are felt to be a good solution to checkerboard ownership and access problems. Land exchanges should only be done with owners' consent."

> "The Forest Service should make attempts to acquire (buy) private lands in strategic areas, for access, critical wildlife habitat, and checkerboard consolidation."

Typical comments pro and con access to National Forest lands include:

> "Much of 'my public land' is unnecessarily locked up. Access is needed for hunting, recreation for elderly and handicapped, firewood gathering and fishing. Private landowners adjacent to the forest are curtailing public use for private interests (dude ranches, hideaway homes, private ranchers, etc.). We don't believe any ranch owner or group should control our access."

> The number of proposed accesses is simply not necessary, and would be a burden on private landowners, especially in the Paradise Valley area. Additional access would adversely affect critical grizzly bear and big game habitat, especially in the West Gardiner area. Access also brings in noxious weeds."

In particular, the access proposal for the West Gardiner area drew a huge amount of input. Most people who commented on West Gardiner were against access.

10. **Fire**

Where and under what conditions should fire be used as a tool for land management?

The Forest received very little comment on the use of prescribed fire, except that fire is an alternative to timber harvesting in some areas and that controlled burns can be an effective tool.

Records leading to the identification of major issues are available for review at the Forest Supervisor's Office, and more detailed information is in Appendix A.

E. Summary of Changes Since the Draft EIS

As a result of the public input that was received and because of internal concerns and further review of the documents, several changes have been made in the Forest Plan and Final EIS. These are listed below by the category in which they appear.

1. Changes In The Final EIS

An analysis of alternative ways of managing motorized vehicle use in the Cabin Creek area has been added to the Final EIS. For the Preferred Alternative, area closures have been changed from December 1 to September 1 in the Draft to October 30 to July 15 in the Final EIS.

The wilderness recommendation for Lionhead has been reduced by 1,350 acres in the Preferred Alternative to provide for continued use of a snowmobile trail in Watkins Creek.

Approximately 9,000 acres of roadless lands have been removed from the suitable timber base of the Preferred Alternative. 1,000 acres of these would have been developed and roaded in the first decade.

Potential elk hunting recreation days have been estimated for each Alternative and have been included in Chapter II of the Final EIS.

A discussion of the results of the biological opinion for threatened and endangered species by the U.S.Fish and Wildlife Service is contained in Chapter II of the Final EIS.

The analysis of effects of management activities on the downstream fisheries has been added to the Final EIS, Chapter II.

Fish numbers for all Alternatives have been updated in Chapter II of the Final EIS based on corrections in the model.

The indicator species for fish has been changed from cutthroat trout to wild trout as recommended by the State Department of Fish, Wildlife, and Parks.

The trumpeter swan is included as a sensitive species.

The proposed grazing level of 50,000 AUMs has been reduced in the Preferred Alternative to 45,000 AUMs. Further analysis has shown that the costs of increasing current levels is not warranted.

Suitable timber acres have been reduced from 314,000 acres to 305,000 acres in the Preferred Alternative of the Final EIS and the Forest Plan.

An analysis of below-cost timber sales has shown we will continue to have sales in which the receipts do not equal the costs, but the net public benefit of the overall program outweighs the overall costs. A discussion of this is included in Chapter II of the Final EIS and a discussion of historic Gallatin timber sale costs and receipts is added to Chapter III.

A sensitivity analysis of the effects of using real price increases for timber was done. The results show that using no price increases for the Max PNV Benchmark and the Preferred Alternative tends to decrease their overall PNV, decrease the LTSY (long-term sustained yield), and decrease the suitable lands needed.

Results of analysis of timber utilization standards are included in discussions in Chapter II of the Final EIS. The allowable sale quantity (ASQ) of each Alternative is clarified in Chapter II.

A timber supply study was completed for the State of Montana in March of 1987 to examine the possible supply scenarios throughout the next 50 years. This, along with analysis of the local supply situation, indicates that in the near future of 10 to 20 years there will be a decreasing supply of private timber for local mills to maintain their current level of production. It also indicates that local mills are dependent on at least the level of volume they have been harvesting from the Gallatin NF in the last 5 years and there may be additional pressure to supply more from the National Forests. The results of this study are further discussed in Chapter II and Appendix B of the FEIS.

Testing of the first decade allowable sale quantity (ASQ) and suitable land base has been conducted since the DEIS. This has been done in response to the questions of economics, industry stability, and potential future timber demand. The results of this evaluation are also discussed in Appendix B.

A District Court decision has invalidated the Gallatin Oil and Gas Leasing EA, which covers all the Gallatin National Forest except for a portion of the Hebgen Lake District. A discusion of this situation is included in the Final EIS plus an updated situation statement on oil and gas leasing on the Gallatin.

A new issue covering the Greater Yellowstone Area has been added as a result of public input. This discussion is in Chapter III of the Final EIS.

A more indepth discussion of economic trade-offs has been added to Chapter II of the Final EIS.

Employment as a public benefit and as a measure of economic trade-off has been added as an indicator of Net Public Benefit in Chapter II.

A reduction in discounted timber benefits in the FORPLAN model has resulted in a reduction in PNV for all Alternatives.

2. Changes in the Forest Plan

a. Dispersed Recreation

New Day Use Standards, which direct how commercial day use of the Forest will be managed, have been added to the Forest Plan.

Direction on the linkage of the Forest Travel Map to the Forest Plan has been expanded in the Forest-wide Standards.

A new objective of acquiring trail right-of-way across private land for accessing National Forest lands has been added.

b. **Wildlife - Elk**

Elk/Logging Guidelines have been utilized in the development of the Final Plan. New standards for timber harvest on winter range have been included in MA-11 that will use timber harvest where it is possible to improve winter range habitat.

The amount of acreage scheduled annually for habitat improvement has been reduced from 800 acres to 650 acres. Fewer opportunities for habitat improvement have been identified than were previously assumed.

A new migratory elk winter range prescription has been implemented for the Gardiner/North Yellowstone elk herd. This prescription gives more emphasis to elk and allocates the forage to provide for the migratory elk needs.

c. **Wildlife - Grizzly**

Timber standards have been modified in MA-13 to incorporate the recommendations of the U.S. Fish and Wildlife Service in their biological opinion of the Forest Plan. These are timing and spacing standards for timber harvest in occupied habitat.

A new grizzly bear standard has been added to the Forest Plan which utilizes the Recovery Plan Update '86 Process for changing the occupied line (recovery line).

Management Situation lines MS-1 and MS-2 have been changed to reflect the latest habitat component mapping. This resulted in an increase of about 63,000 acres in occupied habitat.

d. **Wildlife - Fish**

Livestock grazing utilization standards in riparian areas have been changed to leave more vegetation in order to better protect the riparian habitat which is essential to good fishery.

Timber harvest standards in riparian areas have been changed to utilize the silvicultural system that best protects the fishery.

e. **Wildlife - Other**

A sensitive species list developed for Region One has been incorporated into the Forest Plan.

8. **Livestock Grazing**

The reduced grazing utilization standards in riparian areas reduces forage use. This was done to maintain better plant vigor and also help meet riparian dependent wildlife objectives.

The Forest Plan no longer proposes to re-introduce stock in the Windy Pass area in the Gallatin Range.

f. **Timber**

Riparian area timber management standards in the Forest Plan no longer specify clearcutting, but leave the choice of the silvicultural system up to actual site-specific analysis.

Management standards in MA-13 have been changed to incorporate timing and spacing of harvest to provide for grizzly security.

Management standards in MA-11 have been changed to incorporate timing and spacing requirements of timber harvest to provide for wildlife needs and specify harvest on winter range to improve range habitat.

g. **Watershed/Water Quality**

Water quality standards have been included in the Forest Plan for all watersheds.

h. **Oil and Gas**

Leasing decisions on the Gallatin will not be made in the Forest Plan, but will be done through further NEPA analysis and documentation. The Plan only makes land assignment decisions and establishes leasing criteria for those land assignments.

The Island Park Geothermal area direction has been removed from the Forest Plan.

i. **Greater Yellowstone Area**

New coordination standards for the Greater Yellowstone Area have been added to the Forest Plan.

F. Reader's Guide

The remainder of the EIS is organized in the following manner:

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 individuals who helped develop the EIS and Forest Plan.

Chapter VI discusses the consultation with others and describes the results of that.

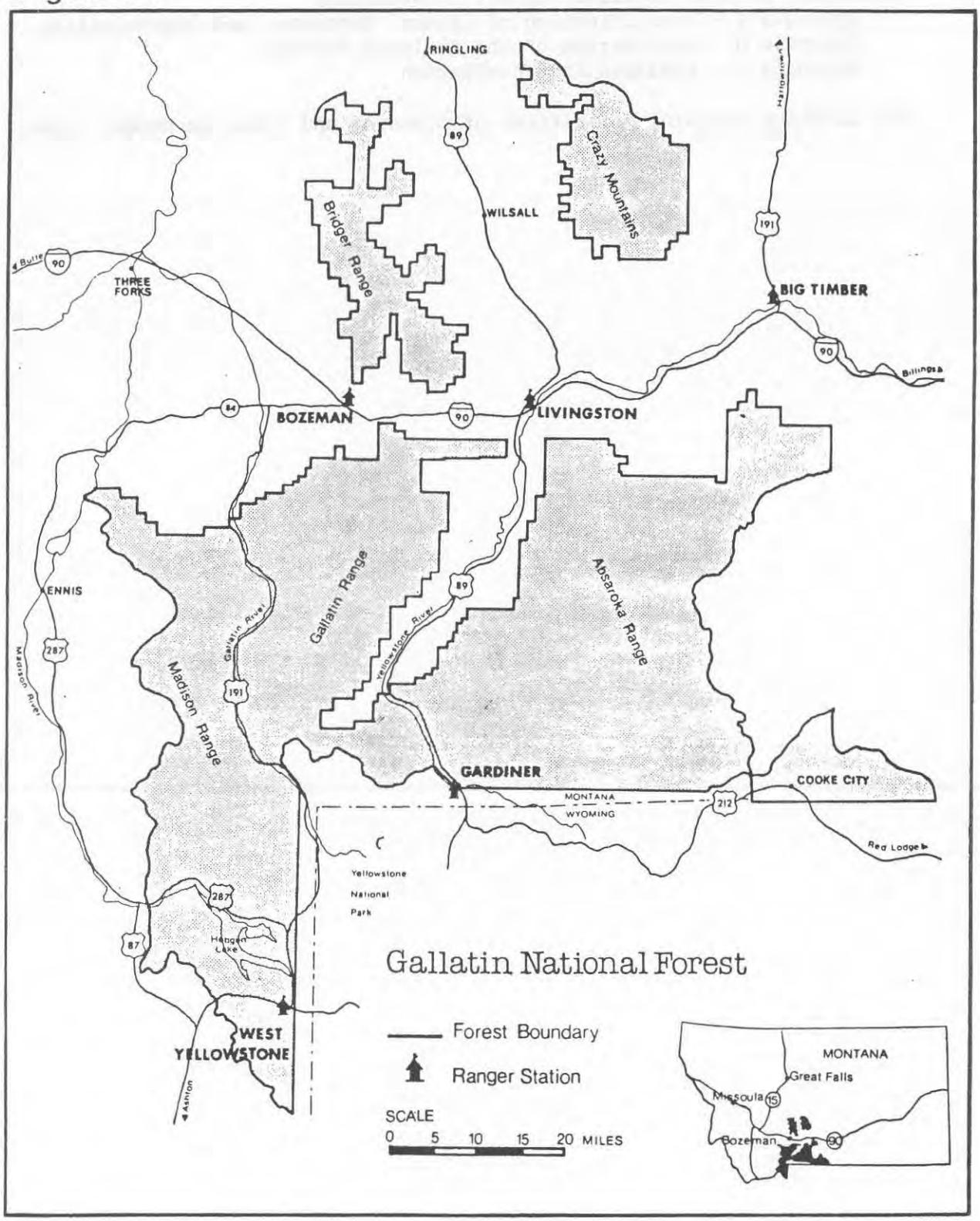
Appendices provide detailed subject information:

- Appendix A - Identification of Issues, Concerns, and Opportunities
- Appendix B - Description of the Analysis Process
- Appendix C - Roadless Area Evaluation

The Glossary contains definitions of planning and other technical terms.

Vicinity Map

Figure 1-1



CHAPTER II: ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

A. Introduction

This chapter presents the development, description, analysis, and effects of alternative ways of managing National Forest land and resources. The alternatives reflect different management objectives which are met by varying land uses, levels of resource outputs, and the assignment and schedule of management activities.

All alternatives presented in detail are feasible and comply with the minimum management requirements. These requirements are derived from applicable laws and regulations, including prevention of significant or permanent impairment of the productivity of the land. See Appendix B for a discussion of the minimum management requirements.

Various options for management of motorized travel within the Cabin Creek Recreation and Wildlife Management Area are presented in this chapter. These options were developed and analyzed separate from the alternatives for management of the Forest because any one of the options could be made a part of all of the alternatives.

B. Alternative Development Process

1. Overview

Forest planning begins by identifying public issues and management concerns. Refer to Appendix A for a description of the identification process.

Once the issues are known, information is needed to determine the Forest's capability to respond to each. This step is called the Analysis of the Management Situation. Base resource data, economics information and environmental/legal constraints are examined. Benchmarks are developed and analyzed to measure resource and economic interrelationships and output ranges for alternative development.

Alternatives are developed that are responsive to issues, and contribute 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 in priced or nonpriced terms. 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 and dispersed recreation, and hunting. The nonpriced outputs considered in this analysis include visual quality, wildlife habitat, mineral development availability, recreation quality, water quality and quantity, old growth/habitat diversity, access, community wellbeing, threatened and endangered species habitat protection and firewood

availability. The nonpriced components of Net Public Benefit 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. A singled, 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 being addressed. 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.

The alternative development process used is outlined in the Forest planning regulations (36 CFR 219.12). Parts of these planning regulations describe the role of NPB in the analysis. These regulations include the following goals for alternative formulations:

- Reflect a broad range of resource outputs and uses and expenditure levels.

- Provide a basis for identifying the alternative that maximizes net public benefits.

- Facilitate the analysis of opportunity costs and tradeoffs.

- Help evaluate the effects on present net value, benefits, and costs.

- Provide different ways to respond to major public issues.

Changes Since the Draft EIS

As a result of public comment and further analysis, some changes have been made in Chapter II since the Draft EIS. These are summarized below.

- Various options for management of motorized travel with the Cabin Creek Recreation and Wildlife Management Area are presented in this chapter. These options were developed and analyzed separate from the alternatives for management of the Forest because any one of the options could be made a part of all of the alternatives.

- The wilderness recommendation for Lionhead in Alternative 7 has been reduced by 1,350 acres and is reflected in Sections C and D.

- 9,000 acres of roadless lands have been removed from the suitable timber base of Alternative 7. This is displayed in Section D.

- A discussion of the timber supply and demand analysis done for the State of Montana and the local area is added to Section D.

- A noninterchangeable component of the allowable sale quantity (ASQ) has been identified for each alternative.

- A discussion of below-cost timber sales is included in Section D.

- An analysis of the downstream fisheries effects has been added to Section D. The fish numbers for all alternatives have been corrected.

- The proposed livestock grazing increase for the second decade of Alternative 7, the Preferred Alternative, has been reduced to 45,000 AUM's. This is shown in Section D.

- A more in-depth discussion of the economic trade-offs of each alternative has been included in Section D.

- An up-dated situation statement on oil and gas leasing on the Gallatin has been included in Section D.

2. Analysis of the Management Situation

The primary analysis prior to developing alternatives was the analysis of the management situation which is the determination of the ability of the Forest to supply goods and services in response to society's demands. This analysis provided a basis for formulating a broad range of alternatives by examining the following:

a. Benchmark Levels

Eight benchmark levels were developed to define resource supply potentials and economic relationships of the Forest. Production capabilities were determined for a minimum level, for single resources and for a set of multiple resource outputs that maximize present net value (NFMA regulation 219.12e). A level was also established from which the costs and effects of applying regulation and policy constraints were measured. The computer model FORPLAN was used to help determine the resource supply potentials. The benchmark levels and analysis are summarized in this chapter. Appendix B, section VI provides a detailed discussion of the benchmark levels.

1) Constraints

Regulation and policy constraints applied to benchmarks have in most cases the effect of reducing the maximum resource supply potential. NFMA regulation 219.27 specifies that certain minimum management requirements be included in the planning process. The methods to meet these minimum management requirements includes developing standards and guidelines and appropriate practices for management prescriptions; assignment of management prescriptions and intensities to analysis areas in FORPLAN; and applying specific constraints in FORPLAN. A complete description of the minimum management requirements can be found in Appendix B, Section VI. Constraints commonly applied to the benchmark levels except for the maximum timber-range and minimum level benchmark are:

1. Soil and water protection to maintain the productive capacity of the land.

2. A nondeclining sustained yield in the Forest's timber harvest. This assures the timber industry a steady supply of sawtimber from the Forest.

3. Timber harvest level. Lower limit to insure some harvest in the first three decades.

4. Timber ending inventory. This is to assure that harvestable size timber will be available in the decades immediately following the end of the planning horizon and in an amount expected.

5. Cumulative Mean Annual Increment. Minimum timber rotation ages are set at the age where 95 percent of the cumulative mean annual increment (CMAL) timber volume occurs. This assures that timber is not harvested while still growing at its maximum rate.

6. Nonforest lands, and other lands not suitable for timber production were not assigned prescriptions that include timber harvest. This assures that lands assigned to timber harvest prescriptions are tentatively suitable for timber harvest.

7. Wilderness prescriptions are the only ones available for the Absaroka-Beartooth and Lee Metcalf wildernesses. These wilderness prescriptions assure that the legal and regulatory requirements for managing designated wilderness areas are fulfilled.

8. Cabin Creek Recreation-Wildlife Management Area. The recreation/wildlife prescription is the only prescription made available in order to bring management of the area into compliance with the Lee Metcalf Wilderness and Management Act of 1983.

9. Roaded lands with slopes less than 40 percent. The roaded recreation prescription is only available to roaded lands with slope less than 40 percent because it is not practical to operate motorized vehicles to any extent on lands that are greater than 40 percent slope.

10. The Nonroaded Recreation prescription is only available for nonroaded lands included in the Forest's roadless inventory. This ensures the prescription is not applied to roaded lands or to small isolated parcels of nonroaded lands.

11. The Developed Recreation prescription is only available to developed recreation sites as identified in the analysis areas.

12. Range prescriptions are only applied to the RANGHI and RANGLO condition classes in order to optimize range management on permanent rangelands and to avoid awarding unsuitable range to grazing.

13. Apply the minimum level prescription to ROCK condition class in order to limit costs since priced outputs are not expected from the ROCK condition class.

Other constraints are:

1. In the maximum timber/range benchmark a timber volume constraint of 35.5 MMBF was used for the first decade. A range constraint of 70,000 AUM's per year was used.

2. In the minimum level benchmark, all analysis areas except 5600 acres of developed sites were constrained with the minimum level prescription.

Further discussion of constraints can be found in Appendix B, Section VII.

2) Benchmark Descriptions

a) Current Direction (No Action) (CM8)

This benchmark level defines the current level of goods and services and the most likely level expected to be provided in the future if current management direction continues. This benchmark is carried forward as Alternative 1.

b) Maximize Present Net Value (PV5)

Using market and nonmarket assigned values, this benchmark establishes the mix of resource uses and a schedule of outputs and costs that maximize present net value (PNV). This benchmark was used as a basis for alternatives 5, 8, and 9. This benchmark is displayed in this FEIS when a comparison of alternatives is made in order to provide a reference to the maximum present net value potential.

c) Maximize Timber (MT1)

This benchmark is designed to measure the maximum legal capability of the Forest to produce timber. This benchmark was not carried forward as an alternative, but it is used for a comparison to the alternatives. High costs and a limited response to other resource issues and concerns made it infeasible to carry this forward unchanged as an alternative. It was used, however, to help formulate the beginning harvest volume of Alternative 2.

d) Maximize Livestock Potential (MT1)

Livestock forage production was maximized to determine the suitable range potential. This benchmark was not carried forward because land was identified for intensive range management which is not economically suited for that purpose. Information from this benchmark was used to develop Alternative 2.

e) Maximize Big Game Habitat Potential

Although no FORPLAN benchmark run was made, an analysis of the potential for elk capacity was made. The potential for elk is based on the availability of winter forage. Information from this benchmark was used to illustrate the biological potential for wintering animals and to develop alternatives.

f) Maximize Wilderness (MW2)

Wilderness management was maximized through roadless assignment in order to explore the opportunity cost by comparison with the maximum present net value benchmark. This benchmark was carried forward with minor modifications to form Alternative 9.

g) Minimum Level (ML4)

This benchmark defines the minimum costs of public landownership and the resource outputs which are incidental to custodial management. This benchmark is not a viable alternative because it is not responsive to public issues and management concerns. It also does not provide multiple resource uses and outputs. This benchmark is displayed in this DEIS when comparison of alternatives are made in order to provide a reference to the minimum resource potential.

h) Other Benchmarks

Other benchmarks or iterations of these benchmarks were developed and analyzed. These are described in Part VI-C of Appendix B.

b. Benchmark Analysis

Benchmarks developed during the analysis of the management situation established upper and lower potential production levels. Additional analysis was done to estimate projected use levels. The following resource areas were analyzed:

1) Recreation

The Gallatin has a capacity for developed recreation of 884,000 recreation visitor days (RVD's) annually. Recreation sites include campgrounds, picnic areas, boat ramps, and two downhill ski areas. This capacity is 23 percent greater than is currently being used. Over the past 10 years, an average of 683,000 RVD's have been utilized each year.

Projecting current consumption trends indicates that by 1995 developed recreation use would increase to 958,700 RVD's. Given this assumed increase, the current capacity of 884,400 RVD's would be surpassed before 1990.

The Gallatin has the highest level of dispersed recreation use of any Forest in Region 1. This use was 1,339,100 RVD's in 1980. The major activities that account for most of this use are automobile travel, hiking, horseback riding, fishing, camping, and hunting. At present there are problems on some parts of the Forest due to too much concentrated recreation use. There are also potential problems at times due to conflicts between various user groups. Most types of dispersed recreation can be supplied well into the future. Big game hunting is an exception. The supply will fall short of demand. As more use is made of the Forest, the types or quality of the experiences may change.

2) Wilderness/Roadless

The Forest now has two Congressionally designated wilderness areas. The Absaroka-Beartooth has 580,562 acres on the Gallatin and the Lee Metcalf has 135,112 acres. There are an additional 488,400 acres of National Forest roadless lands available for wilderness consideration in the maximum potential benchmark. In addition, there are 149,259 acres of roadless land in the Madison Range that were "released" in the Lee Metcalf Wilderness Bill and are not being re-evaluated for wilderness.

There is a need in some parts of the current wilderness areas to upgrade existing trails to accommodate heavy use. An opportunity exists for dispersing use to other less used areas by providing additional access and trailhead facilities. In some parts of the wilderness, use may have to be controlled to avoid conflict with the grizzly bear.

In general, the Gallatin can supply wilderness experience in excess of demand well into the future.

3) Elk

Elk are found on distinct summer and wintering areas across the Gallatin National Forest and on adjacent and intermingled private land. In addition, two migratory elk herds from Yellowstone National Park spend at least part of the winter on the Gallatin. The total current wintering population is approximately 9,800 animals. About 5,600 of these winter on National Forest land and 4,200 on private land.

In the benchmark analysis, a potential for supporting a maximum of 8,400 elk on National Forest winter range was identified. The actual population that could occur in the future depends on such variables as resource use and intensity of management, private land management, hunting use, and weather. The Montana Department of Fish, Wildlife, and Parks has stated that the demand for elk hunting exceeds the potential that exists on the Gallatin (Montana Department of Fish, Wildlife, and Parks, 1982)

4) Fisheries

The Gallatin's fishery is of national interest. Three major rivers that cross the Forest--the Gallatin, Madison, and Yellowstone--are classified as "Blue Ribbon" streams of national significance. The Forest contains 1,052 miles of fishing streams with a population estimated at 509,000 catchable trout. There are also 18,800 acres of lakes with an estimated population of 1,044,000 trout. The biological potential of the total fishery could be improved to sustain 163 percent of the existing population. Most of this increase would be in lakes.

5) Range

The current domestic livestock grazing level is 43,400 animal unit-months (AUM's) annually. This occurs on 173,000 acres of suitable range. Because of the terrain of the Forest and because the allotments are often small and dispersed, increases in forage production on present allotments would require substantial investments. Bringing additional range into allotments would increase production, but would require large investments to develop the range.

Potential increases of 6,800 AUM's could come from existing allotments. Rangeland outside existing allotments could potentially support about 20,000 additional AUM's.

6) Timber

The maximum timber benchmark has a base harvest schedule of 35.5 MMBF annually in the first decade. This rises to 37.6 MMBF in the fifth decade and to 56.6 MMBF in the tenth decade. The long term sustained yield is 56.5 MMBF from

438,200 acres of suitable timberland. In the past 30 years the volume of timber harvested from the Gallatin has fluctuated drastically. The program sell has been from a decade average high of 26.7 MMBF per year to an average low of 13.7 MMBF per year. The last RPA targets were for 15 MMBF in the first decade up to 26 MMBF in the fifth decade.

7) **Present Net Value**

The maximum PNV while meeting minimum management requirements and providing for a nondeclining yield of timber is $319 million. The minimum PNV of $27 million comes from the benchmark which does not include nonmarket values in the calculation of PNV. See Appendix B, Part IV, for a discussion of present net value.

8) **Discounted Costs**

The minimum discounted costs of managing the Gallatin National Forest is represented by the Minimum Management Benchmark. Minimum discounted costs total $67 million.

9) **Employment**

Local employment dependent upon the Gallatin National Forest resources totals about 2,500 jobs per year currently. Average first decade employment ranges from 2,000 jobs in the Minimum Management Benchmark to 2,800 jobs in the Maximum Timber Benchmark.

C. Adequate Range of Alternatives

An adequate range of alternatives was developed by first formulating the alternatives that were required by regulation or policy. This included: one that maximized market opportunities (Alternative 2); one that reflected the current program direction (Alternative 1); one that recommended wilderness classification for all roadless lands (Alternative 9); one that recommended no additional wilderness classification (Alternative 6); one that responded to the 1980 RPA program (Alternative 4); and one that recommended wilderness classification for a substantial portion of the roadless area (Alternative 8).

These alternatives were examined to determine where they fit in the range of outputs expressed by the benchmarks and how well they responded to the issues and concerns.

Additional alternatives were developed that responded in different ways to the issues surrounding wildlife, fisheries, water quality, timber production, and economic efficiency. Another alternative considered a departure from nondeclining timber harvest flow. These alternatives helped to complete the range of alternatives considered. All of the alternatives considered are implementable options for management of the Forest. Figure II-1 shows that range of alternatives as they address selected issues and concerns.

Figure II-1: Range of Alternatives

```
Resource (Units of Measure)

-----------------Alternatives-----------------

Roadless Management (M acres)
 136        300        400        500        637
 |_____________________________________________|
 |                                             |
 9     8     5            1   2   7   3  6 MIN
                          4       10  PNV  LVL

Wilderness Additons (M acres)
 0       150        300        488        637
 |_____________________________|_____________|
 |                                           |
 2,6,1,7,4  3     5     8      9--Madison Roadless
 PNV,  10
 MIN LVL

Elk Capacity on National Forest (M Elk)
 4.5                  5.6                  6.6
 |_____________________________________________|
 |                                             |
 2 MAX                1,5   7   3,4   6      8
   PNV                     10  MIN LVL        9

First Decade Timber Harvest (MMBF)
 0                    15                   31
 |_____________________________________________|
 |                                             |
 MIN     MAX     5,3       4  6,7  10   1     2
 LVL     PNV     8,9

Long Term Sustained Yield (MMBF)
 0          10         20         30         43
 |_____________________________________________|
 |                                             |
 MIN      MAX 3       9  8  6  7  1 10  4   2
 LVL      PNV                     5

Suitable Timberland (M acres)
 64    100        200          300          367
 |_____________________________________________|
 |                                             |
 MAX 3          9  8  6 5    1   7  4 10      2
 PNV

Livestock Grazing (M AUM'S)
 29        40          50         60         68
 |_____________________________________________|
 |                                             |
 3         9     8,1,5  6,7,   MAX    4       2
                        10     PNV

Present Net Value (MM$)
 208         235        260        290        309
 |_____________________________________________|
 |                                             |
 MIN LVL              1    2  9  8 5 6 3 4     MAX PNV
                                10,7
```

Each alternative considered was formulated so that multiple resource use occurs. Each alternative harvests timber, and provides forage for livestock and elk, wilderness, recreation opportunities, availability for minerals, wildfire protection, etc. The difference between alternatives and how well each alternative responds to particular issues and concerns is reflected in the amount and emphasis placed on the individual resources.

The FORPLAN model was used in developing each alternative. Most of the alternatives required one or more FORPLAN iterations to adequately portray the intent of the alternative. Resource output constraints were applied in modeling the alternatives to achieve such objectives as soil and watershed protection, provisions for wildlife habitat, meeting RPA targets, providing for timber age class distribution, or emphasizing certain types of recreation.

The ten alternatives considered in detail are described in the following section. Each alternative has a schedule of resource outputs and a table of economic data projected for 15 decades (See Table II-29 for more detail).

The constraints used to develop these alternatives are described in Appendix B, Section VII.

Ten alternatives were developed to respond to the issues and concerns identified. All of the alternatives considered are described in detail. None of the alternatives considered were eliminated.

Changes Since the Draft EIS

Alternative 7 (Preferred Alternative) has been changed somewhat in order to respond to concerns raised during the review of the Draft EIS. Changes include:

- the ASQ of 21 MMBF contains a noninterchangeable component of 5 MMBF dead sawlogs and posts and poles.
- a reduction in suitable timber base from 314,000 acres to 305,000 acres.
- a reduction in livestock grazing from 50,000 AUM's to 45,000 AUM's.
- an increase in stream fish numbers up to the current level of 509,000.
- a decrease of 1,350 acres in the Lionhead wilderness recommendation.
- a reduction of big game habitat improvement from 800 acres to 650 acres.
- utilization of the Cooperative Elk/Logging Study guidelines.
- timber harvest timing and spacing standards for grizzly bear Situation 1 areas.
- the acreage of grizzly bear MS-1 and MS-2 areas has increased by about 63,000 acres.
- water quality standards for each major watershed on the Forest.

- new coordination standards for the Greater Yellowstone area.

- a change in the timing of motorized trail bike use in the Cabin Creek area from September 1 through December 1 to July 15 through October 30 each year.

All alternatives have some common changes since the DEIS. These include:

- a reduction in discounted timber benefits.

- a reduction in Present Net Value.

- a change in fisheries numbers due to updated modelling.

In addition, there have been numerous small editorial changes throughout the FEIS.

1. Alternative 1 - (Current Direction)

The objective of this alternative is to continue the current recommendations for management on the Gallatin. This direction has been set through law, policy, and existing management plans.

a. Recreation

The developed facilities such as campgrounds, picnic grounds, and interpretive sites would be maintained but no new facilities would be constructed. Maintenance funds would not be adequate to keep the facilities from deteriorating, so within ten or twenty years, some of the capacity provided by those recreation sites would be lost. However, the demand is expected to increase and more camping would occur on undeveloped sites.

A wide variety of dispersed recreation opportunities exists in this alternative. Opportunities for increasing dispersed use in nonroaded areas would remain low because very little investment would be made in trail construction and trail maintenance. In the next twenty years, most of the trees killed by the mountain pine beetle will fall and trails going through these stands would be unusable (Walker, 1978). Very few trailhead facilities would be built and maintained.

b. Wilderness, Roadless

The current status of the Hyalite-Porcupine-Buffalo Horn Area as a study area would change. The Montana Wilderness Study Act (PL 95-150) requires the Forest Service to make a recommendation for the management of the area.

The Lionhead roadless area (24,584) acres, and the Reef and Republic roadless areas (910 acres combined) are recommended for wilderness. This provides 741,168 acres as wilderness. Concentration of users on popular trails and in certain areas of wilderness would occur because little investment would be made for additional access points and new mainline trail construction. This concentration will cause both a decrease in the quality of the wilderness experience for some users and a degradation of the vegetation and soils in these high use areas.

Approximately 514,200 acres or 81 percent of inventoried roadless land would remain unroaded 50 years from now. About 40,100 acres will be developed in the next decade due to road construction and timber harvest.

c. Wildlife and Fish

Big game populations in Alternative 1 would remain at the current level. This would be accomplished by continuing to distribute available forage between big game and livestock and by habitat improvement on 1,000 acres every year. Elk are used as the indicator species to estimate the effects on big game. This alternative would provide for about 5,600 animals on National Forest lands and 4,200 animals on private lands. This number of elk provides for about 54,000 elk hunter days with a kill of 1,680 animals per year within the National Forest boundaries. Current populations of big game would continue to have some adverse effects on intermingled and adjacent landowners. Ranchers who have elk wintering on their pastures may experience damage to their fences and haystacks, especially during more severe winters. Burlington Northern Railroad Company lands and other private lands would continue to be used by hunters during hunting seasons.

Some conflict would continue on National Forest lands between big game and livestock grazing on permanent winter range. These conflicts now are at a manageable level and would be expected to remain so in Alternative 1.

Fisheries habitat currently provides 509,000 catchable trout in Forest streams. The habitat potential is declining and is expected to provide 493,000 catchable trout by the fifth decade.

In this current direction alternative, the area considered as needed for the grizzly bear would be given emphasis for grizzly management. This habitat management would provide for recovery of the grizzly population to where it could eventually be removed from the "threatened" classification.

d. Range

Livestock grazing would remain at current 43,400 AUM's. The range program would continue to be funded at a low level and range management would be extensive rather than intensive. Complex grazing systems such as multiple pasture systems would not be implemented and there would be little investment in additional fences and water structures. Grazing would continue to occur where it does now, mostly in the valley bottoms and at lower altitudes which contain riparian zones and also often include big game winter range. Unused forage exists on elk summer range.

Continuing to graze the current amounts in riparian zones could lead to streambank deterioration and an 11 percent reduction in the catchable fish population on those streams passing through heavily grazed allotments (Boussu, 1954).

Range improvement projects would involve burning about 325 acres per year to temporarily convert areas of sagebrush to grasses. These projects are needed to prevent a deterioration in the condition of winter range in some areas where both livestock and big game grazing occurs.

e. **Timber**

The suitable timber land base for this alternative is 246,700 acres. This land base represents 56 percent of the 438,200 acres which were determined to be tentatively suitable for producing commercial wood products. From these lands would come a harvest of about 25 million board feet annually. This would require 3,120 acres to be harvested annually for the first decade, but this acreage would decline to 2,630 per year by decade 5. In the current direction alternative, the harvest would continue to come mainly from areas where harvest has occurred in the past. The effect of this, coupled with the small base, would be increased road construction in drainages already roaded. This would lead to increases in sedimentation from these drainages. In some drainages, stream channels could be damaged as the hydrologic limits of the drainage are reached.

As timber harvest openings are made in key big game range, less hiding cover would be available. A combination of less hiding cover and more open roads would change the hunting opportunities of these areas (Lonner and Cada, 1982). Where access is easier and cover is diminished, more of the kill would occur in the first few days of the season and chances for a kill later in the season would decrease.

The silvicultural practices applied to the 246,700 acres of suitable timber land will help reduce long range losses caused by mountain pine beetle in lodgepole pine (Cole, 1978). Besides the 25 million board feet of live volume, approximately 15 million board feet of dead material could potentially be harvested annually in the first decade. This would decrease to about 4 million board feet per year in the second decade and none after that. Concentrating harvest into previously roaded drainages would mean a future reduction of firewood available and accessible to local users.

f. **Water and Soils**

Increases in sedimentation described above would take place in only some drainages, not forestwide. Forestwide increases in sediment above the present rates would be 3 percent in the first decade and 5 percent in the fifth decade. In some individual drainages, the increases in sedimentation rates would be 10 percent as estimated by sedimentation prediction procedures (Planning Records, 1981).

g. **Minerals, Oil and Gas**

Mineral exploration and development opportunity on the 994,200 acres outside of existing wilderness is moderate to low. Because new road construction would be limited to a relatively small portion of the Forest, much of the exploration would be more difficult.

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

Leasing in Non-Wilderness Lands" which is incorporated by reference into this EIS.

h. Landownership and Access

An ongoing effort would be continued under this alternative to acquire approximately 8,000 acres of Burlington Northern lands within the Porcupine and South Cottonwood Creek drainages through exchange of National Forest lands elsewhere on the Forest. No other large exchanges are proposed.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Socio-Economic

The first decade yearly average cost of $5,768,000 produces outputs and activities that provide $1,389,000 in receipts to the U.S. Treasury and 2,506 private sector jobs. Eighty percent of these jobs are recreation related. The present net value (PNV) for the entire 150-year planning horizon is $236,000,000.

2. Alternative 2

This alternative emphasizes the production of timber, livestock forage, and minerals. It produces the highest levels of timber and livestock outputs of any alternative. It is also the highest cost alternative because of the higher administrative costs to produce the amount of timber harvest and road construction.

a. Recreation

Developed recreation sites would be maintained, but no new construction would occur. As existing sites become more crowded, people would move to undeveloped sites for camping and picnicking. These areas would not be maintained and loss of soil and vegetation would eventually occur.

A long-term result of this alternative is that more roaded access would be available into more parts of the Forest. The opportunity for roaded and motorized dispersed recreation would greatly increase over the current situation. As more of the land is accessed for roaded use, there would be a reduction of land outside wilderness areas that would offer a primitive or semi-primitive recreation opportunity. There would be very little investment for trail construction and maintenance. Continued deterioration of the trails would lead to more erosion and stream sedimentation (Pacha, 1980). As discussed in Alternative 1, maintenance of trails through beetle-killed timber stands would be difficult and costly. Lack of maintenance would result in periods of trail closure.

b. **Wilderness, Roadless**

The Hyalite-Porcupine-Buffalo Horn Study Area is assigned to nonwilderness uses. No new wilderness is recommended. Increased recreation use in present wilderness areas would cause soil and vegetation resource damage in the more popular areas due to heavy concentrations of users. The wilderness experience most users would be looking for would be degraded because of the concentrations of people. Lack of investments for new trail construction and access into other parts of the wilderness areas would continue to result in adverse social and biological effects.

Approximately 531,500 acres of inventoried roadless land will remain unroaded 50 years from now. About 41,300 acres would be developed in the next 10 years due to road construction and timber harvest.

c. **Wildlife and Fish**

Big game populations would decrease. The capacity of National Forest winter range to support elk would be about 4,500 animals. The reasons for this reduction in elk habitat capability are three: 1) Increased forage granted to livestock grazing, 2) decreased security cover and increased open road mileage from timber management, and 3) less investment for big game habitat improvements.

A reduced elk herd would result in lower hunting success ratios as more hunters would be competing for fewer animals.

Fisheries habitat presently sustaining 509,000 catchable trout would decline to habitat for 491,000 catchable trout in Forest streams at the end of the fifth decade. Much of the decrease is caused by the timber access road construction which increases sediment.

The area considered as needed for the grizzly bear would be given emphasis for grizzly management. This habitat management would provide for recovery of the grizzly population where it could eventually be removed from the "threatened" classification.

d. **Range**

Livestock grazing levels would increase from 43,400 AUM's to 59,400 AUM's by the second decade and 67,800 by the fourth decade. These increases would be accomplished partly by implementing more intensive range management practices which would entail significant investments for both the Gallatin National Forest and the permittees who graze the National Forest. This program would mean more of the forage available on winter range would be awarded to livestock rather than big game.

Increases in livestock grazing would also be accomplished by utilizing unused forage on elk summer range. Investments would need to be made for fencing and for driveways to get the stock to the higher elevations of summer range. Some of the increased utilization of summer range would come from sheep grazing. Increased domestic sheep grazing on summer range could adversely affect the big horn sheep populations, especially in the Gallatin Divide area. Close contact

between domestic sheep and bighorn sheep increases the incidence of disease in the wild populations (Jones, 1981).

Because more riparian vegetation would be affected as grazing levels increase, investments for mitigation of the effects on soil and water would increase.

e. **Timber**

This alternative would have the largest suitable timber land base of all the alternatives. Of the 438,200 acres of tentatively suitable timber land, 367,600 acres are suitable for timber harvest. The harvest volume of 31.3 MMBF annually for the first decade would come from harvesting approximately 3,620 acres every year. In the second decade, the annual harvest of 34.7 MMBF would come from 5,190 acres harvested each year.

In order to carry out the harvest schedule for this alternative for the next 50 years, 350 miles of collector roads and 1,300 miles of local timber roads would be constructed. This amount of road construction would result in an average forestwide increase in stream sedimentation of about 6 percent per decade above natural sedimentation rates. Catchable stream trout would decline from the current 509,000 fish to about 484,000 fish after the end of the first decade and somewhat fewer after the fifth decade. More roads would mean easier access to fishable streams. As more fishing pressure is put on the streams, these populations could further decline or necessitate more restrictive limits, catch and release fishing, or increased fish stocking.

The collector roads constructed in this alternative would generally remain open for use. Approximately 30 percent of the local timber harvest roads would also remain open to provide for continuing management needs. The combination of open roads and number of acres of cutover land each year would result in a reduction of big game security habitat. With better access and less hiding cover, much of the elk harvest would occur within a few days of the hunting season opening (Lonner and Cada, 1980).

The timber harvest in this alternative would be spread out over the Forest and a large proportion of it would occur on presently unroaded lands. Silvicultural practices on this land would provide a better opportunity to protect against insects, disease, and wildfire. By creating harvest openings in large stands of mature and over-mature timber, different size classes such as seedlings/saplings, and poles would result over a 50-year period. This would result in not only a more diverse habitat for several species of wildlife which prefer early successional plant communities, but would also decrease the risk of future epidemics of insects and disease such as the mountain pine beetle (Wellner, 1978). A reduction in the amount of dead timber and accumulation of fuels would greatly reduce the potential for large wildfires in these forested areas.

Increased access would provide the opportunity to salvage timber which has been killed by mountain pine beetle. In the first decade, 12.2 MMBF per year could potentially be salvaged and in the second decade as much as 6.5 MMBF could be harvested. For at least the next 20 years, there would be good opportunity in this alternative for firewood cutting due to the large number of roads into the areas of dead timber.

f. **Water and Soils**

Even though sedimentation increases from road construction average 6 percent per decade above natural rates on a forestwide basis, there will be some drainages where increases would be 10 percent or greater (Planning Records, 1981). These localized effects could occur as a result of scheduling timber harvest in areas that have sensitive and unstable soils or that have already been heavily roaded. Water yield increases are generally a result of removing vegetation by timber harvest or loss of vegetation from wildfire. Water yields would increase only by about 1 percent per decade over natural yields.

g. **Minerals, Oil and Gas**

Mineral exploration and development opportunity on the 1,019,700 acres outside of existing wilderness is high. More exploration and possibly more discoveries could result in adverse effects on water quality, visual quality, and wildlife security.

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

h. **Landownership and Access**

An ongoing effort would be continued under this alternative to acquire approximately 8,000 acres of Burlington Northern lands within the Porcupine and South Cottonwood Creek drainages through exchange of National Forest lands elsewhere on the Forest. No other large exchanges are proposed.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. **Socio-Economic**

The first decade yearly average cost of $7,695,000 produces outputs and activities that provide $1,573,000 in receipts to the U.S. Treasury and 2,766 private sector jobs. The present net value (PNV) for the entire 150 year planning horizon is $249,000,000.

3. **Alternative 3**

The goal of this alternative is to reduce costs by 20 percent. Investments in the timber and range programs would be low. Few new roads would be constructed. There is low emphasis on fisheries and wildlife.

a. **Recreation**

Maintenance of existing developed facilities would be at a low level. Congestion of developed recreation facilities would occur after about 10 years because there would be no construction of new camp and picnic sites. Private investment in these kinds of facilities off the Forest would be encouraged.

Opportunity for roaded recreation use would increase slowly because of the few new roads constructed. As more people use the roaded areas for recreation, crowding and congestion could occur. Few investments would be made for trail reconstruction and trailhead facilities.

b. **Wilderness, Roadless**

In the Hyalite Porcupine-Buffalo Horn Study Area, 64,200 acres of National Forest land would be recommended for inclusion in the Wilderness System. This alternative envisions the acquisition of 16,100 acres of private land within the recommended wilderness area that is presently owned by Burlington Northern Railroad Company. The recommended wilderness would also encompass 3,700 acres of State of Montana lands administered by the Department of Fish, Wildlife, and Parks as a wildlife range. The total wilderness area would contain 84,000 acres.

Approximately 569,800 acres or 89 percent of inventoried roadless land will remain unroaded fifty years from now. In this alternative there would be no roading of roadless lands planned during the next 10 years.

c. **Wildlife and Fish**

Big game winter range would be managed to maintain forage production for elk and deer and to maintain security and thermal cover. Available forage would be prescribed primarily to big game with a reduction in livestock grazing. This reduction would take place over approximately ten years and the grazing permittees would either be forced to reduce their stock or find substitute grazing on private land.

Elk capacity on National Forest winter range would increase by about 800 animals with the additional forage available and less competition from domestic livestock (Planning Records, 1981). A larger elk population should result in a greater hunter harvest. Since there is little new road construction and less cover modification from timber harvest, the opportunity exists for a long hunting season with the elk harvest spread out over the entire season (Lonner and Cada, 1982). Additional elk wintering on private lands would damage more fences and haystacks. Increased concentrations of big game on areas where prescribed fire has been used to increase forage could lead to some soil erosion and increased sedimentation.

Because of the few miles of new road construction necessary to implement this alternative, sedimentation increases from road construction are less than one percent per decade. Additional roaded access to fishing streams would be minimal. Populations of stream fish would be about 517,000 catchable size trout.

A large portion of the occupied habitat on the Gallatin would be managed for grizzly bear emphasis. In Situation 1 areas, 100 percent of the land would be managed for grizzly emphasis, and in Situation 2 areas, 67 percent. Situation I areas are defined as having the components necessary for the survival of the grizzly; Situation II areas have components used by the bear but not necessary for population recovery. In these areas, some trails would be closed certain times of the year to reduce man/bear conflicts and reduce the potential for grizzlies being killed. The alternative would provide for an earlier recovery of the bear population than Alternatives 1 or 2.

d. **Range**

The livestock grazing program is the lowest of all the alternatives. There would be a reduction of approximately 12,000 AUM's of grazing over a ten-year period. This would severely affect some permittees, possibly driving some out of business. Others would have to find substitute grazing on private land.

The removal of livestock from winter ranges would provide more forage for big game and allow for more habitat capacity for elk. The winter range vegetation condition would improve with less cattle/elk competition. There would also be less grazing of riparian vegetation and less impact to streambanks (Boussu, 1954).

e. **Timber**

This alternative has the smallest suitable timber base of 84,800 acres. Only 700-800 acres would be harvested annually. An average of less than 9 miles of road per year would be constructed. Sedimentation increases above the natural rates would be less than 1 percent per decade.

The small timber volume of about 12 million board feet annually in the first decade coming from the National Forest would adversely affect the local timber industry and local employment. About 6 million board feet of this volume would be dead. By the second decade, no dead volume would be available and the total harvest volume would be 6 million board feet. Timber mills may be able to make up the shortage from private timber lands for a few years, but in the long run the timber available to local mills would decrease. Some mills would close. Others would run at a very low capacity.

Since there would be a small area where silvicultural practices would occur, little opportunity would exist for reducing losses to insect and disease attack. Except in areas where wildfire occurs, the rest of the Forest would be characterized in time by predominately climax species stands growing at a rate much lower than potential (Arvo and Simmerman, 1982). Lodgepole pine killed by mountain pine beetle in recent years would become downfall over the next twenty years. Wildfire occurrence would increase as natural accumulations of dead material build up.

There would be less opportunity for supplying firewood because of the few new roads. As the available firewood was cut, no new areas of dead wood would be accessed. There would be little opportunity for firewood gatherers to collect wood from timber sale slash piles.

f. **Water and Soils**

The current hydrologic conditions of the watersheds would be maintained. In no drainages would there be concentrated enough removal of timber to create conditions where water yield increases would endanger stream channel stability.

g. **Minerals, Oil and Gas**

Mineral exploration and development opportunity on the 955,538 acres outside of existing and recommended wilderness is moderate to low. The lack of roads would make exploration more difficult and more expensive. Mineral development in nonroaded area would change the character of the area due to access roads and facilities needed to extract the minerals.

Lease and development stipulations would be used so that special areas of the Forest would be protected. These areas include riparian areas,, sensitive soils, and critical habitat for big game, grizzly bear, and bald eagle.

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

h. **Landownership and Access**

The acquisition of private land within the recommended wilderness lands has been discussed. Acquisition would be accomplished by land exchange with the current owners. The net effect of the land exchange and creation of wilderness would be removal of up to 16,100 acres of National Forest land from the tentatively suitable timber land base.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. **Socio-Economic**

The first-decade yearly average cost of $4,756,000 produces outputs and activities that provide $432,000 in receipts to the U.S. Treasury and 2,247 private sector jobs. The present net value (PNV) for the entire 150 year planning horizon is $292,000,000.

4. **Alternative 4 - RPA**

This alternative attempts to produce a combination of goods and services that could best meet the 1980 Resources Planning Act (RPA) Program outputs targeted for the Gallatin in the Northern Regional Guide. Recreation and timber targets can be met. The targets for both elk and livestock cannot both be met

simultaneously because of the competition for forage, especially on wintering areas. Therefore, livestock forage production cannot meet RPA targets beyond the third decade. There will be high costs in the range program to produce these levels and minimize conflicts with elk and deer.

a. **Recreation**

An RPA developed recreation program would emphasize cooperation with private investors. To meet the increasing demands for developed facilities, private lands adjacent to or intermingled with National Forest lands would be utilized for developed recreation facilities. Investments by the Forest Service would be aimed only at maintaining current capacity in National Forest facilities. This program would result in more camping, picicking, skiing, etc., taking place off the Forest.

In order to keep pace with the RPA objectives for dispersed recreation, more investment would be made for trail construction and access into the Forest. The effect would be to reduce congestion and overuse at some current heavy use areas and to maintain the trail system in good condition. Roaded natural appearing recreation opportunities will increase significantly and semi-primitive recreation opportunity will decrease as the unroaded lands are roaded.

b. **Wilderness, Roadless**

In the Hyalite-Porcupine-Buffalo Horn Study Area, 22,100 acres would be recommended for wilderness designation. The recommended area would include only Federally owned land around the Hyalite Peaks. The Lionshead roadless area, 24,584 acres, plus Republic and Reef roadless areas, 910 acres, are also recommended for wilderness. This provides 763,268 of wilderness opportunity. Motorized use in thse areas would be curtailed and investments in a new trail system would be required for future recreation use.

Approximately 511,300 acres of inventoried roadless land remain unroaded after 50 years. About 33,500 acres of roadless land would be developed over the next 10 year period.

c. **Wildlife and Fish**

In this alternative, a population capacity on National Forest winter range of about 6,400 elk would be provided. There would be more conflict between elk and livestock management and it would be more difficult to coordinate the two. Some areas of winter range would receive heavy use in severe winters, thus reducing their ability to recover.

Habitat improvement projects such as prescribed burning on winter range would be necessary to increase the habitat capacity for elk in order to approach RPA objectives. More forage would be made available for both elk and livestock. An intensive livestock management program with large investments for fences and water improvements would be necessary to ensure a proper assignment of forage between elk and livestock.

Wildlife diversity is provided in this alternative by habitat improvements and also by timber management. After 100 years, the diversity of timber age classes

would be the greatest in this alternative and it would also be spread out over the largest number of acres - 370,000 (Planning Records, 1981).

Fisheries habitat changes slightly from the current habitat for 509,000 catchable trout to habitat for 508,000 catchable in Forest streams at the end of 10 years. Part of the reason for the reduction is increased sediment caused by road construction. Also contributing to the loss of habitat is the increased cattle grazing along fisheries streams and on adjacent riparian vegetation.

About three-quarters of the occupied habitat on the Gallatin would be managed for grizzly bear emphasis. In Situation 1 areas, 100 percent of the land would be managed for grizzly emphasis, and in Situation 2 areas, 36 percent. This alternative would provide for an earlier recovery of the population than Alternatives 1 or 2, but a somewhat later recovery than Alternative 3.

d. **Range**

The RPA targets for livestock grazing could not be met beyond the third decade. AUM production can be increased from the present 43,400 AUM's to about 60,000 AUM's in combination with the forage that was needed for the elk population. This level of livestock grazing would be accomplished by more intensive range management using multiple pasture systems and rest-rotation. Also new allotments on summer range areas would be available for grazing use. More fences and other structures and more prescribed burning would have an effect on visual quality.

New allotments on summer range would have the effect of displacing some elk from their traditional summering areas. This would not be critical because of the excess of forage available in the areas. Reintroducing sheep grazing on summer range that is within some of the occupied grizzly bear habitat would increase the potential for conflict with the grizzly bear.

e. **Timber**

The RPA targets for timber from the Gallatin would be achievable on a suitable timber land base of 310,200 acres. Timber harvest is 16 MMBF annually in the first decade, and then increases to 35 MMBF annually by the fifth decade. An average of about 3,000 acres per year would be harvested over the next 50 years. The threat of insect and disease epidemics on these 310,200 suitable acres would be reduced along with less risk of wildfire.

About 50 percent of the programed timber harvest in this alternative would come from currently unroaded lands. Much of the scheduled harvest for the first 2 decades would come from the east side of the Forest where the mountain pine beetle epidemic has not yet caused large-scale tree mortality. Therefore, there would be little opportunity to salvage much of the dead material that would be available on the west side. This alternative would provide for firewood cutting in the next 20 years mostly in those areas that are already roaded.

f. **Water and Soil**

The road construction necessary to implement this alternative increases sedimentation in streams less than 3 percent for the first decade and 5 percent

by the fifth decade (Planning Records, 1982). A minor increase in water yield caused by timber harvest would not adversely effect stream channel stability.

g. Minerals, Oil and Gas

Mineral exploration and development opportunity on the 972,144 acres outside of existing wilderness is moderate to low. The road and transportation system on roaded lands would be managed to make the opportunity for increased exploration and development easier and less costly.

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

h. Landownership and Access

An ongoing effort would be continued under this alternative to acquire approximately 8,000 acres of Burlington Northern lands within the Porcupine and South Cottonwood Creek drainages through exchange of National Forest lands elsewhere on the Forest. No other large exchanges are proposed.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Socio-Economic

The first-decade yearly average cost of $6,290,000 produces outputs and activities that provide $883,000 in receipts to the U.S. Treasury and 2,501 private sector jobs. The Present Net Value (PNV) for the entire 150 year planning horizon is $289,000,000.

5. Alternative 5

The goal of this alternative is to manage the Gallatin National Forest outside the recommended wilderness areas in a way that would maximize the PNV of all the resources that are produced while meeting recreation, timber, and wildlife objectives. Market values are assigned to timber and livestock. Estimated "willingness to pay" values used in RPA are assigned to different recreation uses such as developed recreation, wilderness, motorized and nonmoterized use. Wildlife and fish are valued in terms of the visitor days of hunting, fishing, viewing etc. they produce. By setting an objective of maximizing PNV, the most economically efficient set of management practices are selected in this alternative.

a. **Recreation**

The developed sites would be maintained, but no new construction would occur. As existing sites became more crowded, people would stop using them or would find undeveloped sites for camping and picnicking. The developed sites themselves would need more maintenance as they become more crowded and, eventually, more deteriorated.

The current trail system would not be expanded and would become more congested. The primitive and semi-primitive experiences now available would decrease more quickly in this alternative than in one which would disperse users.

b. **Wilderness, Roadless**

The undeveloped National Forest lands within the Hyalite-Porcupine-Buffalo Horn Study Area, approximately 105,260 acres, would be recommended for Wilderness in this alternative. The area recommended includes about 40,600 acres of privately owned land and 6,600 acres which belong to the State and City of Bozeman. Efforts would be made to acquire the private lands to manage as wilderness.

This recommendation would provide for more wilderness opportunity close to Bozeman, and, in the short-term, would alleviate crowding on some of the trails in the Lee Metcalf Wilderness. Motorized use of the Big Sky snowmobile trail and motorbike trails within the new wilderness would be eliminated.

Other lands recommended for wilderness in this alternative include the Lionhead, Reef, Republic, Crazy Mountains, and a portion of the North Absaroka roadless areas.

The Lionhead area contains approximately 40,000 total acres of National Forest land (24,600 acres located in the Gallatin and 15,400 acres on the Targhee National Forest in Idaho).

The Reef area contains about 2,200 acres of Gallatin National Forest land and 100 acres of private ownership. This area is contiguous to about 16,800 acres of roadless land on the Shoshone National Forest in Wyoming.

The Republic Mountain area, lying southwest of Cooke City, contains about 700 acres of public land and lies adjacent to the established North Absaroka Wilderness in Wyoming.

The Crazy Mountain roadless area is located on both the Gallatin and Lewis and Clark Forests. The entire 136,500-acre area is within the area recommended for wilderness by this alternative. The Gallatin portion contains approximately 70,500 acres of National Forest land plus 37,100 acres of private ownership. The Lewis and Clark portion has about 16,600 acres of public ownership and 12,300 acres of private.

The portion of the North Absaroka roadless area recommended for wilderness in this alternative lies adjacent to the existing Absaroka-Beartooth Wilderness along its northern and western fringes. This area is shown on the map for the area in Appendix C. The portions labeled Emigrant-Mill, Strawberry, Livingston Peak, Tie Creek, and Mount Rae are recommended as additions to the wilderness.

These areas contain approximately 53,400 total acres. About 49,000 acres is National Forest and 4,400 acres is private land.

Approximately 359,000 acres or 56 percent of inventoried roadless land outside wilderness would remain unroaded after 50 years. Only 14,700 acres of roadless land would be planned for development in the next decade.

c. **Wildlife and Fish**

This alternative would provide wintering habitat for about 5,600 animals on National Forest land and 4,200 animals on private land. This would be accomplished by habitat protection and modification of winter range through habitat improvement projects. Ranchers who have elk wintering on their pastures may experience damage to their fences and haystacks, especially during more severe winters. Burlington Northern Railroad Company lands and other private lands would continue to be used by hunters during hunting season. Investments on winter range for fences and the implementation of more intensive livestock grazing systems on permanent winter range would help minimize conflicts between big game and livestock.

Fisheries habitat that currently sustains 509,000 catchable trout would decline to habitat for 494,000 catchable trout in Forest streams at the end of the first decade. The reduction occurs primarily from increased sediment caused by timber access road construction.

Grizzly bear management would be emphasized in about 61 percent of the occupied habitat. The grizzly population would recover at the same rate as in Alternatives 1 or 2.

d. **Range**

Livestock grazing levels increase from the present 43,400 AUM's to 45,600 AUM's by the second decade. Increased forage production on winter range would be distributed to livestock and big game. Increases in livestock grazing would also be accomplished by utilizing some unused forage on elk summer range. Investments would need to be made for fencing and for driveways to get the stock to the higher elevations of summer range. Livestock use of this summer range, much of which is traditionally used by big game, would cause only slight conflict with big game populations. Elk often tend to avoid areas where there are concentrations of cattle (Painter, 1980).

e. **Timber**

Timber harvest is 11 MMBF annually in the first decade and increases to 30 MMBF in the fifth decade. This alternative has a relatively small suitable timber base of 239,300 acres. In the first 3 decades, an average of only 1,770 acres per year would be harvested. The greatest present net value is achieved by operating on a small base and not considering additional constraints for water quality and wildlife. Much of the harvest would come from presently roaded areas in the first 2 decades. The remainder would come from the east side of the Forest. In the later decades, harvest would come increasingly from nonroaded areas.

In the early decades, moving a larger proportion of the harvest to the east side of the Forest would result in less opportunity to salvage the dead material now available on the west side.

Timber management would create the age class distribution necessary to reduce insect epidemics on the 239,300 acres of suitable timber land over a period of several decades (Wellner, 1978). On the remainder of the 1.3 million acres of the Gallatin which are forested, the same conditions of large stands of single-aged trees would continue to exist, and continued attacks of mountain pine beetle would be expected to occur periodically. An average of 17 miles of road construction per year are scheduled in the first 3 decades.

f. Water and Soils

Sedimentation increases of less than 3 percent per decade for the first three decades are expected. However, in the fifth decade, a substantial increase in road construction would occur as harvest becomes more economical in nonroaded areas. This would result in increased sedimentation rates of almost 6 percent. This results in stream channel erosion as excessive amounts of water are released following storms or in the springtime as snow melting occurs.

g. Minerals, Oil and Gas

Mineral exploration and development opportunity on the 767,185 acres outside of existing wilderness is moderate to low. Exploration and development on the nonroaded portions of the Forest will be more difficult and more expensive.

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

h. Landownership and Access

Within the areas proposed for wilderness in this alternative there is a total of about 94,500 acres of privately owned land. The Hyalite-Porcupine-Buffalo Horn portion contains approximately 40,000 acres of private lands; the Absaroka-Beartooth, approximately 4,400 acres; and the Crazy Mountains, about 49,400 acres. It is likely that some of these owners would be unwilling to exchange or sell their properties. Possible exchanges of National Forest lands would cause a loss from the tentatively suitable timber base.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. **Socio-Economic**

The first-decade yearly average cost of $6,035,000 produces outputs and activities that provide $713,000 in receipts to the U.S. Treasury and 2,563 private sector jobs. The Present Net Value (PNV) for the entire 150 year planning horizon is $272,000,000.

6. **Alternative 6**

The goal of this alternative is to intensify the management of the currently roaded portions of the Forest and have little additional road construction and timber harvest in the unroaded areas. On the roaded areas, emphasis is placed on timber, range, and roaded recreation. Investments would be concentrated here.

The extensive type of management on unroaded lands would be mainly for the dispersal of recreation users to provide a broad range of recreation opportunities in a near natural setting. Investments would be made only to keep the resources from being impaired where these kinds of uses are most concentrated. Fire protection would be provided only where investments or roaded lands are endangered.

All the HPBH Study Area is assigned to roadless management.

a. **Recreation**

Developed recreation would not be emphasized. No new facilities would be constructed and existing facilities would be expected to deteriorate over the next 20 years. The Forest Service would encourage the development of campgrounds on private land. Some Forest Service facilities would be closed in the future to encourage this private development. The experience that most people now enjoy in Forest campgrounds would change if only private facilities were available. There would be a number of users who would prefer to be on the National Forest even if developed camping spaces were not available. They would use undeveloped sites which would, over time, receive damage to vegetation and soil loss due to heavy use.

The dispersed recreation that would occur on the largely unroaded areas would primarily be of a primitive and semi-primitive type. Access to many internal areas of the Gallatin National Forest would remain difficult. Within these large areas of land, the user would be able to experience solitude and escape from the signts and sounds of man's activity. However, there would be some areas of intermingled ownership where the private lands would be accessed by roads and developed.

This alternative would provide for trail maintenance, but very little new trail construction to disperse users. Trail maintenance would be come more difficult and more expensive as the beetle-killed timber stands create downfall in large areas of the Forest.

The amount of Forest available for roaded recreation would not increase except where roads were built to access private lands. In general, these roads would

not be available for public use. As recreation use of the Forest roads increases, there would be more congestion and demands to leave the roads open.

b. **Wilderness / Roadless**

No additional wilderness would be recommended in this alternative. Management of the Absaroka-Beartooth and Lee Metcalf wildernesses would be at a low intensity level. The 11 inventoried roadless areas, consisting of 637,700 acres, would remain essentially roadless except for development in three of them. In the Madison Range, parts of the Cherry Creek (12,900 acres) and Teepee Creek (2900 acres) areas would be accessed for timber management. In the Gallatin Range, Bozeman Creek (3,500 acres) and in the Absaroka Range the East Boulder (4,300 acres) would be developed. It would be expected that only 6,300 acres of these would be developed in the first decade.

c. **Wildlife and Fish**

Management for wildlife in the nonroaded lands would not be intensive. There would be no vegetation manipulation by timber harvest and little by prescribed burning. However, there would be less control of wildfire in these lands. Wildfire would create more forage in some areas and increase vegetative diversity in others. Old-growth dependent species of wildlife like the moose and goshawk would benefit from this alternative. Accumulations of pine beetle-killed timber and downfall would impede elk use if the downfall were deeper than about 2-1/2 feet (Wellner, 1978).

Habitat improvement would take place on the roaded lands, mostly in winter range. Prescribed burning and structural improvements such as fencing would be used to produce more forage for big game needs and to help reduce the conflicts between elk and livestock. This would provide for a habitat capability of 6,500 elk wintering on current National Forest range. This population level would provide for a diverse hunting opportunity on both the roaded and nonroaded lands (Planning Records, 1982). The lack of timber harvest removing the cover and no road construction on a major portion of the Forest would provide security for elk. In these nonroaded areas, the hunting opportunity would remain more static (Lonner and Cada, 1982).

More capability for elk on the National Forest would cause some livestock management problems such as upkeep of fences and the proper utilization of forage. Range conditions in this alternative would be expected to decline, but in no case would less than 45 percent of the total forage be left to maintain fair range condition. Larger elk populations would also cause increased pressure on winter range on private land which could lead to damage on these lands.

Fisheries habitat for almost 511,000 catchable trout in Forest streams would be maintained because stream sedimentation increases due to road construction are low in this alternative, less than 3 percent over the first decade and less than 2 percent increase by the fifth decade.

Management for grizzly bear would be emphasized on 100 percent of Situation 1 areas and 24 percent of Situation 2 areas. Recovery of their population would occur earlier than in Alternatives 1, 2, and 5, but later than in Alternatives 3, 4, 7, 8, 9, and 10. On those areas of grizzly bear occupied habitat not

given emphasis, the bear would be adversely affected by increased dispersed recreation use.

d. **Range**

Livestock grazing increases of up to 49,000 AUM's are projected through the first two decades. After that, livestock use would level off at 50,000 AUM's per year. These increases would be achieved through forage improvements and better distribution of livestock by intensive management systems. As stated earlier, increased livestock grazing in conjunction with increased big game populations would leave more range in only a fair condition rather than the existing good condition. The increases in fences and prescribed burning would be evident from roads and would decrease the visual quality of the Forest's roaded lands. These management practices would decrease the habitat of those wildlife species dependent on the sagebrush plant community as more sagebrush is burned (Thomas,1979).

e. **Timber**

Timber harvest would be 17 MMBF annually through the fifth decade and then would increase to 25 MMBF by the tenth decade. The suitable land base for timber management would be 228,600 acres. Except for about 22,000 acres, this is all on presently roaded areas. An average of just over 2,000 acres per decade would be harvested. Because of the small suitable base, the harvest would occur in a relatively small number of drainages. This would increase the possibility that in some areas increased water yields from harvest would be large enough to cause stream channel erosion. Because of the more concentrated harvest on areas where some roads now exist, little new road construction would be required. Stream sedimentation increases caused by road construction would be low with very little adverse effect on the stream fisheries populations. The lack of flexibility in where the timber harvest can come from in this alternative increases the probability of site-specific problems.

Concentration of timber harvest in currently roaded areas would reduce the future availability of firewood to local users.

On the roaded portions of the Forest, the alteration of the landscape would be quite evident because of the concentration of timber management. It would become harder to blend the openings from timber harvest into the natural landscape.

This alternative would not offer much opportunity to improve the timber age class distribution, so the Forest would be susceptible to recurring mountain pine beetle attacks. This alternative would rely on natural processes such as fire, insects, and disease to provide overall vegetation diversity for wildlife habitat. The suitable timber base would support more early forest development stages such as grasses, forbs, and seedlings because of the more intensive timber harvest. Wildlife species dependent upon these early successional stages would be benefited on these lands (Thomas, 1979).

f. **Water and Soils**

Forestwide sedimentation increases and their effects on stream fisheries are relatively low in this alternative. Increases of less than 3 percent per decade

in the first decade would be expected. This would decrease to less than 2 percent increase per decade by the fifth decade. The primary reason for these low increases is the low amount of road construction planned.

Concentrated timber harvest in some drainages could cause the hydrologic limits to be exceeded, resulting in stream channel erosion as excessive amounts of water are released following storms or in the springtime as snow melting occurs.

g. Minerals, Oil, and Gas

Exploration and development on roaded lands would be relatively easy and accessible. Forest roads would be used and the needs of oil and gas exploration would be coordinated with the transportation plan. Exploration in these areas would have little effect on sediment increases. Activities in critical big game and grizzly bear habitat would be coordinated to occur at times of the year when these species would be less affected. The physical and biological effects of development of mines or oil fields would vary by the size of the operation. The possible range of activity is too great to make worthwhile estimates at this time.

On nonroaded lands, exploration and development would be more difficult and expensive. If roads were required, they could be constructed subject to consideration for wildlife and sensitive soils.

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

h. Landownership and Access

An ongoing effort would be continued under this alternative to acquire approximately 8,000 acres of Burlington Northern Inc. lands within the Porcupine and South Cottonwood Creek drainages through exchange of National Forest lands elsewhere on the Forest. No other large exchanges are proposed.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Socio-Economic

The first decade yearly annual costs of $6,038,000 produces outputs and activities that provide $897,000 in receipts to the U.S. Treasury and 2444 jobs to the local economy. The Present Net Value (PNV) for the entire 150-year planning horizon is $276 million.

7. Alternative 7 (Preferred Altenative)

The goal of this alternative is to respond to a variety of resource needs and social concerns. It emphasizes the wildlife and recreation values of the Forest and coordination of its management with all the Greater Yellowstone Area. At the same time, it maintains the commodity outputs at a level that maintains industry stability. This alternative is also designed to demonstrate the flexibility that exists in the plan period to adjust timber outputs if higher demand for timber and increases in price occur.

On the lands suited for timber management the objective is to implement prescriptions which regulate growing, tending, harvesting, and regenerating wood production. Timber harvest is distributed over a relatively large land base (suitable acres) to minimize water quality effects on specific drainages and to improve age class size and species distribution of timber stands. On the remaining forested areas, fire may be used as a tool as needed to maintain the age and species diversity necessary for a wide variety of wildlife and reduce the potential for large fires.

Water quality is emphasized by implementing mitigation measures to reduce sedimentation from road construction and consequent effects on the fisheries. Standards for management activities in riparian areas are set to protect this resource.

Another objective is to maintain elk and deer winter range in good condition. Use of fire for forage improvement and investments for better management of livestock on winter range will help to maintain the big game populations at levels commensurate with the habitat capability. Road management is used to increase the effectivenss of big game summer habitat and to maintain the hunting opportunity and diversity that now exists.

In occupied grizzly bear habitat, emphasis is given to the bear with the objective of helping provide for a recovered population at an early date. A strong policy of reducing grizzly mortality will necessitate strict control of activities including concentrated recreation and livestock grazing in some areas.

More investment for the construction or reconstruction of mainline trails and the maintenance of existing trails will provide opportunities for dispersed recreation. More parking places along roads and highways for access to winter sports like skiing and snowmobiling will be provided. The maintenance of existing developed sites would be improved to reverse their deteriorating condition, and a moderate level of investment would be used to construct new campgrounds in areas of increasing demand. Some campgrounds could be closed or consolidated to increase efficiency. Some may need to be closed in the future to reduce the potential for grizzly bear conflicts. The Forest would encourage development of private recreation facilities on private land and to a limited extent on National Forest land to help meet increasing demand for this type of use.

This alternative would require the construction of 170 miles of access road to the Forest boundaries over a 30-year period. Increasing traffic on the narrow dirt road in the Hyalite drainage is a serious safety problem. This alternative envisions that ongoing reconstruction will be completed.

Livestock grazing is increased above current levels. Increased management and investment on some allotments are needed to mitigate adverse effects of grazing. Utilization of forage in riparian areas is limited to an average of 40 percent to protect fisheries habitat. Increases in grazing would occur gradually over the next two decades. The livestock industry can respond to the increase and winter range and grizzly bear habitat would be protected.

A strong commitment to the minerals program is anticipated, with increasing costs expected, to respond to national demand for minerals, oil, and gas.

a. **Recreation**

A moderate level of investment will be made for construction of developed recreation facilities. This construction would occur in areas where facilities do not exist or are inadequate to meet demand. Putting campgrounds in these ares would reduce some of the resource damage caused by people camping in overcrowded, undeveloped places. It would also make the maintenance of the entire area easier while at the same time responding to a public need for developed sites.

The maintenance of existing sites would be at a level which would reverse their deteriorating condition. Public safety would be maintained and the user would enjoy the facilities more than in those alternatives which could not properly maintain them.

Areas assigned to dispersed recreation would be managed to provide a wide range of opportunities, both of a roaded and nonroaded type. Access to these areas would be emphasized and dispersal of users in these areas would be gained by trailhead and trail construction. Trail construction to disperse use would cut down on concentrations of people in certain areas and help alleviate some of the soil and vegetation damage this causes. New mainline trail construction out of creek bottoms and wet areas would reverse some of the damage to these areas that is now occurring. However, by providing more access and more opportunity to get to some areas, users would experience less solitude here than if these areas remained relatively hard to access.

Access to the National Forest for recreation and other uses would benefit many people. However, private landowners could experience more trespass on their intermingled private lands. They would feel they have less control over what happens on their land.

More and better access to different parts of the Forest would better disperse recreation use and relieve congestion of heavily used areas.

b. **Wilderness, Roadless**

This alternative recommends the addition of 21,941 acres for wilderness classification. It includes 21,461 acres of the Lionhead area in Montana and 480 acres of Republic Mountain.

Portions of the 32,780 acres Lionhead roadless area are excluded from wilderness consideration in this alternative to provide for continued heavy snowmobile use in the southeastern portion of the area, timber management activity on the

eastern border, and for wildife winter range improvement work along the western edge. The Montana portion of the Lionhead roadless area borders a roadless area on the Targhee National Forest in Idaho. If the Idaho portion is classified as wilderness, the Montana section will contribute to a larger area which will straddle the Continental Divide. The two areas would total 35,860 acres.

The 480-acre Republic Mountain area, proposed as wilderness, is located southwest of Cooke City and is adjacent to the existing North Absaroka Wilderness in Wyoming.

The Hyalite-Porcupine-Buffalo Horn Study Area is proposed as nonwilderness in this alternative. Two special management areas are envisioned in this proposed action. The rugged Hyalite Peaks area would be managed as a 23,102-acre scenic area. This would be managed to provide for continued dispersed recreation uses. A National Recreation Trail is proposed for the area and would extend down Gallatin Divide to Windy Pass. A special 33,260 acre wildlife management area in the Porcupine and Buffalo Horn Creeks area would be administered to protect and enhance important elk and grizzly bear habitats. Motorized use of the Big Sky Snowmobile Trail and motorbike use would be maintained.

Alternative 7 provides for approximately 738,000 acres of wilderness on the Gallatin plus 552,200 acres of additional National Forest land that would remain unroaded after 50 years. About 31,300 acres of roadless lands in this alterantive would be developed in the first decade.

c. Wildlife and Fish

The wildlife program under this alternative emphasizes managing big game winter range in good condition. Added emphasis is also placed on managing habitat for small and nongame species. Keeping winter range in good condition would ensure that big game populations increase slightly above current levels assuming hunting seasons do not change. More winter forage on National Forest lands would keep the elk herds there longer in most years and reduce the damage that elk cause to adjacent ranchers' fences and haystacks. In the Gardiner area where elk from Yellowstone Park winter, more forage on National Forest land may not keep the elk off private lands. In that area it is often the hunting pressure that drives the elk down to the more secure private lands (based on observation of Forest personnel).

Prescribed burning of sagebrush and some aspen would increase browse and forage for big game and provide more habitat for species dependent on grasses. More forage would mutually benefit livestock grazing and big game. Except for the smoke from burning and some obvious alteration of the landscape, prescribed burning in sagebrush has little adverse effect.

Stream fisheries would remain at the 509,000 catchable trout level throughout the first five decades.

Grizzly bear management would be aimed at providing adequate habitat requirements and reducing man-caused mortality to a point that would ensure the recovery of the species earlier than all other alternatives. In this alternative, all occupied habitat is given emphasis for the bear, including both MS-1 and MS-2 lands. Activities that take place in occupied habitat - such as livestock grazing, timber management, or recreation use - are done in a way

that the grizzly populations can be protected. This would have no effect on the amount of harvest volume that would come from occupied lands, but would curtail harvest and other management activities such as thinning during certain critical periods of the year.

Grizzly management could result in the closure of trails or areas to recreation use if there was a high potential for man/bear confrontation. Some recreation use would be diminished. In this alternative, no new or additional sheep grazing occurs in Situation 1 areas. Livestock grazing would not be incompatible with grizzly management. However, livestock may be moved or removed for a short time to reduce chances of man/bear confrontations.

d. Range

Livestock grazing use would increase from the present 43,400 AUM's to 45,000 AUM's. This increase would result from implementing more intensive grazing systems to distribute use and better utilize available forage. By implementing better grazing systems such as rest-rotation and multiple pastures, the range conditions --especially on big game winter range-- would improve. In this alternative, forage utilization standards for grazing in riparian areas, coupled with improved grazing systems, would ensure that vegetation next to streams would remain in good condition. Protection of this riparian vegetation would lead to less use of streambank vegetation and to less adverse impact on the fisheries (Boussu, 1954). Controlling livestock use in riparian areas would also reduce damage to streambanks from trampling and overgrazing. Maintaining these streambanks in good condition is an important factor in maintaining the catchable stream populations of trout.

Increases in livestock grazing on summer range could displace elk from some of their traditional range (Painter, 1980). Reintroduction of domestic sheep in the Gallatin Range could separate two individual herds of bighorn sheep (Planning Records, 1982). The smaller herd would have more difficulty depending on the larger herd for breeding purposes; therefore, domestic sheep will not be reintroduced in this area. No increases in domestic sheep AUM's would be scheduled for Situation One grizzly bear habitat. In all areas of occupied grizzly bear habitat, livestock grazing would be guided by the overall goal of providing for a viable, recovered grizzly population in the Yellowstone Ecosystem. The guidelines, as they pertain to livestock grazing, would provide for temporary removal of livestock from areas to prevent a confrontation with the bear.

e. Timber

Timber management would occur on 305,000 acres of suitable timber land. In the first decade, the annual sale volume offered would average 21 million board feet. In the second and third decades under this schedule, the annual volume would remain at 21 MMBF. The relatively large base would allow the scheduling of timber sales without many unforseen delays. Carrying out the timber management program on a large base would mean there would be no heavy concentrations of harvest in any one drainage. A procedure using an "equivalent clearcut area" estimation would be used to signal if there were becoming too many openings in a particular area which could lead to excessive water run-off and consequent stream channel erosion (Planning Records, 1982). This process estimates the time it takes for the soils to recover their water-holding

capabilities after a clearcut is made and the numbers of acres that are in different stages of recovery. With the large base, it would be easier to schedule harvest away from areas that need more time for hydrologic recovery.

In this alternative, more of the offered volume would come from the east side of the Forest, especially in the first two decades. This would allow more live volume to be harvested before the expected mountain pine beetle infestation reaches that part of the Gallatin. With this schedule, however, an estimated 4.0 million board feet per year of dead trees would be salvaged in the first decade in the scheduled timber sales. This is a major part of a noninterchangeable component of 5 MMBF. One million board feet of this component would be posts and poles. If the opportunity or need arises, the Forest will attempt to include an additional 4 MMBF per year of dead salvage sawlogs. This would come from both current and past harvest areas, especially in areas that have the greatest proportion of dead and are easily accessed by the current road system. This alternative would also provide for a continued opportunity for firewood gatherers to harvest dead timber because of additional roads that would be constructed into areas that have a large component of insect-killed timber. This alternative would provide the opportunity to change the allowable sale quantity or suitable land base during the plan period if the demand for timber increases significantly and timber prices increase. Before either of these changes were made, the Plan would have to be amended.

More road construction and a larger timber base would result in a reduction in roadless acres on the Forest. It would take about 50 years to complete the road system on the suitable timber lands. During this time, the opportunity for primitive and semi-primitive recreation opportunities on these lands would decrease. Big game hunting opportunities would change on these lands because of more roads and less forest cover. More of the kill would be expected to occur in the first few days of the season (Lonner and Cada, 1982). This change would occur gradually over a 20 to 30 year period.

This alternative would provide the opportunity to improve the age class distribution of timber through timber management. It would convert more of the stands into young age classes. One effect of this would be to reduce future losses to mountain pine beetle attacks. Providing for more age class distribution would also provide for more wildlife species diversity. There would be more habitat for those species which require early successional stages of forest development which timber harvest brings about. Species such as moose and goshawk, which depend on old growth forest, would not be adversely affected by this alterantive. These species require at least 10 percent old growth habitat component (Thomas, 1979). This alternative would provide at least 10 percent old growth within the suitable forest land plus as much as 75 percent old growth on the remainder of the forested land.

The larger timber base would eventually reduce the risk of fire in insect-infested stands. At the same time, fire control efforts would be less expensive because the roads in suitable timber land would be used to move fire fighting equipment.

f. Watershed and Soils

As discussed earlier, road standards and design would help keep increases in sedimentation rates within acceptable levels even though this alternative would

construct the third most miles of road. Increases in sedimentation rates would be about 3.8 percent per decade above natural rates (Planning Records, 1982).

Road construction and timber harvest would not be concentrated in any drainage. This alternative would offer the greatest opportunity to meet the harvest schedule and still distribute the harvest over the Forest in order to reduce the potential for mass soil failure and stream channel erosion in any watershed.

g. Minerals, Oil/Gas

Added emphasis would be placed on responding to leasing requests and coordinating minerals and oil/gas activities with other activities, especially transporation planning. This alternative, like all the other alternatives, would have very little land outside wilderness which would not be available for leasing and exploration. Restrictions on exploration and development would be placed on riparian areas, areas of sensitive soils, and critical big game and grizzly bear habitat.

Most oil and gas exploration would not require new road construction. There is little adverse effect on the physical or biologial environment from exploration (USDA, Forest Service, 1981a). However, development of an oil field or a mine could have adverse impacts on water quality, some wildlife, and visual quality. A mining operation would require high standard roads, tailing sites, settling ponds, and large mining equipment. Development of an oil field would require roads to drill sites and production facilities. Depending on the size of the mining operation or oil field, the physical, biological, and social effects could be minor or major.

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

h. Landownership and Access

An ongoing effort to acquire approximately 8,000 acres of Burlington Northern Inc. lands within the Porcupine and South Cottonwood Creek drainages through exchange of National Forest lands elsewhere on the Forest would be continued under this alternative. No other large exchanges are proposed.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Socio-Economic

The first decade annual costs of $6,354,000 produced outputs and activities that provide $885,000 in receipts to the U.S. Treasury and 2,685 jobs to the local economy. The Present Net Value (PNV) for the planning horizon is $276,000,000.

8. Alternative 8

The objective of this alternative is to explore the benefits and costs of prescribing a large segment of the roadless resource to wilderness. A high degree of economic efficiency is attempted on the lands not recommended for wilderness. In this alternative, approximately 78 percent of the remaining roadless lands outside of existing wilderness are assigned a wilderness prescription.

To implement this alternative, it would be desirable to acquire large acreages of private land within the proposed wilderness areas by means other than exchange. However, some of the private landowners may not be willing to sell their lands.

A detailed appraisal of the value of the private lands has not been conducted. A rough estimate of value for these lands averages about $250 per acre. There are approximately 99,200 acres of private ownerships within the areas proposed as wilderness in this alternative.

The outputs described below are based on the assumption that the National Forest lands outside of the proposed wilderness additions would not be exchanged for private lands. If National Forest lands were not available due to exchange, the nonwilderness outputs would be less than what is described.

The new wilderness recommendations in this alternative would be the Hyalite-Porcupine-Buffalo Horn study area plus adjacent roadless areas in the Gallatin Range, the Crazy and Bridger Mountains, roadless lands adjacent or close to the existing Absaroka-Beartooth Wilderness, Lionhead, Republic Mountain, Reef, Dry Canyon, Chico, and North Absaroka roadless areas.

a. Recreation

Investments for trails and trailhead facilities to disperse people would result in opportunities for more people to experience a primitive or semi-primitive type of recreation. As the use of unroaded areas increases, this alternative would provide these types of dispersed recreation for an extended period into the future. The concentrations of users that now exist in some areas would be reduced because of the construction of new trails and accessing of new areas with trailhead facilities.

The assignment of large areas of land for dispersed nonroaded and nonmotorized recreation uses would mean very little new road construction on the Forest. There would be no vegetation manipulation such as timber harvest or prescribed burning in these areas. Except for the containment of wildfires, natural processes would prevail.

Opportunity for roaded recreation use would increase slowly in this alternative because of the few new roads constructed. As the population of the area increases and more people use the Forest roads for recreation, crowding and congestion would occur.

The opportunities for snowmobiling and trail biking would be reduced. A major portion of the Big Sky Snowmobile Trail, along with popular areas in the Lionhead roadless area, would be closed. Trail bike use within the Gallatin Range roadless areas and other proposed wilderness areas would be curtailed.

Congestion of developed recreation facilities on the National Forest would occur after about 20 years because construction of new camping and picnicking sites would not keep up with demand. Private investment in these kinds of facilities off the Forest would be encouraged. Maintenance of existing developed facilities would increase due to heavier use.

b. **Wilderness / Roadless**

The existing and proposed wilderness under this alternative would be managed to disperse use. Investments would be made for new trail construction, especially to upgrade heavily used trails and to access new areas of wilderness. Besides providing more wilderness, this would reduce soil and vegetation impacts in heavily used areas. New mainline trails constructed away from the stream bottoms would reduce horse travel damage to those trails.

The undeveloped National Forest lands within the Hyalite-Porcupine-Buffalo Horn Study Area, approximately 105,600 acres, would be recommended for wilderness in this alternative. The area recommended includes about 40,600 acres of privately owned land and 6,600 acres which belong to the State and City of Bozeman. Efforts would be made to acquire the private lands to manage as wilderness.

The 5,466 acres of State game range in the Buffalo Horn Creek area and 1,115 acres of City of Bozeman municipal watershed in the Bozeman Creek area would not be acquired.

This recommendation would provide for more wilderness opportunity close to Bozeman, and in the short-term, would alleviate crowding on some of the trails in the Spanish Peaks. It would displace the motorized types of recreation within the study area.

Three other areas lying adjacent to the study area are also recommended for wilderness in this alternative. These areas would expand the Gallatin Divide area to 158,000 acres of National Forest ownership plus 42,300 acres of private lands for wilderness.

The wilderness recommendation for the Crazy Mountain roadless area is the same as was explained in Alternative 5. The Gallatin portion would contain about 70,500 acres of pulic lands plus 37,100 acres of private ownership. The Lewis and Clark portion would contribute an additional 16,600 acres of National Forest plus 12,300 acres of private.

The proposed Lionhead area recommended for wilderness would provide an additional 48,200 acres. This includes 32,800 acres of the Gallatin and 15,400 acres of the Targhee National Forest in Idaho.

The Republic Mountain area would contribute an additional 700 acres to the wilderness system in this alternative. The Reef roadless area is also recommended for wilderness in this alternative. This area contains about 2,200 acres of Gallatin National Forest land and 100 acres of private ownership. The area lies along the State line between Montana and Wyoming and is contiguous to about 16,800 acres of roadless land on the Shoshone National Forest in Wyoming not designated as wilderness by the Wyoming Wilderness Act.

The Dry Canyon area is also included as an addition to the wilderness system in this alternative. This area is 2,200 acres of roadless Forest land situated about 5 miles south of West Yellowstone and lies adjacent to Yellowstone National Park.

The roadless portion of the Bridger Mountain Range is recommended as wilderness by this alternative. This would contribute about 45,400 acres of National Forest to wilderness. The area includes about 2,100 acres of private ownership within its boundary.

This alternative includes the Chico roadless area as a wilderness recommendation. The area contains about 10,900 acres of National Forest and 700 acres of private land. Approximately 62,600 acres of the North Absaroka roadless area are recommended as an addition to the exiting Absaroka-Beartooth Wilderness in this alternative. The segments recommended include those identified for Alternative 5 plus the Dome Mountain portion lying northeast of Yankee Jim Canyon. The total area would add about 57,600 acres of National Forest plus 4,600 acres of private land to the wilderness system.

This alternative recommends a total addition of approximately 518,200 acres to the wilderness system. It contains about 412,400 acres of National Forest, 99,200 acres of private land, and 6,600 acres of State and City of Bozeman lands within the area. This would result in acquiring the private land in the HPBH Study Area portions of roadless area and checkerboard ownerships adjacent to the Absaroka-Beartooth Wilderness and within the Crazies may necessitate trading out of land elsewhere on the National Forest. This would result in a decrease in the tentatively suitable timber base on the Forest. Many of the areas traded away would be key big game winter range which could be managed differently under private ownership. This would also reduce the National Forest area presently used for motorized recreation.

c. Wildlife and Fish

Big game winter range not exchanged to private landowners would be managed to increase forage production for elk and deer and to maintain security and thermal cover. The available forage would be used primarily by big game with a resultant reduction in livestock grazing in Alternative 8. This reduction would take place over approximately ten years and the grazing permittees would either be forced to reduce their stock or find substitute grazing on private land.

If all of the existing National Forest elk winter range were retained in public ownership, these lands could be managed to increase the elk overwintering capacity to about 6,600 animals with additional forage available and less competition from domestic livestock (Planning Records, 1981). It is possible, however, that some of the National Forest winter range would need to be

exchanged to private owners in order to acquire the higher elevation private ownerships envisioned for wilderness classification. This would decrease the winter capacity to produce elk.

A larger elk population would result in a greater harvest by hunters. Considering also that there is little new road construction and little cover modification from timber harvest, the opportunity for a long hunting season with the harvest spread out over the entire area would be high (Lonner and Cada, 1982). Opportunities for road hunting and easy access into areas would decrease, however, because of the small amount of new road construction. Increases in the big game population, especially elk, would cause adverse impacts on ranching operations adjacent to and intermingled with the Forest. Additional elk wintering on private lands would damage more fences and haystacks. Increased concentrations of big game on areas where prescribed fire has been used to increase forage could lead to some soil erosion and increased sedimentation.

Stream fisheries habitat would be healthy. Sedimentation increases from road construction would be low. Populations of stream fish would be about 516,000 catchable size trout, which would provide good fishing opportunity on the accessible streams. Because of the few miles of new road construction necessary to implement this alternative, additional access to Forest fishing streams would be minimal.

The alternative would afford a good opportunity to assist in the recovery of the grizzly bear population because a large portion of the occupied habitat on the Gallatin would be managed for grizzly bear emphasis. In Situation 1 areas, 100 percent of the land would be managed for grizzly emphasis, and in Situation 2 areas, 67 percent. In these areas, some trails would be closed certain times of the year to reduce man/bear conflicts and reduce the potential for grizzlies being killed.

d. Range

The livestock grazing program for Alternative 8 would increase from the existing 43,400 AUM's to 45,000 AUM's. This would be accomplished through improved range management practices.

The removal of some livestock from winter ranges would provide more forage for big game. The winter range vegetation condition would improve with less cattle/elk competition. There would also be less grazing of riparian vegetation and the streambanks of important fisheries streams would be less impacted (Boussu, 1954). There would be less possibility for irreversible damage by cattle to undercut streambanks, which are important fisheries habitat components.

e. Timber

This alternative would have the lowest timber output in the first three decades of any alternative except 3 and 9. An average of less than 11 miles of road per year would be constructed. Stream fisheries would have low impacts in this alternative.

The small timber volume of about 12 million board feet annually coming from the National Forest in the first decade would adversely affect the local timber industry and local employment. Timber mills may be able to make up the shortage from private timber lands for a few years, but in the long run the timber available to local mills would decrease. Some mills would possibly close. Others would run at a very low capacity.

Since there would be a small area where silvicultural practices would occur, little opportunity would exist for reducing losses to insect and disease attack. Except in areas where wildfire occurs, the rest of the Forest would be characterized in time by predominantly climax species stands growing at a rate much lower than potential (Arvo and Simmerman, 1982). Lodgepole pine killed by mountain pine beetle in recent years would become downfall over the next twenty years. Wildfire severity would increase as natural accumulations of dead material build up.

There would be less opportunity for supplying firewood because of the few new roads. As the available firewood was cut, no new ares of dead wood would be accessed. There would be little opportunity for firewood gatherers to collect wood from timber sale slash piles.

f. **Watershed and Soils**

As described earlier, this alternative would increase sedimentation rates by very little above natural rates. The current hydrologic conditions of the watersheds would be maintained. In no drainages would there be concentrated enough removal of timber to create conditions where water yield increases endanger stream channel stability.

g. **Minerals, Oil/Gas**

The probability of discovering oil and gas would be low in this alternative because the lack of roads and the amounts of wilderness. The effects of exploration on the physical and biological environment would be minimal. Development of major fields, if discovered, would change the character of nonroaded areas significantly. The roads necessary for development would allow access into previously unaccessed areas. Pipelines and roads would make alterations in the natural landscape and have an adverse effect on the visual quality of some areas.

Lease and development stipulations would apply so that special areas of the Forest would be protected during exploration and development phases. These areas include riparian areas, sensitive soils, and critical habitat for big game and threatened/endangered species such as the grizzly and bald eagle.

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

h. Landownership and Access

The probable land exchange with Burlington Northern and other private owners in these alternatives has already been discussed under the wilderness section. Effects of the exchange would be more wilderness and a loss of National Forest timber base.

Where intermingled National Forest and private land ownership exists outside of the wilderness areas, private landowners would be allowed access to their lands. Some of the roads leading to private inholdings would be used by the public to gain vehicle access farther into basically nonroaded areas. This would make hunting and fishing more accessible and would put more people into areas planned for nonroaded recreation opportunities. With more people, the primitive and semi-primitive experiences in these places would change. Timber harvest activities on private lands would alter the natural landscape in some areas of high primitive and semi-primitive recreation opportunity. Because the timber volume coming from National Forest lands would be low in these alternatives, private timber owners within the Forest boundary would likely cut their lands more heavily. Besides the visual effects, this could lead to watershed problems in some of the more unstable drainages and possibly significant impacts on wildlife in localized areas.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Social - Economic

The first-decade yearly annual cost of $5,652,000 produces outputs and activities that provide $543,000 in receipts to the U.S. Treasury and 2,458 jobs to the local economy. The Present Net Value (PNV) for the entire 150-year planning horizon is $270 million.

Alternative 9

The objective of this alternative is to identify the value of recommending all of the remaining roadless areas of the Gallatin as wilderness. A high degree of economic efficiency is attempted on the existing roaded lands.

The theme of alternative 9 is similar to Alternative 8. With this alternative, approximately 69 percent of the entire Forest would become wilderness. Alternatives 5 and 8 recommended large additions of land for wilderness but not all the remaining roadless country on the Forest.

Due to large amounts of privately owned land within some of the areas proposed for wilderness in this alternative, it would be desirable to acquire the private lands through means other than exchange of National Forest land outside of the roadless areas. It is recognized that some of the private landowners may not be willing to sell their lands.

A detailed appraisal of the value of the private lands has not been conducted. A rough estimate of value for these lands averages about $250 per acre. Within

the roadless areas recommended for wilderness in this alternative there are about 107,900 acres of privately owned lands.

The outputs described below are based on the assumption that the National Forest lands outside of the proposed wilderness additions would not be exchanged for private lands. If National Forest lands were not available due to exchange, the nonwilderness outputs would be less than what is described.

a. **Recreation**

Investments for trails and trailhead facilities to disperse people would result in opportunities for more people to experience a primitive or semi-primitive type of recreation. As the use of unroaded areas increases over time, these alternatives would provide for these types of dispersed recreation the longest into the future. The concentrations of users that now exist in some areas would be reduced because of the construction of new trails and accessing of new areas with trailhead facilities.

The assignment of large areas of land for dispersed nonroaded and nonmotorized recreation uses would mean there would be a very little new road construction on the Forest and there would be no vegetation manipulation such as timber harvest or prescribed burning in these areas. Except for the containment of wildfires, natural processes would prevail.

Opportunity for roaded recreation use would increase slowly in this alternative because of the few new roads constructed, along with the reduction of National Forest land outside of proposed wilderness if traded to private landowners to facilitate the additional wilderness. As the population of the area increases and more people use the Forest roads for recreation, crowding and congestion would occur.

The opportunities for snowmobiling and trail biking would be reduced. A major portion of the Big Sky Snowmobile Trail along with popular areas in the Lionhead roadless area would be closed. Trail bike use within the Gallatin Range roadless areas and other proposed wilderness areas would be curtailed.

Congestion of developed recreation facilities on the National Forest would occur after about 20 years because construction of new camping and picnicking sites would not keep up with demand. Private investment in these kinds of facilities off the Forest would be encouraged. Maintenance costs of existing developed facilities would increase due to heavier use.

b. **Wilderness / Roadless**

The existing and proposed wilderness under this alternative would be managed to disperse use. Investments would be made for new trail construction, especially to upgrade heavily used trails and to access new areas of wilderness. Besides providing more wilderness, this would reduce soil and vegetation impacts in heavily used areas. New mainline trails constructed away from the stream bottoms would reduce horse travel damage to those trails.

The 105,600 acres of National Forest land in the Hyalite-Porcupine-Buffalo Horn Study Area would be recommended for wilderness. Within the study area there are 40,600 roadless acres of private land. An attempt would be made to acquire the

private land to manage as wilderness. It is envisioned the 5,466 acres of State game range in the Buffalo Horn Creek area and 1,115 acres of City of Bozeman municipal watershed in the Bozeman Creek area would not be acquired.

This recommendation would provide for more wilderness opportunity close to Bozeman, and, in the short-term, would alleviate crowding on some of the trails in the Spanish Peaks. It would displace the motorized types of recreation within the study area.

Three other areas lying adjacent to the Study Area are also recommended for wilderness in this alternative. These areas would expand the Gallatin Divide area to 158,100 acres of National Forest ownership plus 42,300 acres of private lands for wilderness.

The wilderness recommendation for the Crazy Mountain roadless area is the same as was explained in Alternatives 5 and 8. The Gallatin portion would contain about 70,500 acres of public lands plus 37,100 acres of private ownership. The Lewis and Clark portion would contribute an additional 16,600 acres of National Forest plus 12,300 acres of private.

The proposed Lionhead area recommended for wilderness would provide an additional 48,200 acres. This includes 32,800 acres of the Gallatin and 15,400 acres of the Targhee National Forest in Idaho.

The Republic Mountain area would contribute an additional 700 acres to the wilderness system in this alternative. The Reef roadless area is also recommended for wilderness in this alternative. This area contains about 2,200 acres of Gallatin National Forest land and 100 acres of private ownership. The area lies along the State line between Montana and Wyoming and is contiguous to about 16,800 acres of roadless land on the Shoshone National Forest in Wyoming which was identified as nonwilderness in the recent Wyoming Wilderness Act.

The Dry Canyon area is also included as an addition to the wilderness system in this alternative. This area is 2,200 acres of roadless Forest land situated about 5 miles south of West Yellowstone and lies adjacent to Yellowstone National Park.

The roadless portion of the Bridger Mountain Range is recommended as wilderness by this alternative. This would contribute about 45,400 acres of National Forest to wilderness. The area includes about 2,100 acres of private ownership within its boundary. This alternative includes the Chico roadless area as a wilderness recommendation. The area contains about 10,900 acres of National Forest and 700 acres of private land.

The entire 193,400 acres of the North Absaroka roadless area is recommended as an addition to the existing Absaroka-Beartooth Wilderness in this alternative. The Gallatin portion would contain about 159,300 acres of public lands plus 11,400 acres of private. The Custer portion would contribute an additional 22,500 acres of National Forest plus 200 acres of private.

The Box Canyon roadless area is included as a wilderness recommendation in this alternative. The area has a total area of 12,900 acres. This is made up of 1,700 acres of National Forest land on the Gallatin and 9,900 acres on the Lewis and Clark. The Gallatin portion includes an additional 500 acres of private

land while the Lewis and Clark portion includes 800 acres of private ownership within the area recommended for wilderness.

Also recommended for wilderness by this alternative is the Beartooth roadless area. This area contains about 6,300 total acres lying north and east of Cooke City. The area includes about 4,700 acres of National Forest land on the Gallatin and 1,200 acres on the Custer National Forests. It also includes about 300 acres of private land on the Gallatin and 100 acres of private within the Custer National Forests.

Acquiring the private land in the roadless areas recommended for wilderness in this alternaive may necessitate trading out of land elsewhere in the National Forest. This would result in a decrease in the tentatively suitable timber base on the Forest. Private owners, mostly adjacent ranchers, would possibly trade for National Forest lands at lower elevations. Many of these low-elevation areas would be key big game winter range which could be managed differently under private ownership. This would also reduce the National Forest area presently used for motorized recreation.

c. Wildlife and Fish

Big game winter range not exchanged to private landowners would be managed to increase forage production for elk and deer and to maintain security and thermal cover. The available forage would be awarded primarily to big game with a resultant reduction in livestock grazing in Alternative 9. This reduction would take place over approximately ten years and the grazing permittees would either be forced to reduce their stock or find substitute grazing on private land.

If all of the existing National Forest elk winter range were retained in public ownership, these lands could be managed to increase the elk overwintering capacity to about 6,600 animals with additional forage available and less competition from domestic livestock (Planning Records, 1981). It is possible, however, that some of the National Forest winter range would need to be exchanged with private owners in order to acquire the higher elevation private ownerships envisioned for wilderness classification. This would decrease the winter capacity to produce elk.

A larger elk population would result in a greater hunter harvest. Considering also that there is little new road construction and little cover modification from timber harvest, the opportunity for a long hunting season with the harvest spread out over the entire area would be high (Lonner and Cada, 1982). Opportunities for road hunting and easy access into areas would decrease, however, because of the small amount of new road construction. Increases in big game population, especially elk, would cause adverse impacts on ranching operations adjacent to and intermngled with the Forest. Additional elk wintering on private lands would damage more fences and haystacks. Increased concentrations of big game on areas where prescribed fire has been used to increase forage could lead to some soil erosion and increased sedimentation.

Stream fisheries habitat would be healthy. Sedimentation increases from road construction are low. Populations of stream fish would be about 518,000 catchable size trout, which would provide good fishing opportunity on the accessible streams. Because of the few miles of new road construction necessary

to implement this alternative, additional access to Forest fishing streams would be minimal.

The alternative would afford a good opportunity to assist in the recovery of the grizzly bear population because a large portion of the occupied habitat on the Gallatin would be managed for grizzly bear emphasis. In Situation 1 areas, 100 percent of the land would be managed for grizzly emphasis, and in Situation 2 areas, 67 percent. In these areas, some trails would be closed certain times of the year to reduce man/bear conflicts and reduce the potential for grizzlies being killed.

d. **Range**

The livestock grazing program for Alternative 9 would decrease from the existing 43,400 AUM's to 40,000 AUM's to provide for more elk and fish.

The removal of some livestock from winter ranges would provide more forage for big game. The winter range vegetation condition would improve with less cattle/elk competition. There would also be less grazing of riparian vegetation and the streambanks of important fisheries streams would be less impacted (Boussu, 1954). There would be less possibility for irreversible damage by cattle to undercut streambanks, which are important fisheries habitat components.

e. **Timber**

This alternative would have the lowest timber output in the first three decades of any alternative except 3. An average of less than 11 miles of road per year would be constructed. Stream fisheries would have low impacts in this alternative.

The small timber volume of about 12 million board feet annually coming from the National Forest would adversely affect the local timber industry and local employment. Timber mills may be able to make up the shortage from private timber lands for a few years, but in the long run the timber available to local mills would decrease. Some mills would possibly close. Others would run at a very low capacity.

Since there would be a small area where silvicultural practices would occur, little opportunity would exist for reducing losses to insect and disease attack. Except in areas where wildfire occurs, the rest of the Forest would be characterized in time by predominantly climax species stands growing at a rate much lower than potential (Arvo and Simmerman, 1982). Lodgepole pine killed by mountain pine beetle in recent years would become downfall over the next twenty years. Wildfire occurrence would increase as natural accumulations of dead material build up.

There would be less opportunity for supplying firewood because of the few new roads. As the available firewood was cut, no new ares of dead wood would be accessed. There would be little opportunity for firewood gatherers to collect wood from timber-sale slash piles.

f. Watershed and Soils

As described earlier, this alternative would increase sedimentation rates very little above natural rates. The current hydrologic conditions of the watersheds would be maintained. In no drainages would there be concentrated enough removal of timber to create conditions where water yield increases endanger stream channel stability.

g. Minerals, Oil/Gas

The probability of discovering oil and gas would be low in this alternative because the lack of roads and the amounts of wilderness. The effects of exploration on the physical and biological environment would be minimal. Development of major fields, if discovered, would change the character of roaded areas significantly. The roads necessary for development would allow access into previously unaccessed areas. Pipelines and roads would make alterations in the natural landscape and have an adverse effect on the visual quality of some areas.

Lease and development stipulations would apply so that special areas of the Forest would be protected during exploration and development phases. These areas include riparian areas, sensitive soils, and critical habitat for big game and threatened/endangered species such as the grizzly and bald eagle.

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

h. Landownership and Access

The probable land exchange with Burlington Northern and other private owners in this alternative has already been discussed under the wilderness section. Effects of the exchange would be more wilderness and a loss of National Forest timber base.

Where intermingled National Forest and private land ownership exists outside of the wilderness area, private landowners would be allowed access to their lands. Some of the roads leading to private inholdings would be used by the public to gain vehicle access farther into basically nonroaded areas. This would make hunting and fishing more accessible and would put more people into areas planned for nonroaded recreation opportunities. With more people, the primitive and semi-primitive experiences in these places would change. Timber harvest activities on private lands would alter the natural landscape in some areas of high primitive and semi-primitive recreation opportunity. Because the timber volume coming from National Forest lands would be low in these alternatives, private timber owners within the Forest boundary may cut their lands more heavily. Besides the visual effects, this could lead to watershed problems in

some of the more unstable drainages and possibly significant impacts on wildlife in localized areas.

Access needs are essentially the same for all alternatives. The type of access (road or trail) will vary somewhat depending on the management emphasis of the land accessed. Most access needs are from county roads, through private land, to the Forest boundary. All access proposals will have more site-specific environmental analysis accompanying them when they are implemented.

i. Social - Economic

The first-decade yearly annual cost of $5,545,000 produces outputs and activities that provide $535,000 in receipts to the U.S. Treasury and 2,427 jobs to the local economy. The Present Net Value (PNV) for the entire 150-year planning horizon is $259 million.

10. Alternative 10 (Departure)

This alternative has the same objectives and the same land uses as Alternative 7 (Preferred Alternative) except that the nondeclining timber flow constraint was not applied. The timber management objectives of this alternative are:

1. Meet the RPA target
2. Provide for a broad timber base
3. Optimize timber age class distribution over the suitable timber acres
4. Maintain water quality by distributing the timber harvest
5. Decrease protection costs and losses from fire
6. Provide for community stability by not allowing a change in any decade of more than 25 percent from the previous decade, and
7. Optimize cost efficiency.

The NFMA regulations allow a Forest to depart from nondeclining yield if certain conditions are met. These conditions include: the opportunity to reduce substantial losses of timber through mortality; a means of mitigating economic impacts on communities; and opportunity to meet the targets of the RPA Program.

There is no departure in the early decades with the Gallatin FORPLAN model. This is due to the volume tables used which reflect losses to mountain pine beetle in the first two decades and the real price increase for timber in the economic tables. If not constrained the model will delay harvest until decades 4 to 5 to capture these better returns. It is necessary to constrain the model with a harvest floor in the first four decades to maintain any level of harvest in this period. No departure occurs in this alternative until the sixth decade.

A departure schedule is not selected because it does not increase the net public benefit. For instance, reduction of long-term timber losses due to insect infestation can best be accomplished by a proper age class distribution. The

departure schedule of this alternative does not achieve the long-term distribution as well as Alternative 7. The current mountain pine beetle epidemic cannot be affected by a departure schedule because the epidemic is to far progressed and on a downward trend already. There is no increase in PNV, the present net value is the same as Alternative 7. Community stability is not improved because of the fluctuations in the harvest schedule which occur from decade to decade, nor is a departure needed to meet the RPA Program.

The effects and other resource outputs of Alternative 10 are similar to Alternative 7 (Preferred Alternative). See Table II-1 for a comparison of the timber harvest schedules of Alternatives 7 and 10.

Table II-1: Harvest Schedules for Departure and Preferred Alternative by Decade

DECADE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Alter-natives	Units															
Preferred	MMBF	21.0	21.0	21.0	23.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Alternative	MMCF	5.6	5.6	5.6	6.1	6.6	8.4	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Alternative	MMBF	21.1	23.5	23.5	24.5	30.3	27.4	34.7	41.2	33.9	29.9	37.5	35.5	35.5	42.8	33.9
10(Depart.)	MMCF	5.6	5.6	5.6	6.1	6.6	6.8	8.6	10.2	8.4	7.4	9.3	8.8	8.8	10.6	8.4

D. Comparison of Alternatives

The purpose of Forest planning is to aid decision makers in their selection of an alternative that maximizes net public benefits. A summary of how each issue is affected by alternatives is in Table II-28. The outputs that differ significantly among alternatives are described. Total resource production for each alternative and selected benchmarks is shown in Table II-29 at the end of the chapter.

1. Recreation

Changes Since the Draft EIS

Alternative travel restrictions for the Cabin Creek Management Area have been analyzed and are displayed in the FEIS. These range from no restrictions to total motorized use restrictions. Any of these travel restrictions could be applied to any of the nine alternatives presented in this EIS. See the section on Cabin Creek for a description of these restricton options.

a. Dispersed Recreation

The Gallatin National Forest has the highest level of dispersed recreation use of any Forest in Region 1. There were 1,105,000 RVD's of dispersed recreation use on the Gallatin outside wilderness in 1980. Also in 1980 there were about 234,000 RVD's of wilderness use in the Absaroka-Beartooth Wilderness and the Spanish Peaks Primitive Area on the Gallatin Forest. There is ample capacity for dispersed recreation use to increase as demand goes up. However, demand for

big game hunting is expected to increase faster than the supply in all alternatives.

All alternatives provide different levels of opportunities for either primitive, motorized, or nonmotorized dispersed recreation experiences. Alternatives with the largest amount of wilderness provide the highest level of opportunity for primitive recreation; alternatives with the most road development provide the highest level of motorized recreation. Alternatives 2, 4, 1, and 6 are most favorable to motorized recreation. Alternatives 9, 8, 5 and 7 encourage more primitive recreation. Alternative 2 has the highest combined level of dispersed recreation in the first decade, while Alternative 3 has the highest by the later decades.

Table II-2: Dispersed Recreation by Alternative (Avgerage Annual MRVD's)

Alt	Primitive		Motorized		Nonmotorized		Total Dispersed	
	Dec 1	Dec 5	Dec 1	Dec 5	Dec 1	Dec 5	Dec 1	Dec 5
1	189	318	705	1059	364	448	1258	1825
2	272	456	706	1115	378	517	1356	2088
3	288	483	587	1036	423	662	1298	2181
4	274	460	673	1108	393	562	1340	2130
5	352	591	575	1007	331	501	1258	2099
6	285	479	620	1057	409	614	1314	2150
7	308	516	600	1004	392	560	1300	2080
8	373	626	552	973	290	439	1215	2038
9	391	657	541	960	261	261	1193	2010
10	308	516	600	1004	392	560	1300	2080

b. Developed Recreation

Developed recreation use includes activities at Forest Service recreation facilities as well as at private recreation facilities on National Forest lands. The latter includes resorts, recreation residences, and developed ski areas. The existing capacity of facilities for developed recreation is 884,400 RVD's per year.

All alternatives can meet the projected use through the first decade. Alternatives 4, 5, 7, 9, and 10 can meet projected use through the third decade and can meet RPA targets through the fifth. In these alternatives a modest Federal capital investment of $300,000 per decade would be made. The Forest would actively encourage private investment to help expand capacity to meet growing demand. Existing ski areas would expand and a new area would be built. These activities would be anticipated to meet RPA targets through the fifth decade. In later decades, the Gallatin Forest will not attempt to supply all the developed recreation demanded. Private investment on private land will absorb the surplus demand.

In Alternatives 3 and 8, Bridger Bowl and Big Sky ski areas would expand and Ski Yellowstone would be built. This activity plus a Federal capital investment in new recreation sites of $250,000 per decade would allow the Forest to meet RPA targets through the fourth decade (the year 2020).

In Alternatives 1, 2, and 6, the developed sites will be maintained to provide existing capacity, with no federal investment in new site construction. The ski area expansions outlined above would be constructed. Assuming no other private investments take place on National Forest land, these alternatives would be able to meet RPA targets for developed recreation only through the second decade.

Table II-3: Developed Recreation by Alternative (Thousands of RVD's Per Year)

Alternative	Decade 1	Decade 3	Decade 5
1	803	922	922
2	803	922	922
3	959	1168	1168
4	803	1132	1245
5	803	1132	1244
6	803	922	922
7	803	1132	1244
8	959	1168	1168
9	803	1130	1244
10	803	1132	1244

c. Cabin Creek Motorized Travel

1) Introduction

The Lee Metcalf Wilderness and Management Act of 1983 recognizes the important recreation and wildlife values of the Cabin Creek area. This Act, in part, provides that the area

> "shall be managed to protect the wildlife and recreational values of these lands and shall be hereby withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and geothermal leasing, and all amendments thereto. The area shall further be administered by the Secretary of Agriculture to maintain presently existing wilderness character, with no commercial timber harvest nor additional road construction permitted. The Secretary shall permit continued use of the area by motorized equipment only for activities associated with existing levels of livestock grazing, administration purposes including snowmobile trail maintenance and for snowmobiling during periods of adequate snow cover but only where such uses are compatible with the protection and propagation of wildlife within the area: Provided, That the Secretary may, in his discretion, also permit limited motor vehicle access by individuals and others within the area where such access is compatible with the protection and propagation of wildlife and where such access was established prior to the date of enactment of this Act. Management direction for the area that recognizes these values shall be included in the Forest Plan developed for the Gallatin National Forest in accordance with section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976."

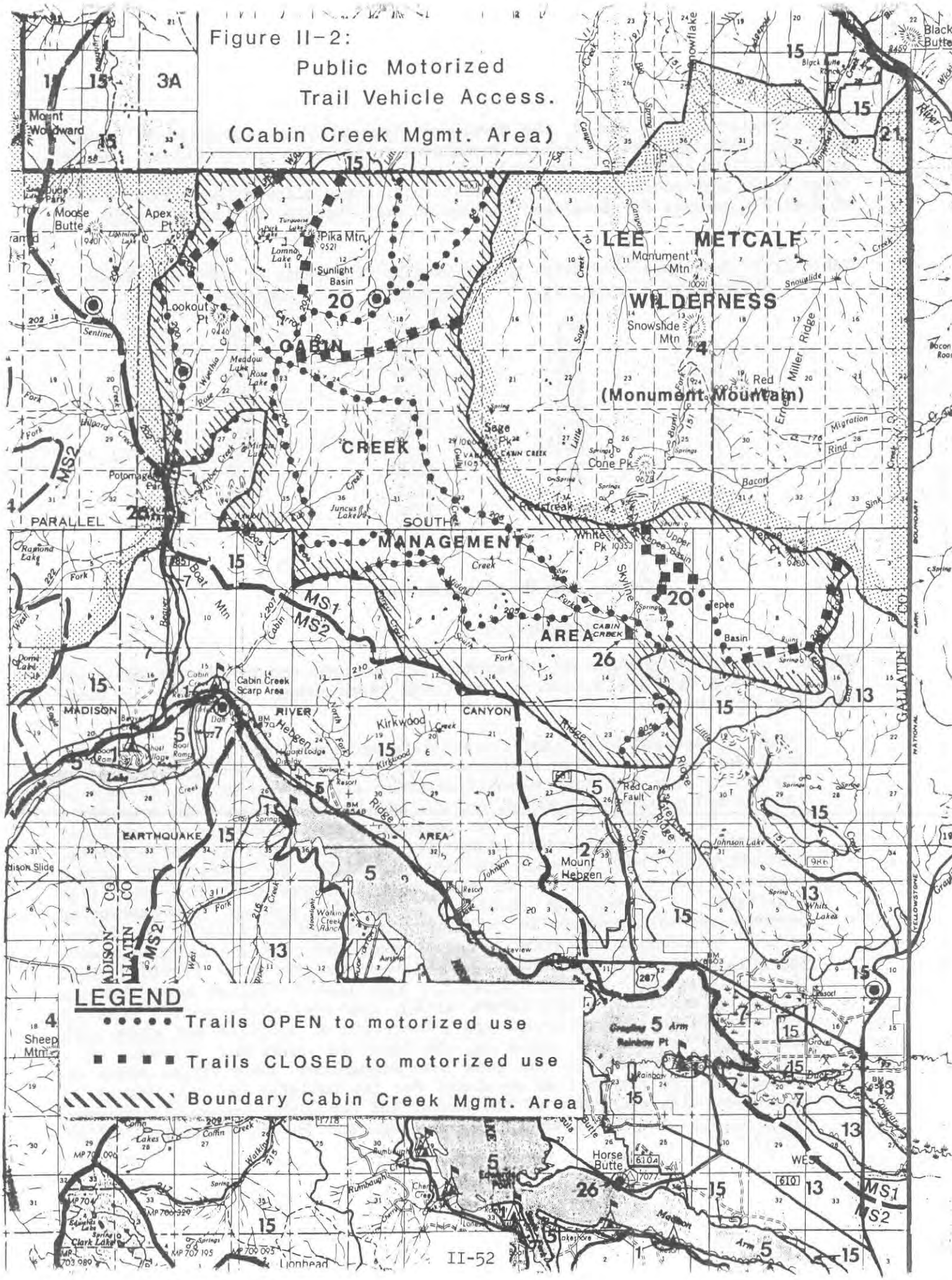


Figure II-2:
Public Motorized
Trail Vehicle Access.
(Cabin Creek Mgmt. Area)

This legislation provides for use of motorized vehicles associated with existing levels of livestock grazing, administrative purposes, and for snowmobiling when such uses are compatible with the protection and propagation of wildlife.

2) Options for Public Motorized Vehicle Access

The following options for public motorized trail vehicle access for the Cabin Creek area were developed that are responsive to public issues and management concerns.

Option 1: Public motorized trail vehicle access allowed where established prior to enactment of the Lee Metcalf Wilderness Act. This includes four-wheeled vehicles (i.e., jeep type), trail bikes, and snowmobiles that were unrestricted within the areas. Motorized vehicles would be permitted off established trails throughout the year.

Option 2: Public motorized trail vehicle access allowed on all designated National Forest system trails. No off-trail use by motorized trail vehicles would be allowed. Motorized use would be allowed throughout the year, but only vehicles 40 inches in width or less would be permitted (36 CFR 261.12 (f)).

Option 3: Public motorized trail vehicle access allowed on some designated National Forest system trails from September 1 through December 1. Trail vehicles 40 inches in width or less would be permitted (36 261.12 (f)). No off-trail motorized trail vehicle use would be allowed (see map, Figure II-2).

Option 4: Public motorized trail vehicle access allowed on some designated National Forest system trails from July 1 through October 80. Only trail vehicles 40 inches in width or less would be permitted (356 CFR 261.12 (f)). No off-trail motorized trail vehicle use would be allowed (see map, Figure II-2).

Option 5 (Preferred Option): Public motorized trail vehicle access allowed on some designated National Forest system trails from July 15 through October 30. No off-trail motorized trail vehicle use would be allowed (see map, Figure II-2).

Option 6 (Current Direction): No public motorized trail vehicle access allowed.

3) Comparison of Options

This section of the EIS compares the effects of the six options for public motorized vehicle use in the Cabin Creek Recreation and Wildlife Area.

a) Public Motorized Recreation

All options provide for continued snowmobiling when compatible with the protection and propagation of wildlife as directed by the Lee Metcalf Wilderness and Management Act.

Option 1 describes motorized vehicle use which occurred during the early 1970s. Four-wheeled vehicles utilized a road, which is now closed, located in the northern portion of the Cabin Creek area from the Wapiti Cabin along trail number 68 to an abandoned oil well site near Pika Mountain (see map, Figure

II-2). A minor amount of off-road 4X4 use also occurred within the area where terrain permitted. Much of the off-road four-wheeled vehicle use was done to retrieve harvested big game animals. Option 1 also provides for trail bike use throughout the area.

Option 2 would provide for yearlong use of motorized vehicles 40 inches in width and under on all of the trails within the area. No off-trail use of motorized trail vehicles would be allowed.

Option 3 would provide for use of motorized vehicles 40 inches in width and under on some designated trails (see Figure II-2) from Setpember 1 through December 1. This use period generally coincides with the big game hunting season. No off-trail use of motorized trail vehicles would be allowed.

Option 4 would be the same as Option 3 except the motorized trail use period would be from July 1 through October 30. This use period coincides with the dry season.

Option 5 (Preferred Option) would be the same as Options 3 and 4 except the motorized trail use period would be from July 15 through October 30. This period provides for motorized trail use during most of the dry season but avoids the time of year, before July 15, which is recognized as being important for grizzly bears to recover their weight lost during hibernation.

Option 6 (Current Direction) would not allow motorized trail vehicle use within the area.

b) **Wildlife**

In all options which allow for use of motorized trail vehicles the activity would cause some displacement of elk. Option 1 would cause the greatest amount of elk displacement followed by Option 2. Options 3, 4, and 5 would cause less elk displacement by motorized trail vehicles because the use would be restricted to designated trails.

c) **Grizzly Bear**

Prior to release of the Draft EIS, Option 3 was reviewed by the U.S. Fish and Wildlife Service and they provided a formal biological opinion which stated that implementation of the Forest Plan would not likely jeopardize the continued existence of the grizzly bear or other threatened or endangered wildlife species. Since release of the Draft EIS, Forest personnel have informally consulted with the agency concerning the other options. At the time, the Forest was favoring Option 4 for public motorized trail use. In our meeting with the agency they indicated they would prefer to reduce public motorized trail activity from July 1 through October 30 to July 15 through October 30. Their biologists pointed out that the period before July 15 was recognized as being important to the bear for post-denning weight recovery. Option 5 (Preferred Option) provides for no public motorized trail use.

d) **Soil**

Use of motorized vehicles can cause soil erosion to occur. Soil movement is most likely to occur if the motorized use takes place when the soil is wet.

Options 1 and 2 have the highest risk for soil erosion because they allow motorized use throughout the year. Option 6 would not cause soil movement caused by public motorized use. Option 3 could cause a moderate amount of soil movement on the trails designated for motorized trail use. Options 4 and 5 would have a low risk for soil erosion due to motorized trail use.

e) Other Resources

The various options discussed above would not cause significantly different effects on other resources.

f) Social and Economic Impacts

The different options for public motorized vehicle use would cause different social effects. The options which have the fewest restrictions on motorized recreation would be favored by those who enjoy the activity but would be disliked by those who enjoy more primitive or non-motorized recreation.

The options do not differ significantly in their effects on economics.

2. Wilderness, Recommended Wilderness, and Roadless Areas

Changes Since the Draft EIS

The amount of roadless land in Alternative 7 that would remain undeveloped has increased by 9,000 acres because this amount of roadless land has been removed from the suitable timber base.

The wilderness recommendation for Lionhead in Alternative 7 has been reduced by 1,350 acres to allow a portion of Watkins Creek to remain available to snowmobiling.

a. Roadless Inventory

The RARE II inventory of 1979 totaled 621,520 acres of National Forest roadless land on the Gallatin Forest. This inventory was revised in 1983. The 1983 inventory reflected changes resulting from creation of the Lee Metcalf Wilderness by Congress, timber and road developments made during the interim, as well as additions of some new areas. The re-inventory resulted in a net increase of 18,154 acres in the roadless inventory. Table II-4 shows the roadless inventory changes.

There are 637,659 acres of currently inventoried roadless land on the Gallatin Forest. This includes 149,259 acres of roadless land in the Taylor-Hilgard Montana Wilderness Study Act (MWSA), area of the Madison Range. This is the roadless area outside of the area designated by Congress as wilderness in the Lee Metcalf Wilderness Act of 1983. It was studied for wilderness by Congress but was not selected. Therefore, the Madison range roadless area is not included in wilderness recommendations under any alternative. The area is still included in the inventory of roadless lands and various parts are awarded to roadless management under each of the alternatives. Alternative 9 recommends all roadless land for wilderness except for the 149,259 acres of the Madison Range, which was included within the Taylor-Hilgard Wilderness Study area. Alternative 3 manages all the inventoried roadless area under roadless or

wilderness prescriptions except for 3,908 acres. Alternative 6 has no additional wilderness but prescribes all the roadless area to roadless management prescriptions except for 22,342 acres.

The assignment of roadless areas to the various management emphasis prescriptions by alternatives is shown in Table II-5. A summary of management emphasis is displayed at the end of the table to interpret how the roadless resource will be affected over time. The roaded category indicates the rate of access into roadless lands which are allocated to greater than 5,000 acres in size which will be available for future considerations of wilderness. Similar information for each roadless area is also given in Appendix C.

b. Wilderness and Recommended Wilderness

The 715,674 acres of the Absaroka-Beartooth and Lee Metcalf wildernesses will be maintained in all alternatives. All alternatives except 2 and 6 include recommendations for additional wilderness. Table II-6 shows allocation of roadless areas to wilderness under the various alternatives.

Each roadless area was considered for wilderness in at least one alternative and for non-wilderness in at least one alternative. Alternative 5 provides for more than 50 percent of roadless lands as wilderness while at the same time trying to maintain the long-term production of commodity outputs.

The Preferred Alternative 7 recommends new wilderness designation for 21,941 acres. This recommendation is a preliminary administrative recommendation 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. Final decisions on wilderness designation have been reserved by the Congress.

Figure II-3: Wilderness, Roadless, and Roaded Assignments

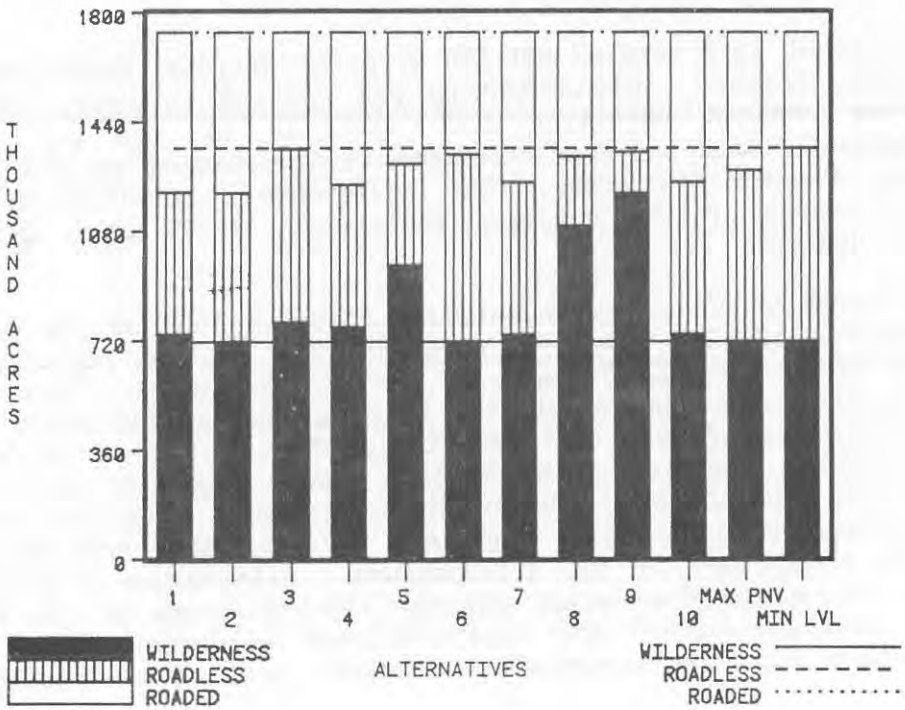


Table II-4: Adjustments to Roadless Inventory

Roadless Name	ID	Changes in Gross Acres	Changes in Net Acres	Reasons for Change	Revised Gross Acres	Revised Net Acres
N. Absaroka	1371	-11,515	-10,950	Roads and timber sales		
		+56,699	+55,571	Unit Plan roadless	170,684	159,259
			(Custer N.F. portion		22,700	22,500)
Crazy Mts	1541	-2423	-743	Private land access		
		-150	-150	Existing Timber sale	107,647	70,498
			(Beaverhead N.F.portion		28,900	16,600)
Bridger Mts	1543	-860	-860	Existing Timber sale		
		+15,372	+14,481	Unit Plan roadless	47,512	45,402
Chico Peak	1547	-845	-845	Existing roads	11,555	10,855
Gallatin	1548	-560	-560	Private land access		
		-560	-450	Timber sale		
		+5,740	+5,300	Additional roadless	202,920	158,109
Madison [1/]	1549		-67,668	Became wilderness		
			+15,859	Additional roadless	157,332	149,259
Reef	1914	-30	-30	Acreage recalculation	2,270	2,170
Republic Mt.	1545				700	700
Dry Canyon	1550	-920	-920	Existing timber sale	2,160	2,160
Box Canyon	1742	-120	-120	Existing rd	2,180	1,747
			(Lewis & Clark N.F. portion		10,740	9,900)
Beartooth	1912	-370	-370	Timber sale	5,040	4,720
			(Custer N.F. portion		1,280	1,180)
Lionhead	1963	+6,260	+6,260	Additional roadless		
		+4,120	+4,120	Acreage recalculation		
					32,780	32,780
			(Targhee N.F. portion		15,400	15,400)
Total						
Gallatin National Forest			+18,154		742,780	637,659
Other National Forests					79,020	65,580

[1] The remaining Madison Roadless Area is not being reevaluated for wilderness in this DEIS because Congress released it from further consideration in the Lee Metcalf Wilderness Act.

Table II-5: Management Emphasis by Altenative for Roadless Areas
(Thousands of Acres)

MANAGEMENT EMPHASIS	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Min Level	312.5	107.3	133.6	110.8	7.9	105.0	101.2	6.7	3.3	101.2	8.6	601.0
Dis Rec Rded	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	4.3	0.0	0.0
Dis Rec Wildl	86.2	86.3	212.1	97.3	121.8	202.3	209.1	91.4	54.8	190.8	226.9	36.7
Dis Rec Non Rd	0.0	161.9	211.3	150.1	135.8	244.5	118.2	76.6	45.2	118.2	213.9	0.0
Big Game	0.0	0.0	0.0	11.1	.6	1.4	16.1	0.0	0.0	16.1	1.8	0.0
Timber Mgt	145.4	149.5	3.9	110.1	52.7	21.0	74.8	28.3	13.7	92.8	2.0	0.0
Range Mgt	68.1	132.7	12.6	110.7	66.2	63.5	91.0	54.4	32.3	91.0	107.5	0.0
Wilderness	25.5	0.0	64.2	47.6	252.6	0.0	21.9	380.3	488.4	23.7	0.0	0.0
Total	637.7	637.7	637.7	637.7	637.7	637.7	637.7	637.7	637.7	637.7	637.7	637.7
Summary of Management Emphasis Proposed for Roadless Areas												
Developed	145.3	149.5	3.9	121.2	53.3	22.3	103.8	28.3	13.7	113.2	3.8	0
Decade 1	40.1	41.3	0	33.5	14.7	6.3	30.3	0	0	31.3	0	0
Decade 5	98.0	106.2	3.6	78.8	25.9	10.8	62.2	5.5	2.9	62.4	3.8	0
Roadless Mgt	466.8	488.2	569.6	468.8	331.8	615.3	512.0	229.1	135.5	500.7	633.9	637.7
Decade 1	572.1	596.4	573.5	556.6	370.4	631.4	584.1	257.4	149.3	583.1	633.9	637.7
Decade 5	514.2	531.5	569.8	511.3	359.2	626.8	552.2	251.8	146.3	552.2	633.9	637.7
Wilderness Mgt	25.5	0	64.2	47.6	252.6	0	21.9	380.3	488.4	23.7	0	0

Table II-6: Wilderness Recommendations by Alternatives
(Gallatin National Forest Land Only, Thousands of Acres)

AREA NAME	TOTAL ACRES	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Dry Canyon (1550)													
M-Acres	2.2	0	0	0	0	0	0	0	2.2	2.2	0	0	0
Percent									100	100			
Lionhead (1963)													
M-Acres	32.8	24.6	0	0	24.6	24.6	0	21.5	32.8	32.8	22.8	0	0
Percent		75			75	75		70	100	100	70		
Gallatin (1548)													
M-Acres	158.1	0	0	64.2	22.1	105.6	0	0	158.1	158.1	0	0	0
Percent				41	14	67			100	100			
Bridger (1543)													
M-Acres	45.4	0	0	0	0	0	0	0	45.4	45.4	0	0	0
Percent									100	100			
Crazy Mts (1541)													
M-Acres	70.5	0	0	0	0	70.5	0	0	70.5	70.5	0	0	0
Percent						100			100	100			
Box Canyon (1742)													
M-Acres	1.7	0	0	0	0	0	0	0	0	1.7	0	0	0
Percent										100			
Chico (1547)													
M-Acres	10.8	0	0	0	0	0	0	0	10.8	10.8	0	0	0
Percent									100	100	0	0	0
Republic (1545)													
M-Acres	.7	.5	0	0	.5	.7	0	.5	.7	.7	.5	0	0
Percent		68			68	100		68	100	100	68		
Reef (1914)													
M-Acres	2.2	.4	0	0	.4	2.2	0	0	2.2	2.2	.4	0	0
Percent		20			20	100		0	100	100	20		
Beartooth (1912)													
M-Acres	4.7	0	0	0	0	0	0	0	0	4.7	0	0	0
Percent										100			
N. Absaroka (1371)													
M-Acres	159.2	0	0	0	0	49.2	0	0	57.6	159.2	0	0	0
Percent							31			36	100		
Total Acres	488.4	25.5	0	64.2	47.6	252.6	0	21.9	380.3	488.4	23.7	0	0
Percent		5	0	13	10	52	0	5	78	100	5	0	0

3. Visual Quality

Visual quality objectives are standards to which proposed changes in the character of the landscape can be compared to estimate acceptability of the change. The preservation objective is applied to wilderness and other special areas where the natural landscape should be unaltered by forest mangement activities. The retention objective is applied to areas where activities should not be evident to the casual Forest visitor and partial retention to areas where activities may be evident but must remain subordinate to the natural landscape. Modification and maximum modification are applied to less visually sensitive areas where changes can dominate the natural landscape but should look natural from a distance.

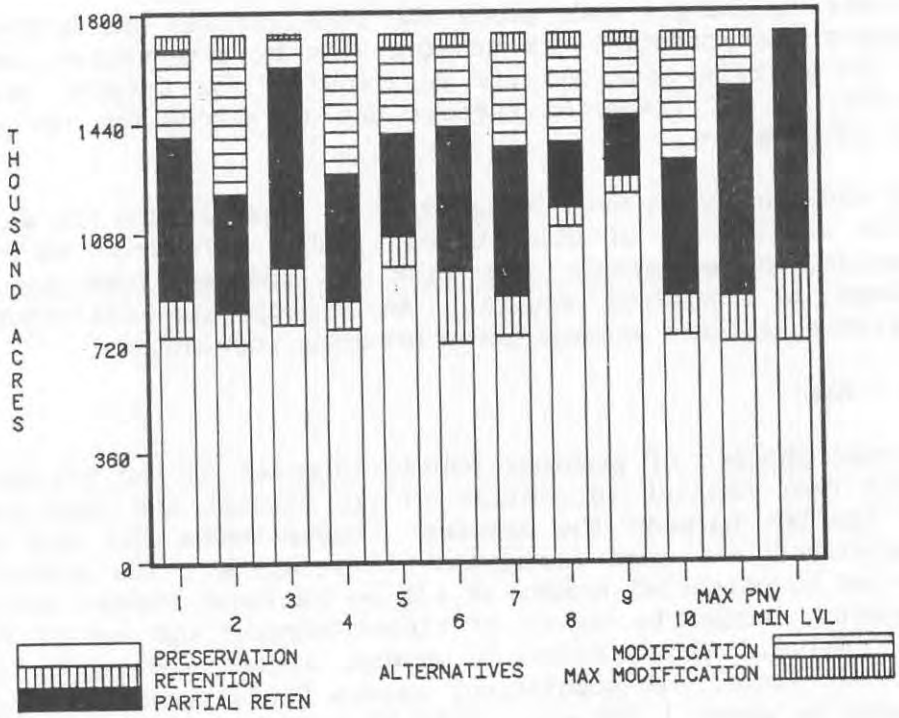
Visual quality objectives have been inventoried and mapped for the Forest according to the procedure described in National Forest Landscape Management (USDA Forest Service, 1977). Comparison of the total Forest assigned to management prescriptions with the 3 highest VQO classes, (preservation, retention, partial retention), shows the relative effect of the alternatives on visual quality. All alternatives have at least 70% of the Forest in VQO categories of preservation, retention, and partial retention. Alternative 2 has 70 percent of the total Forest acreage in the 3 highest VQO classes - the least of all the alternatives. Thus alternative 2 would have the greatest effect to visual quality. In alternative 3, 94 percent of the Forest is assigned to prescriptions with the 3 highest VQO classes, so that alternative would have the least effect on visual quality.

Table II-7 shows the relative distribution of VQO categories in each alternative. Visual quality objectives for alternatives are shown in Figure II-4.

Table II-7: Preservation, Retention and Partial Retention VQO's by Alternative (By Thousands of Acres and Percent/Forest)

ALTERNATIVE/BENCHMARK												
BASE	1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
1305	1397	1209	1625	1274	1406	1426	1332	1375	1463	1305	1538	1735
75%	80%	70%	94%	73%	81%	82%	77%	79%	84%	76%	89%	100%

Figure II-4: Visual Quality Objectives



4. Research Natural Areas

Research Natural Areas (RNAs) provide areas for research, observation, and study of undisturbed ecosystems which typify important forest, shrubland, grassland, alpine, aquatic, and geologic types. All alternatives and the MAX PNV benchmark assign the same levels to research natural area management. The Minimum Level benchmark would have no research natural area management because no management activity will occur on any of the currently undeveloped land (Table II-8).

Table II-8: Acres Assigned to Research Natural Area Management

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
3300	3300	3300	3300	3300	3300	3300	3300	3300	3300	3300	0

5. Wildlife and Fish

Changes Since the Draft EIS

Wildlife and fisheries changes made since the DEIS include the addition of a table that compares the potential elk hunting RVDs by alternative, additional information on the grizzly bear and its relation to the Greater Yellowstone Area, and a correction of fisheries numbers due to remodeling the potential habitat for each alternative.

All alternatives and benchmarks were designed to at least ensure the maintenance of minimum viable populations of wildlife and fish. This requires that each alternative provide an acceptable low risk of species loss by assuring sufficient numbers of breeding adults. An appropriate distribution and diversity of suitable habitats assures these breeding populations.

a. Elk

Elk is the big-game species of greatest public interest on the Forest. It is assumed that mule deer habitat is similar to elk habitat and that population trends will be similar between the species. Cover needs for big game are satisfied by watershed and road management constraints. The winter forage resource, converted to potential number of elk on National Forest winter range in an average winter, varies by amount of timber harvest and use of forage by livestock. The analysis shows there is enough winter forage to at least maintain the current winter elk population, except for Alternative 2 where the potential decreases by about 1,000 elk. Only 53 percent, or 187,000 acres, of the total winter range is on the National Forest. The other 47 percent is in private or State ownership within or adjacent to the Forest. On the 166,000 acres of private winter range, 29 percent is in Burlington Northern or State of Montana ownership where management policies are generally compatible with increases in elk numbers. Other landowners may not have such policies.

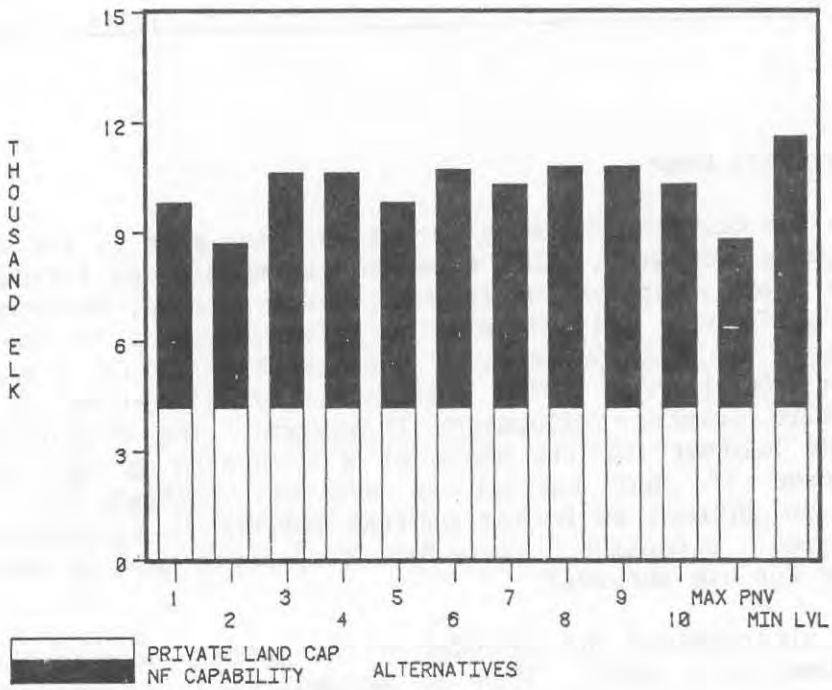
Alternative 1 shows the current situation of 5,600 elk on National Forest winter range and 4,200 elk on State and private winter range. Alternatives 2 and 8 would result in decreased numbers of about 20 and 10 percent respectively. Alternative 5 would maintain the present number and all the other alternatives would result in 10 to 33 percent increases for National Forest winter range potential. See Figure II-5 for this data.

The biological potential is 8,440 elk on National Forest winter range and a total of 12,640 elk on all ownerships if all forage on the National Forest winter range was awarded to elk. This assumes elk numbers on private lands remain constant. The minimum viable population is estimated to be 3,300 elk total, of which about 1,900 would be on National Forest winter range. Alternatives 3 and 4 would support 7,400 elk on National Forest winter range by reduced livestock grazing in Alternative 3 and by increased investments to limit elk/livestock conflicts in Alternative 4. The other alternatives involve one or both of these management strategies.

The 4,200 elk that winter on State or private winter ranges is an average figure that varies with total elk numbers and the severity of the winter. Approximately 1,000 elk winter on Burlington Northern lands, 200 on State lands in the upper Gallatin, and the remainder on other private lands. On the winter

range in the upper Gallatin area, about 2,000 elk annually migrate from Yellowstone National Park to winter on National Forest, State, and private lands. The Northern Yellowstone herd is estimated to be about 15,000 animals. In an average winter from 2,500 to 3,000 of these elk move onto National Forest and private winter range. In a severe winter, as many as 5,000 elk would use these lands. Regardless of the amount of elk use, overall capability of private lands to support elk is not likely to increase.

Figure II-5: Elk Habitat Potential



Biological needs of big-game populations for cover are provided in all alternatives. However, hunting season security cover is necessary to provide for a stable trend in recreational hunting opportunities because elk become increasingly vulnerable to harvest as access increases and cover decreases from current levels. Table II-9 shows the amounts of elk hunting RVD's for each alternative for the first decade and for the fifth decade. Elk hunting RVD's will decrease in those alternatives which have higher timber harvest and road construction with little road management.

Structural and nonstructural habitat improvement and maintenance projects for wildlife and fish would take place in all alternatives. These projects would vary by alternative.

Table II-9: Elk Hunting Recreation Visitor Days (Thousands of RVD's)

		ALTERNATIVE/BENCHMARK									
UNITS	DECADE	1	2	3	4	5	6	7	8	9	10
MRVD's	1	53.6	53.6	54.2	53.6	53.6	54.2	54.2	54.2	54.2	54.2
MRVD's	5	52.5	51.5	54.2	52.5	53.1	54.2	54.2	54.2	54.2	54.2

b. **Grizzly Bear**

The grizzly bear on the Gallatin National Forest occupies part of the habitat of the Greater Yellowstone Ecosystem. This ecosystem is made up of Yellowstone and Grand Teton National Parks, portions of Targhee, Bridger-Teton, Shoshone, Custer and Gallatin National Forests and intermingled private lands. On the Gallatin National Forest, there are 493,350 acres of Management Situation 1 and 324,010 acres of Management Situation 2. This grizzly occupied habitat is about 13 percent of the entire Greater Yellowstone Ecosystem. The Gallatin has the potential to provide habitat for its share of a recovered grizzly population under any alternative if that habitat is actively managed for recovery. Situation 1 areas are defined as having habitat components necessary for the survival of the species. Situation 2 areas have components used by the bear but may not be necessary for his survival.

As a minimum in any alternative, the recovery of the grizzly bear in the Greater Yellowstone Ecosystem is a goal. This is accomplished differently in the various alternatives by a combination of applying the guidelines from the Grizzly Recovery Plan (USDI, 1982) and applying various amounts of grizzly emphasis prescriptions. Those alternatives with larger amounts of grizzly emphasis prescriptions would propose more funds for reducing human/bear conflicts. Up to a point, the more money spent for these activities, the faster the grizzly bear recovery goal could be met.

Accomplishing the grizzly bear guidelines requires effort by the Forest in three different areas: support, protection, and enhancement. Support is that area of general costs associated with having personnel to assess and coordinate activities that could effect the grizzly bear and work that is necessary to support the goal of recovery. Protection is the costs associated with reducing grizzly bear mortality (such as monitoring grazing permits in MS-1) contacting dispersed recreation visitors, and patrolling developed recreation areas in MS-1 and MS-2. Enhancement involves those activities which will improve grizzly bear habitat. These include vegetation manipulation to increase food sources and road and trail closures to provide more secure habitat. The amount of support, protection, and enhancement costs would vary by alternative. These costs are shown in Table II-10.

Table II-10: Estimated Cost for Grizzly Bear Management Emphasis (Annual Average in Thousands of Dollars)

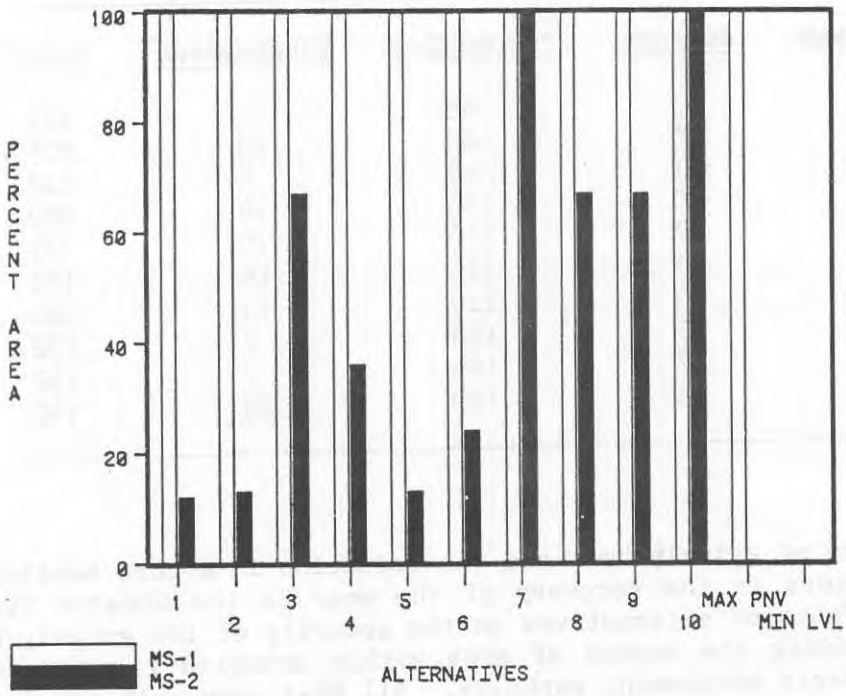
Alternatives	Support	Protection	Enhancement	Total
1	63	98	--	161
2	78	100	28	205
3	27	98	5	118
4	40	105	14	159
5	27	110	10	147
6	43	115	15	171
7	53	120	19	191
8	27	105	7	132
9	27	105	7	132
10	53	120	19	191

Man-caused mortality of grizzly bear and the reduction in secure habitat are the major limiting factors in the recovery of the bear in the Greater Yellowstone Ecosystem. The effects of alternatives on the security of the grizzly bear were assessed by determining the amount of area within occupied habitat that would receive maximum grizzly management emphasis. All MS-1 area will receive maximum grizzly management emphasis while the amount of area within MS-2 will receive only partial management emphasis. These figures are based on estimates of land use assignments by alternative and are shown in Table II-11.

Table II-11: Percent Area of Grizzly Bear Management Emphasis by Alternatives

MANAGEMENT SITUATION	ALTERNATIVE/BENCHMARK										
	1	2	3	4	5	6	7	8	9	10	MIN LVL
	----------Percent----------										
MS-1	100	100	100	100	100	100	100	100	100	100	100
MS-2	12	13	67	36	13	24	100	67	67	100	100

Figure II-6: Occupied Grizzly Bear Habitat with Management Emphasis (Percent)



Activities which can affect the security of the grizzly are recreation use, timber harvest, roading, and livestock grazing. Tables II-12 and II-13 show the amount of annual timber harvest and grazing use by alternatives in grizzly habitat.

Table II-12: Acres of Timber Harvest in Occupied Habitat (Annual Average)

MANAGEMENT SITUATION	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	10
MS-1	278	346	68	178	122	190	175	89	89	234
MS-2	297	370	72	190	130	202	202	95	95	250
TOTAL	576	716	140	368	252	392	377	184	184	484

Table II-13: Thousand AUM's Grazing in Occupied Habitat (Annual Average)

MANAGEMENT SITUATION	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	10
MS-1	5.5	18.1	4.7	11.3	5.5	8.0	5.5	5.5	5.5	6.1
MS-2	7.5	11.9	5.5	9.2	9.2	9.0	7.5	9.2	7.5	8.7
TOTAL	13.0	30.0	10.1	20.4	14.7	17.0	13.0	14.7	13.0	14.8

Alternatives with more timber harvest, recreation use, livestock grazing and road building in occupied habitat will probably mean the recovery rate would be slower. Alternatives 1, 2, and 4 would have the most development activities without increased emphasis on man/bear conflict reduction and therefore the slowest bear recovery rate. Alternative 6 would also provide for a slower recovery because of its high development in roaded portions of occupied habitat and low expenditures for the non-roaded portions.

Alternatives 3 and 7 would have faster recovery rates than currently, but for different reasons. Alternative 3 has the least amount of development of all alternatives, but it also provides the least money for reducing man/bear conflicts. Alternative 7 has a moderate amount of timber harvest and grazing activity in occupied bear habitat, but it also provides for the highest amount of grizzly emphasis prescriptions and the most money for monitoring, public contacts, trail closures and enforcement activities needed for grizzly recovery.

Bear population recovery rates for Alternatives 5, 8 and 9 would be very similar to those for Alternatives 3 and 7. They have relatively low amounts of development in occupied grizzly habitat, but they would spend very little for reducing man-caused grizzly deaths. To facilitate recovery of the grizzly bear the Gallatin's annual target will be "zero" preventable grizzly mortalities.

The Gallatin's grizzly bear standards and guidelines (1984) will be applied in all alternatives to facilitate attainment of this target. All alternatives have the same acres of MS-1 and MS-2. Management emphasis will be placed on preventing the "preventable" causes shown in Table II-14, which documents number of relocations from the Yellowstone Ecosystem and past mortalities in that ecosystem (Yellowstone National Park Bear Management Office, 1984):

Table II-14: Number of Grizzly Relocations and Mortalities (1981-1984)

Type of Loss	Total Yellowstone Ecosystem	Gallatin National Forest
Relocations Outside the Ecosystem	5	1
Mortalities		
--Natural Causes*	5	0
--Management Removal	10	2
--Illegally Shot	10	4
Total Reduction in Grizzly Numbers	30	7

*(Instances that are known.)

c. Other Threatened/Endangered Species

Presently, there are three active bald eagle nesting sites on the Forest. Their security would be maintained under all alternatives. Bald eagles winter along the Madison, Gallatin, Yellowstone, and Boulder Rivers on the Forest. Their continued wintering on these rivers would not be affected by the alternatives.

Several endangered peregrine falcon were fledged from an artificial ledge on the Gallatin National Forest in spring of 1984 in cooperation with other agencies and the Peregrine Fund. Historical nesting territories of the peregrine falcon have been designated on the Forest and the Forest in the past has had native populations of peregrine falcon. Thus it is possible that the peregrine falcon may be found on the Forest, either now or in years to come.
(For more on the bald eagle and peregrine falcon, see Chapter III under "Wildlife".)

There are no known gray wolves on the Gallatin or in the Greater Yellowstone Ecosystem, although a few sightings have been verified on the adjacent Beaverhead National Forest. The forest has the capacity to support approximately five wolves on a yearly basis if they were to be re-introduced. There are no plans to re-introduce a wolf population.

d. Vegetative Diversity

(see discussion of vegetative diversity under the Timber section.)

e. Fisheries

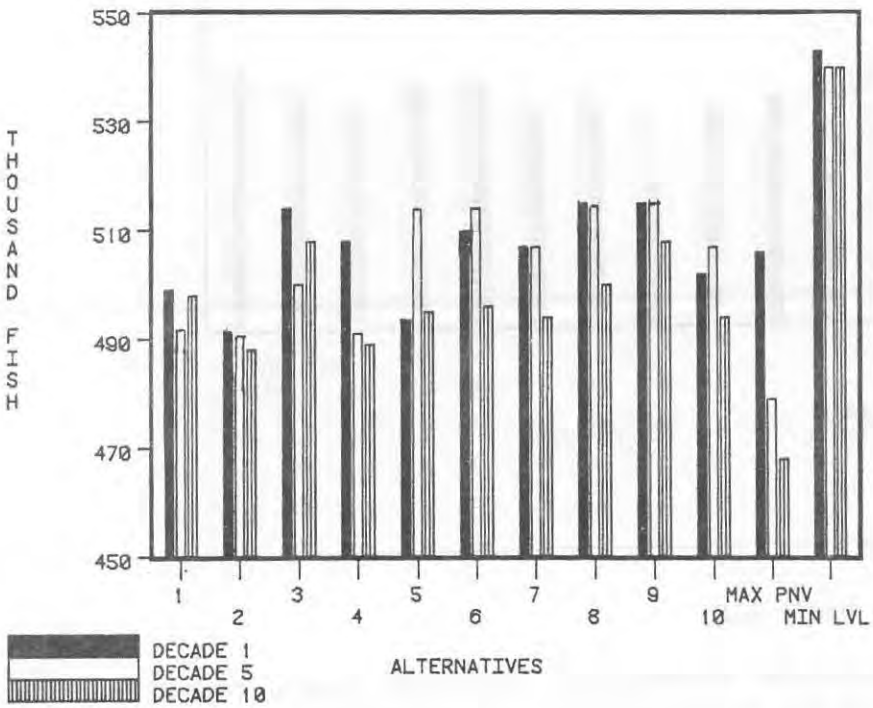
Forest lakes, reservoirs and streams now support about 1,553,000 catchable trout, with 1,044,000 in lakes and reservoirs and 509,000 in streams and

rivers. Catchable trout refers to trout that are six-inches or larger. Approximately one-third of this population is caught each year. Although fish numbers in lakes and reservoirs may not be as directly influenced by the effects of the alternatives as stream fish numbers, their numbers can be affected by reduced water quality and/or fish recruitment within the inlet streams.

Potential changes in populations of stream fisheries by alternative are depicted in Figure II-7. These changes are caused by different levels of sedimentation, grazing management intensities, and timber harvest volumes within streamside riparian areas in the various alternatives. Different levels of habitat improvement are also considered in the alternatives.

Alternatives 2 and 4 with the largest increases in livestock grazing would most affect streamside vegetation, undercut streambanks, and streambed siltation, thereby causing fish population declines over the long term in low gradient fisheries streams. In alternatives 1, 8, and 9 there are relatively small increases in grazing or no increases, but the sediment increases from road construction and management of timber in streamside areas result in maintained and even increased numbers of trout in these alternatives, overcoming the grazing effects alone. Alternative 3 has the least grazing, road construction, and timber harvest, but its low investment level for management practices results in generally lower numbers of fish in the future.

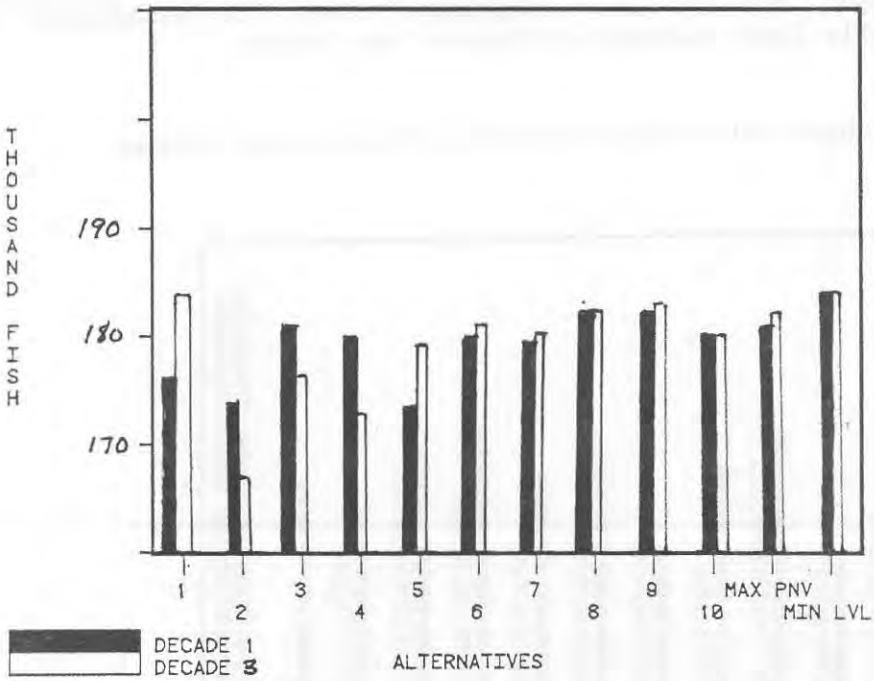
Figure II-7: Catchable Size Cold Water Fish--Rivers and Streams



Management practices cause relatively minor changes in stream fish numbers for all alternatives, as can be seen in Figure II-7. Mitigating measures such as providing culvert passages, road bank seeding, reducing riparian vegetation utilization by livestock, and using certain road construction and maintenance techniques can reduce these effects on fish populations. Fish numbers can be enhanced by habitat improvement activities. The diferences in alternative fish numbers both with and without habitat improvement can be compared by looking at Table II-29 at the end of this chapter.

The Forest currently produces about 179,000 adult fish per year, that are available for recruitment to downstream fisheries. This is an important function of streams on the Gallatin for it helps to resuply fisheries stock to those important off-Forest fisheries rivers like the Madison, Gallatin, and Yellowstone. Figure II-8 shows how this would vary by alternative.

Figure II-8: Downstream Fisheries Recruitment Potential



6. **Range**

Changes Since The Draft EIS

Alternative 7 (Preferred Alternative) livestock forage output has been reduced from 50,000 AUMs in the second decade to 45,000 AUMs.

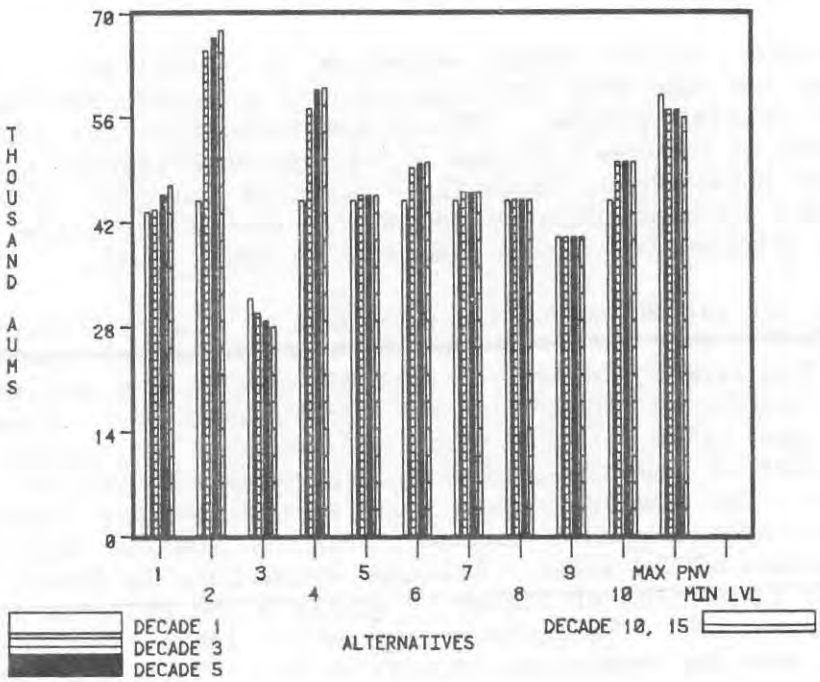
The current livestock forage production level is 43,400 AUM's. Potential capability for livestock forage production is 70,000 AUM's from permanent range

but analysis has shown it would be practical to achieve only about 67,000 AUM's, which is the level produced in Alternative 2. Transitory livestock forage can only increase this by 10 percent or less. In all alternatives, transitory forage makes up less than 10 percent of the total. There is an additional 15,900 AUM's of use on private, intermingled lands which the Gallatin N.F. administers. This use would be expected to fluctuate slightly between alternatives.

Increases in livestock forage would come from more intensive management of existing allotments and/or from bringing additional range into allotments. In Alternative 2, which has the highest livestock AUM output, an additional 5,500 AUM's would come from new allotments. These additional AUM's do not take into consideration constraints for big game and grizzly bear. About 7,000 of these latter AUM's would come from key elk winter range.

Because of steep terrain and typically small and dispersed allotments, increases in forage production on allotments will require substantial investments. Bringing unassigned range into allotments would be most cost effective in the short run. But even this strategy would require large investments for allotment management plans and for fencing and water development before livestock could be introduced on them.

Figure II-9: Average Annual Livestock Forage By Alternative



The 1980 RPA targets were: 50,000 AUM's by the middle of the second decade (1997), 57,000 AUM's in the third, 64,000 in the fourth and 70,000 AUM's in the fifth decade. Figure II-9 shows the livestock forage assignment by alternative. Alternatives 2, 4 and 5 could meet the RPA target in the third

decade. Alternative 6 could meet it through the second decade. Only Alternative 2 would meet the old RPA targets through the the fourth decade. Alternative 10 would meet them through the second decade by producing 50,000 AUM's and Alternative 7 produces 45,000 AUM's. This could be accomplished in a cost effective manner and still meet wildlife objectives.

7. Timber

Summary of Changes Since Draft EIS

Changes in this section since the DEIS include the additional discussion of even-aged and uneven-aged silvicultural management systems, the results of an analysis of utilization standards, an additional table showing harvest levels for all alternatives for all 15 decades, and a clarification of the allowable sale quantity (ASQ), including identification of the noninterchangeable component of the ASQ for each alternative.

a. Base Sale Schedule

The base sale schedule produced in FORPLAN for the Gallatin differs from the usual pattern for most Forests. When the objective function of a FORPLAN run is set to maximize present net worth using the Gallatin data set, the unconstrained model will produce no volume in the first four to five decades. This is because yield tables of mountain pine beetle-depleted timber and real price increases used to value timber in the model cause timber harvest to have greater net value in later decades.

As a result of this, it is always necessary to establish a lower bound constraint for each run made with this data set, if a harvest greater than zero is desired in the initial decades. The volume production for the base sale schedules, displayed in Figures II-9 and II-10, varies primarily as a function of the first decade constraints. Table II-15 displays the cubic and board foot volumes for the base sale schedule by decade for each alternative. Long-term sustained yield by alternative is also displayed in Table II-15.

The acres suitable for timber production displayed in Figure II-12 reflect the amount of lands where timber activities would be applied by alternative. Those alternatives with the larger acerages of suitable timber have the potential to provide the most beneficial effect on the timber resource. These benefits include improved age class distribution, maintenance of healthy, vigorous stands, reduced threat of insects and disease, increased utilization, and higher production levels. The larger timber base affords better flexibility in achieving the base sale schedule because there is greater opportunity for geographic distribution of the acres. All land managed by the Forest was tested for suitability for production of timber by applying the criteria discussed in section II, Appendix B. Tentatively suitable lands were awarded to prescriptions that meet the management objectives of a given alternative. High timber output alternatives have the largest suitable land base . Of any alternative, the most acres planned for harvest would be 368,000 (Alternative 2). Figure II-13 shows timber production in board feet by harvest method for Decade 1. These are FORPLAN projections and do not represent actual targets for the alternatives but represent appropriate ways of meeting the objectives of the alternatives.

Table II-15: Scheduled Timber Harvest With Projections For Subsequent Decades *

		Alternative/Benchmark										
		Current Direction					Preferred Alternative			Departure		
MMBF	Decade*	1	2	3	4	5	6	7	8	9	10	PNV
ASQ	1	25	31	12	16	11	17	21	12	12	16	6
Noninterchangeable		5	5	2	.5	2	2.5	5	1.2	1.2	5	0
Component												
Projected	2	25	35	6	23	11	17	21	8	8	20	6
Harvest	3	25	35	6	26	11	17	21	8	8	22	6
	4	25	35	9	27	11	17	24	10	10	24	8
	5	25	35	9	35	30	17	27	25	23	26	8
	6	25	35	9	35	30	22	27	25	23	27	8
	7	25	35	10	35	30	25	27	25	23	34	8
	8	25	35	10	35	30	25	27	25	23	40	8
	9	25	39	10	35	30	25	27	25	23	33	8
	10	27	39	10	35	30	25	27	25	23	29	8
	11	27	39	10	35	30	25	27	25	23	36	8
	12	27	39	10	35	30	25	27	25	23	34	8
	13	27	39	10	35	30	25	27	25	23	41	8
	14	27	39	10	35	30	25	27	25	23	32	8
	15	27	39	10	35	30	25	27	25	23	33	8
MMCF	1	6.5	8.0	3.1	3.9	3.0	4.1	5.6	3.1	3.1	4.1	1.5
	2	6.5	9.0	1.5	5.5	3.0	4.1	5.6	2.0	2.0	5.1	1.5
	3	6.5	9.0	1.5	6.0	3.0	4.1	5.6	2.0	2.0	5.6	1.5
	4	6.5	9.0	2.1	6.6	3.0	4.1	6.0	2.5	2.2	6.1	2.1
	5	6.5	9.0	2.1	8.7	7.0	4.1	6.9	6.3	5.8	6.6	2.1
	6	6.5	9.0	2.1	9.0	7.0	5.4	6.9	6.3	5.8	6.9	2.1
	7	6.5	9.0	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.6	2.1
	8	6.5	9.0	2.6	9.0	7.0	6.4	6.9	6.3	5.8	10.2	2.1
	9	6.5	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.4	2.1
	10	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	7.4	2.1
	11	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	9.3	2.1
	12	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.8	2.1
	13	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	10.6	2.1
	14	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.1	2.1
	15	6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.1	2.1
Long-Term Sustained Yield												
	MMBF	30	43	10	35	30	25	27	25	23	33	8
	MMCF	7.4	10.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.4	2.6

*Decade 1 is Scheduled, Decades 2 through 15 are Projected

Figure II-10: Timber Sale Schedule for Each Alternative (MMBF/Year)

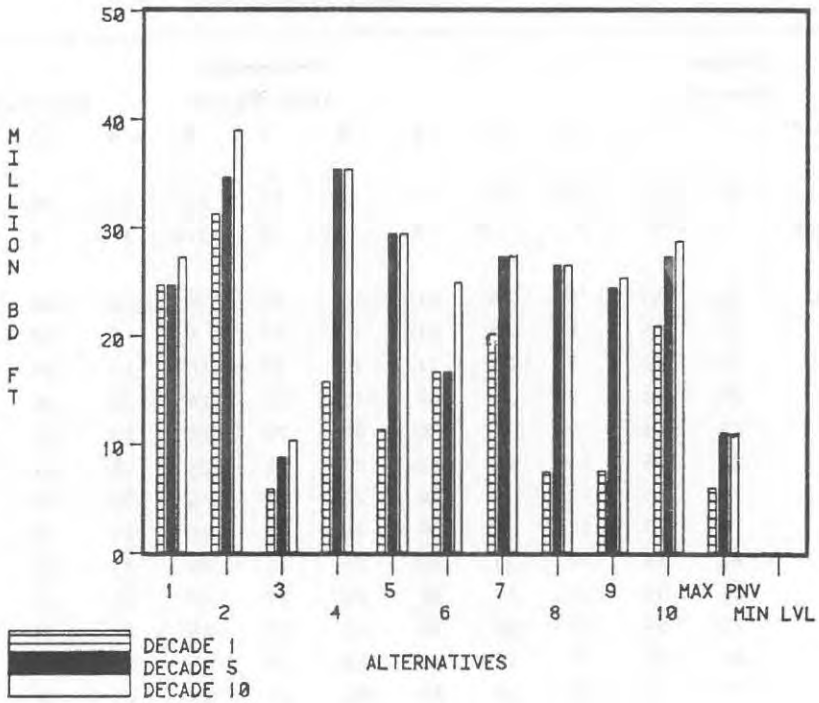


Figure II-11: Timber Sale Schedule for Each Alternative (MMCF/Year)

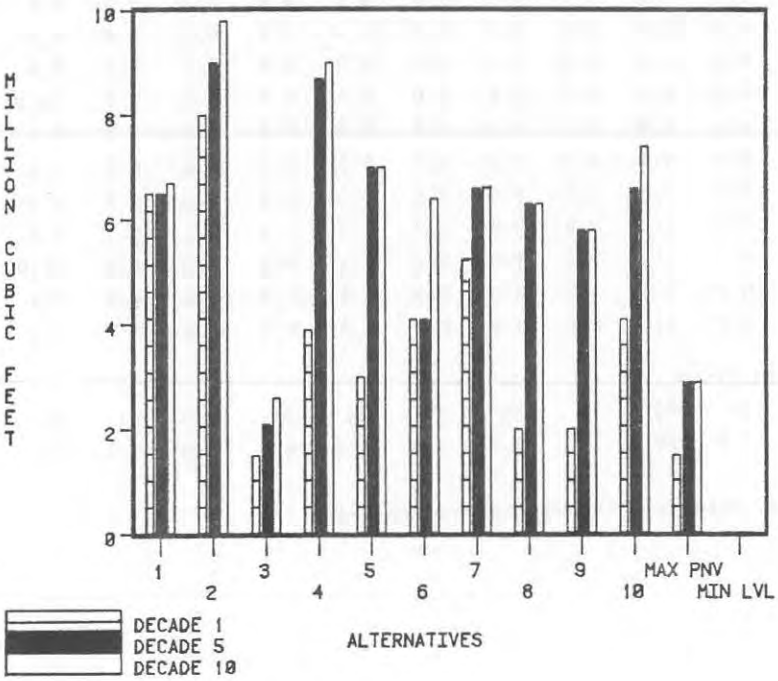
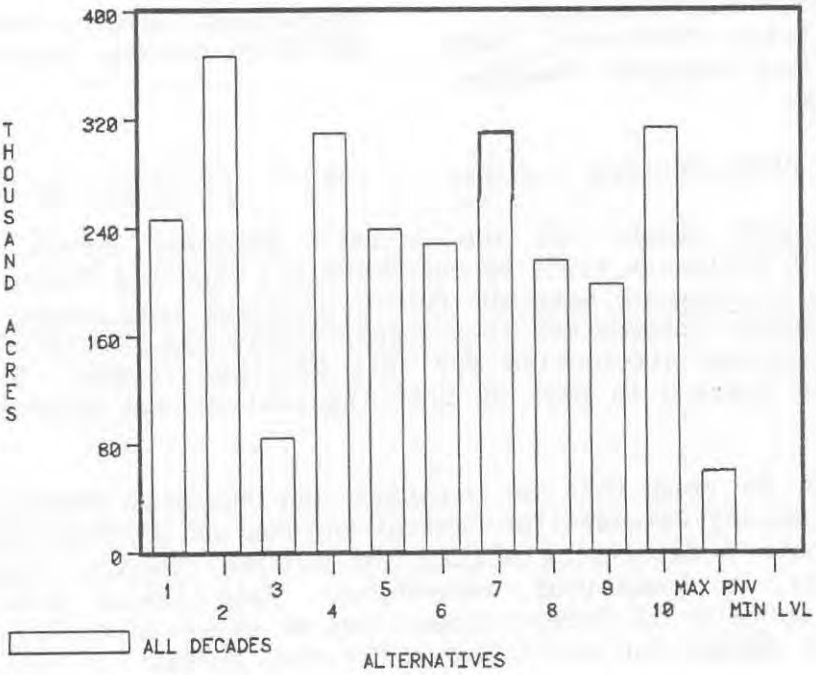


Figure II-12: Lands Suitable for Timber Management



b. Allowable Sale Quantity

The ASQ of each alternative is the amount of timber harvest that would be scheduled in the first decade. Table II-15 shows the ASQ for each alternative. The ASQ is made up of differing components of timber. On the Gallatin, these components are live sawtimber, dead sawtimber which is mountain pine beetle mortality salvage of lodgepole pine, and post and pole material. The dead sawtimber and posts and poles are treated as "noninterchangeable". The noninterchangeable component is defined as that portion of the ASQ which is harvested to meet certain needs, such as salvage or providing small diameter material, and is not interchangeable with other parts of the total ASQ. This noninterchangeable component of ASQ for decade 1 is identified in Table II-15.

c. Timber Supply and Demand

A supply and demand analysis for the Gallatin National Forest was completed using information developed from the report: "Montana's Timber Supply: An Inquiry into Possible Futures," and demand projections based on work done for the 1980 Resource Planning Act Assessment (Adams and Haynes, 1980).

The Montana Timber Supply was subdivided into three sub-state Regions using the historical share of timber processed in the area. A fourth area, Eastern Montana was allocated a constant volume over time and was not a dynamic part of the Model. The Counties and National Forests in each region are listed below. Note that the Gallatin National Forest is included in more than one region.

REGION	COUNTIES	NATIONAL FOREST (all or part)
Central	Beaverhead, Broadwater, Gallatin, Jefferson, Lewis & Clark, Madison, Meagher, Park	Beaverhead, Custer, Deerlodge, Gallatin, Helena, Lewis & Clark
East	All other Montana Counties	Custer, Gallatin, Lewis & Clark

A range of potential demand for the Gallatin 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 this National Forest. The Gallatin National Forest is located in part of both the Central and Eastern sub-state regions.

It is significant to note that as regional and national markets imply an increase in the quantity demanded for Central and Eastern 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. The range of potential demand for the Gallatin National Forest is shown in Table II-16:

Table II-16: Range of Potential Demand and Forest Plan Harvest Level (MMBF/Year)

	Planned	Projected			
	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037
Range of Potential Demand for Gallatin National Forest	16 21	17 23	19 24	25 30	35 41
Gallatin National Forest Plan Harvest Level	21	21	21	24	27

By comparing planned harvest levels from the Gallatin 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 for the next two or three decades. 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, 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.

A more detailed discussion of the timber supply/demand situation for the Gallatin area can be found in Appendix B.

d. Silvicultural Systems

The interdisciplinary team evaluated even-aged and uneven-aged management systems against all of the factors mentioned previously: Regional Guide standards, biological factors, site-specific stand conditions, and other resource objectives.

Even-aged management, in general, was determined to be the best option for addressing the major concerns. Many stands on the Forest, particularly in the mixed conifer type, have a high percentage of overmature, suppressed, or diseased trees. These stands can be rapidly regenerated to young, vigorous stands using even-aged systems. There are also more opportunities to control future stand make-up, such as species and stocking, to minimize future pest problems. This problem is especially critical in the lodgepole pine forest type where mountain pine beetle is a serious threat. Maximizing the volume of timber per unit of road enhances the economics of harvesting and reduces the amount of road that must be built to remove a given volume of timber. This is an important consideration for maintaining water quality and fish habitat. In general, even-aged systems require less road construction to harvest an equivalent volume of timber than uneven-aged systems. Frequent, periodic entries necessary under uneven-aged systems also require the use of roads more often. Even-aged management, even though it has a more immediate impact on wildlife than uneven-aged management, usually only requires 1 to 3 entries for management activities during an 80 to 120 year rotation. Uneven-aged management requires periodic harvest entries on a 10 to 20 year entry schedule. Reduced levels of road access and fewer disturbances to wildlife populations were major factors in determining the silvicultural system to use in developing the Forest Plan.

Uneven-aged silvicultural systems were shown to be effective for meeting the resource objectives in some areas, particularly in visually sensitive areas and riparian areas. In areas where the initial stand conditions were good (adequate stocking, vigorous trees, and minimal disease), uneven-aged systems could be implemented and meet the objectives of visual quality or riparian area protection. In analyzing the requirements for the vegetative manipulation, however, it was determined that, in most cases, resource objectives could be met with either even-aged systems. The specific application of either system in these areas will be based on resource objectives and the site-specific silvicultural prescription.

The Timber Harvesting section in Chapter IV has additional discussion on the impacts of the different silvicultural systems on other resources.

Based on an interdisciplinary evaluation of physical, biological, and economic factors, clearcutting was determined to be the optimum harvest under certain conditions and situations. The final decision on which harvest method will be used will be based on interdisciplinary consideration of site-specific

conditions. In general, clearcutting is the most optimum harvest method in the following situations:

- The moisture and temperature regimes of the site, following clearing, will be favorable for regenerating the desired species. In general, north and east aspects fit this category, but conditions can vary by geographic location.

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

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

- Management objectives for the area can be better achieved by clearing all of the trees in one operation (e.g., increasing browse and forage for wildlife or livestock).

Figure II-13: Timber Production by Harvest Method (Decade 1)

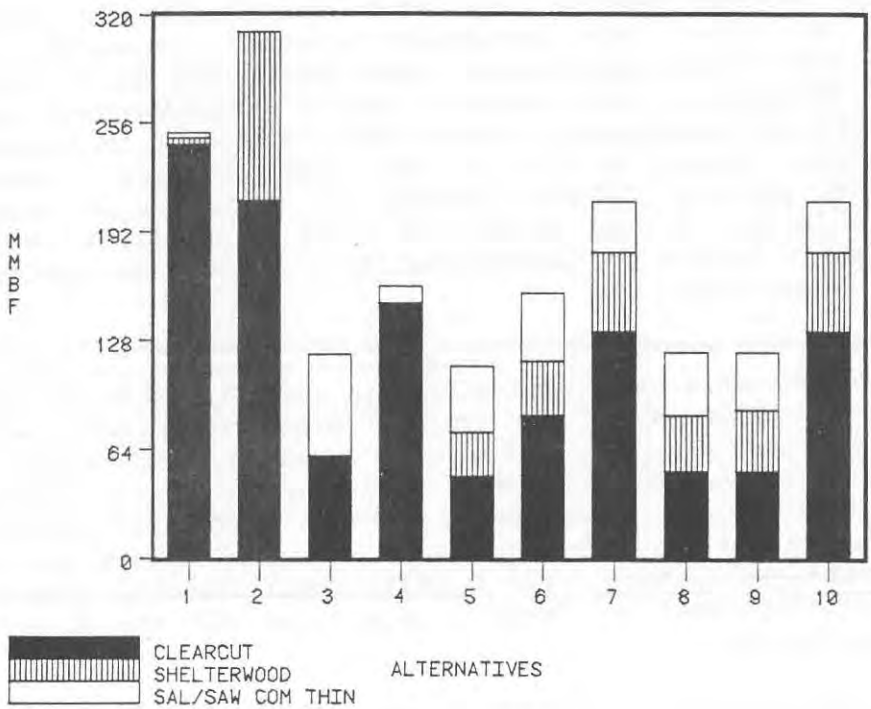


Figure II-13 displays the relative differences in silvicultural systems between alternatives for timber harvest in the first decade of the planning period. The differences between the alternatives are generally insignificant because the availability of different systems for the model to implement was constrained based on the evaluation described previously. The acres of intermediate harvest or commercial thinnings increase in the later decades when there are more immature stands in the suitable landbase. It is important to note that these figures do not represent acreage targets by method for alternatives. Rather, they are the levels projected by the Forest Planning model that represents the optimal way of meeting the objectives and constraints of each alternative. The final determination of which silvicultural system will be used for a specific project will be determined by a certified silviculturist after a site-specific analysis.

e. Salvage of Mountain Pine Beetle (MPB) Mortality

The merits of a departure timber sale schedule to salvage high mortality losses to the MPB has been a common issue on the Gallatin. It is our conclusion from analysis that no economic rationale exists for harvesting additional acres to salvage MPB mortality. An increase in salvage would correspond with a reduction in Present Net Value. Potentially, various levels of salvage volume would be produced in different alternatives.

Table II-17 displays the potentially available, dead (salvage) volume that could be in addition to live volume for Decade 1. Alternative 1 produces the most potential salvage volume (nearly 16 MMBF/Yr), while Alternative 4 produces the least. Alternatives which produce the least salvage typically harvest most or all the volume produced in Decade 1 from the Absaroka and Crazy Mountain ranges. These mountain ranges are not affected by MPB in the volume tables during the first decade.

Table II-17: Estimated Mountain Pine Beetle Mortality Volume Potentially Available With Base Sale Schedule For Decade 1

UNITS	ALTERNATIVE/BENCHMARK									
	1	2	3	4	5	6	7	8	9	10
MMBF	15.8	12.2	5.4	0.5	2.0	2.5	4.0	1.2	1.2	5.4
MMCF	4.0	3.3	1.3	0.1	0.5	0.7	1.0	0.3	0.3	1.5

f. Effects on Diversity

Figure II-14 displays the distribution of forested condition classes at the beginning of the tenth decade for each alternative. The bar graphs show the age class distribution of the lands suitable for timber production and the remainder of the tentively suitable lands, screened out as not appropriate in each alternative. The term "old growth" is used to designate those forested lands

which will continue to develop through the natural successional process. Barring catastrophic change, this class would be older than 120 years before the tenth decade.

Alternatives 2, 4 and 7 provide the best distribution of age classes and improved vegetative diversity within those acres assigned to timber management. These alternatives would also best reduce long-term losses of lodgepole pine to mountain pine beetle. However, note the limited potential for influencing diversity through timber harvest on the Gallatin. The forested land which is tentively suitable for timber production amounts to about 440,000 acres - less than 35 percent of the total forested lands.

Figure II-14: Age Class Distribution At the Start of Decade 10.

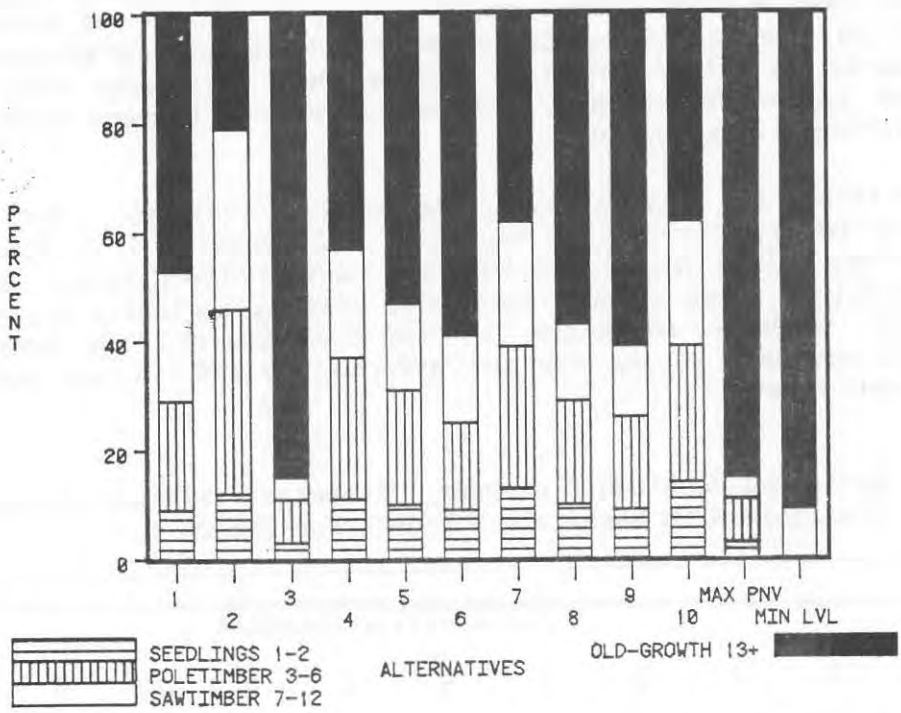
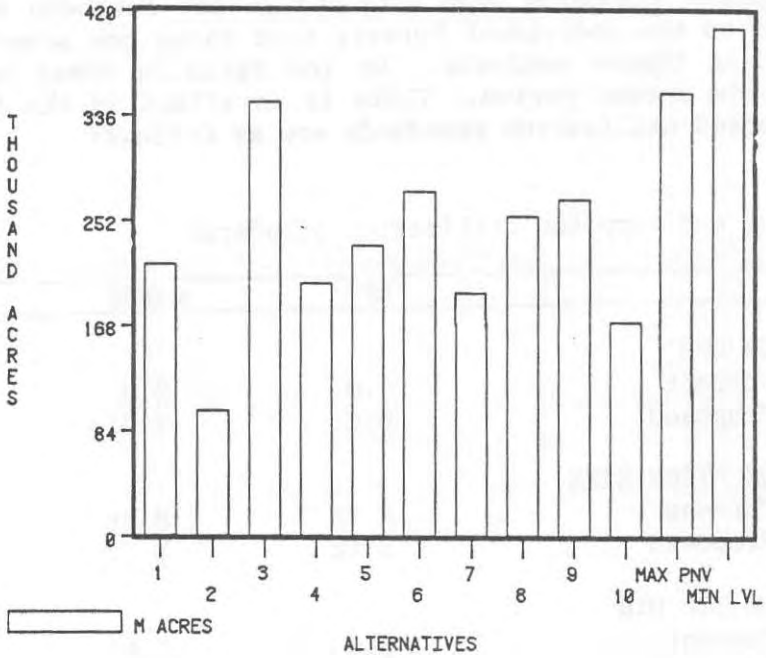


Figure II-15: Old Growth on Tentatively Suitable Timberland in 100 Years



g. Utilization Standards

In 1982, the Northern Region proposed that the product utilization standards for merchantable wood products on National Forest timber sales be changed. These changes and the proposed standards were outlined in the Northern Region Guide. It was the direction to the individual Forests that these new standards be used in all Forest Planning timber analysis. On the Gallatin these new standards become effective in the second period. There is no effect in the first period. The current and proposed utilization standards are as follows:

Table II-18: Current and Proposed Utilization Standards

	LPP	OTHER
MINIMUM DBH		
Current	7.0	8.0
Proposed	6.0	7.0
MINIMUM PIECE SIZE		
Current	8 ft	8 ft
Proposed	8 ft	8 ft
MINIMUM TOP DIB		
Current	5.6	5.6
Proposed	4.6	4.6
% SOUND		
Current	33.33	33.33
Proposed	25.00	25.00

Table II-19: Comparison of Volume, Present Net Value, and Suitable Acres By Alternative in First Decade

	CURRENT STANDARDS	PROPOSED STANDARDS	DIFFERENCE	% CHANGE
Maximum PNV Benchmark:				
MMCF	14.70	14.70	.0	.0
MMBF	60.12	60.12	.0	.0
PNV	321.0	323.2	2.2	.7
Acres Assigned to Timber	253.4	242.5	10.9	4.3
Preferred Alternative:				
MMCF	41.0	41.0	.0	.0
MMBF	160.4	160.4	.0	.0
PNV	293.2	295.8	2.6	.9

Table II-20: Harvest Volume by Standard & Species for the Preferred Alternative

	LPP	DF
Current Standards		
1st Decade		
MMBF	121.64	38.75
MMCF	29.76	11.24
5th Decade		
MMBF	200.85	64.63
MMCF	29.76	11.24
Regional Guide Standards		
1st Decade		
MMBF	121.64	38.75
MMCF	29.76	11.24
5nd Decade		
MMBF	195.95	62.14
MMCF	47.91	18.01

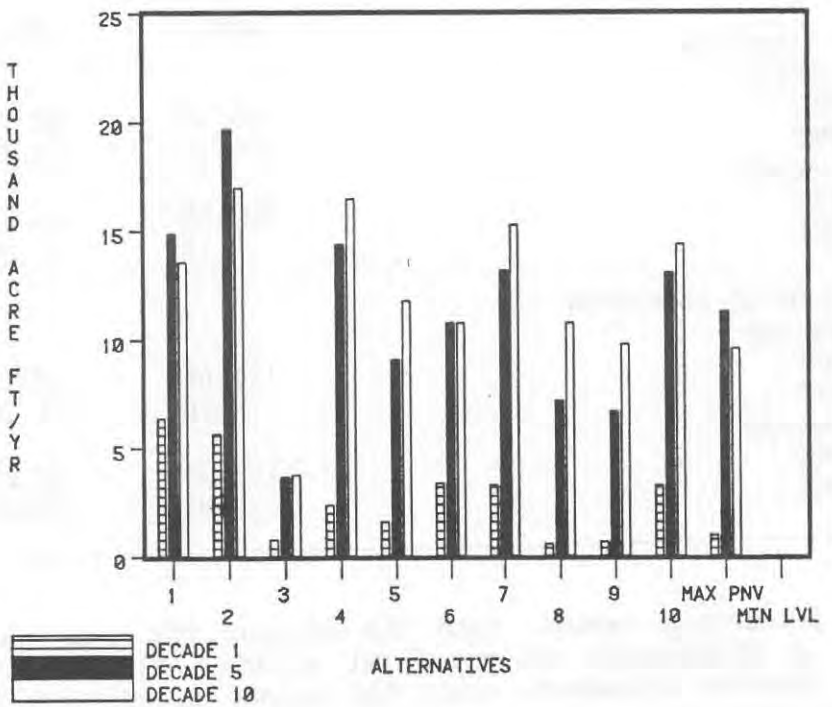
As shown by the preceeding tables, both the maximum PNV and the Preferred Alternative show no differences in the first decade. This is due to not applying the new Regional Standards until the second decade and the use of harvest floors in both alternatives. The harvest floors effect all of the decades shown except the fifth in the maximum PNV. The Preferred Alternative shows a slight difference in board foot volume in the fifth decade. This is a direct effect of the change in utilization standards, although it is only a change of about three percent.

8. Watershed

a. Water Yield

When trees are removed from a site, water yield increases will occur for up to 60 years following clearcutting until complete hydrologic recovery is achieved. The timber harvest and roading schedules unique to each alternative produce water yield increases ranging from 600 to 36,900 acre-feet per year in Alternative 8 (Decade 1) and Alternative 3 (Decade 5), respectively. Compared to the present water yield baseline of 2,028,000 acre-feet per year, even the largest increase is less than two percent. Figure II-16 displays the amount of water yield increase by alternative over time.

Figure II-16: Projected Water Yield Increase Above Baseline



While projected forestwide water yield increases are small, there is a low to moderate chance that some channels of individual watersheds could have accelerated erosion by increased streamflows resulting from a combination of logging and wetter than normal years. For this reason, it is desirable to spread that risk across a larger number of watersheds in stable condition.

The lack of reservoirs downstream from some timber harvest areas in the Bozeman and Hyalite Creek watersheds greatly limits the useability of increased water production for the City of Bozeman. About 80 percent of the increased water yield would occur in the April to June period. Any increased yield during this time could increase the chances of minor flooding in some years. About five percent of the increase would occur during summer months when demands are greatest.

b. Sediment

Sediment production can be generated by both increased water yields and ground disturbances.

The principal activity resulting in increased water yields from Forest lands is timber harvest. Other activities that contribute to increased water yield are the clearing associated with road construction, mineral exploration and development, grazing, and slash disposal and site preparation following timber harvest.

Ground disturbance increases the risk of increased sediment yields. Ground-disturbing activities include road construction, mineral exploration and development, timber harvest with the associated slash disposal and site preparation, and grazing -- especially in riparian zones. The actual risk of increased sediment yield will vary depending on 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 decreases.

Table II-21 displays the amounts of sediment-producing activities for the alternatives as indicators of their sediment production potential.

Table II-21: Sediment Production Potential of Alternatives -- Level of Sediment-Producing Activities (Average Annual, 5 Decades) -in descending order of potential effects.

Sediment-Producing Activities	Alternatives									
	2	1	10	3	6	7	5	8	9	4
Road Construction (Miles)	32.6	25.3	21.1	7.2	12.1	25.7	13.4	10.0	9.6	21.6
Timber Harvest (M-Acres)	3.8	2.98	2.26	0.79	2.11	2.19	1.44	1.04	9.99	2.68
Grazing (M-AUM's)	59.3	44.3	48.3	30.2	48.0	45.0	45.4	45.0	40.0	53.9

For any alternative, a potential exists to control projected sediment increases. Practices such as temporary stream diversion around culverts being installed, fill-slope erosion traps, better seeding of disturbed areas, and road surfacing in critical areas would reduce sediment increase projections by about 40 percent and help achieve water quality management goals. As long as soil and water conservation "best management practices" such as those just described are implemented to prevent or minimize adverse changes in water quality from planned activities conducted by the Gallatin National Forest, adverse changes that do result would not be considered violations of Montana's water quality standards.

Monitoring will be done during project development to track sediment production. The effects of sediment production on water related beneficial uses will be evaluated during project development to ensure meeting Forest water

quality goals. Projects that will not meet State water quality standards will be redesigned, rescheduled, or dropped.

However, some alternatives, due to their potential for producing more sediment, would be more costly in meeting water quality goals. These alternatives would incur a greater risk that water quality might be impacted in spite of best management practices. Alternatives 1 and 2 have the greatest potential for producing sediments. Alternative 4, 6, 7, and 10 also have high enough potentials for producing sediments that mitigating measures for reducing them would have to be followed.

9. Minerals, Oil & Gas

In general, National Forest System lands are open to development for recovery of valuable mineral resources. Metalliferous minerals are open to appropriation under the U.S. Mining Laws Act of May 10,1872. Oil and gas, phosphate, coal and other non-metalliferous minerals are available for development under the Minerals Leasing Act of 1920. Mineral development has long been recognized as a legitimate use of National Forest System lands. The mineral potential of much of the Gallatin National Forest is not well understood because past minerals development has not been extensive.

While National Forest System lands are available for mineral or oil and gas development, various restrictions and mitigating measures may be necessary to protect other resource values and to provide for an orderly development of the resource itself. Any hardrock activities that might develop would be managed under operating plans with the surface resource protected under the provisions of laws governing mineral activity on National Forest land. New oil and gas leases and subsequent reissuance will undergo additional analysis as required by NEPA, tiering to this EIS but being more site-specific.

The geologic potential for locatable minerals and leasable energy resources has been evaluated. The Stillwater Complex on the Big Timber Ranger District and the Jardine and Cooke City areas on the Gardiner Ranger District have been identified as having high potential for locatable minerals. These areas have a high probability for development within the next two decades, depending upon economic factors. Only in Alternative 9 would the roadless portions of these areas be recommended for wilderness. In all other alternatives, they would be available for mineral entry. The Forest Service and Montana Department of State Lands have issued a Final EIS on the social, economic, and environmental effects of a proposed mine in the Jardine area. The Forest Plan alternatives would not affect any of the specific proposals in the State's FEIS.

Relatively little area on the Forest has been identified as having high potential for oil and gas. The Bridger, Bangtail and periphery of the Crazy Mountain Ranges have moderate potential. Considerable exploration activity has occurred in the Bangtails in recent years. This area is generally roaded and in no alternative is it assigned to prescriptions which would require non-standard lease stipulations. The roadless portion of the Bridgers are proposed for wilderness in Alternatives 8 and 9. The Crazy Mountains would become wilderness in Alternatives 5, 8, and 9. These would forgo exploration and development. The roadless crest of the Bridgers and the core of the Crazies would not be roaded in any alternative. These areas would continue to be difficult to explore for energy minerals or to develop in any alternative.

The Gallatin National Forest lands were placed into the following four categories regarding mineral entry and types of lease stipulations:

Category A	Withdrawn or proposed for withdrawal from mineral entry.
Category B	Statutes or executive orders require specific protection or mitigation measures.
Category C	Special conditions on winter game range or other lands require special lease stipulations or plan-of-operation conditions.
Category D	Standard lease stipulations and plan-of-operation conditions apply.

The land area available for mineral entry and constraints applied to entry change by alternative (Table II-22 and Figures II-15 and -16). The Forest road system will provide the best mineral access when it is completed in about 70 years. The amount of the Forest that will be roaded varies by alternative. About 40 percent of the Forest is now classified wilderness where no further mineral entry is allowed.

Figure II-17: Energy Resource Categories

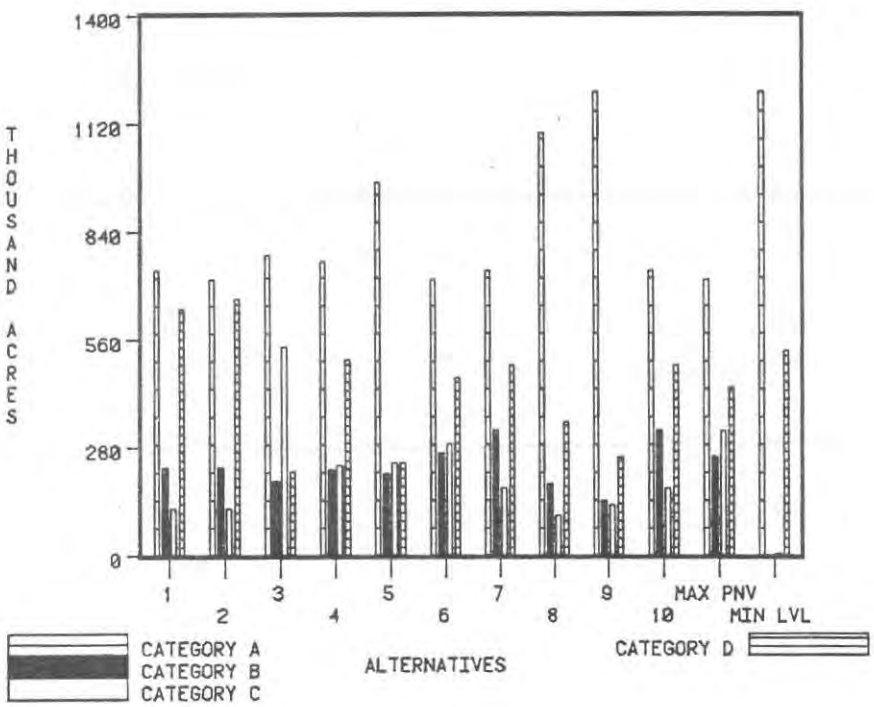


Figure II-18: Non-Energy Resource Categories

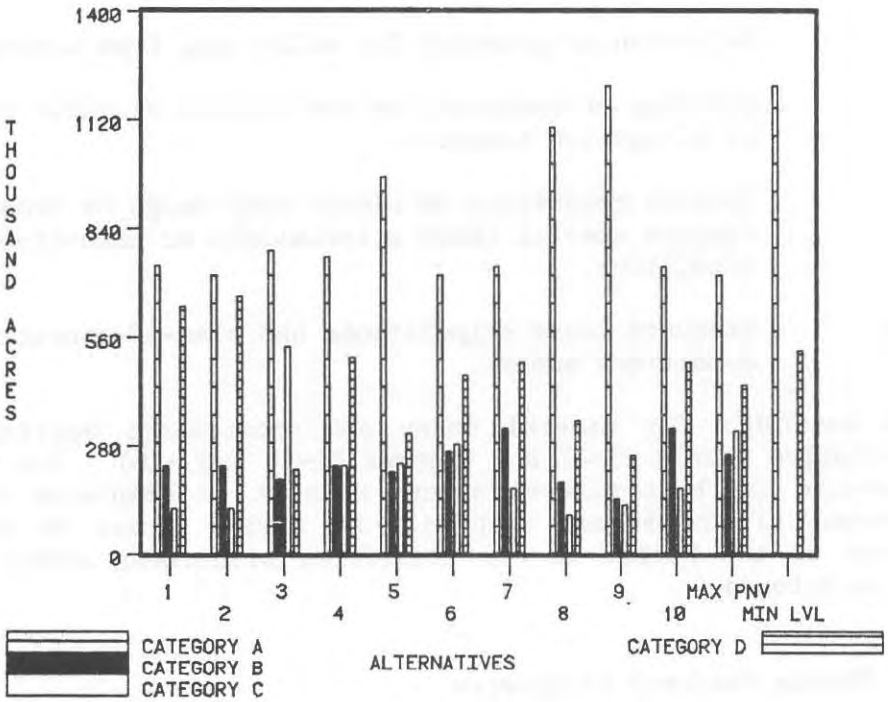


Table II-22: Energy and Non-Energy Mineral Resource Potential
(Thousands of Acres)

Alternative	Category	Potential For Non-Energy Minerals				Potential for Energy Minerals			
		Low	Moderate	High	Very High	Low	Moderate	High	Very High
	A	708	29	2	7	639	67	35	0
1	B	207	3	14	5	140	62	27	0
	C	114	5	0	0	40	78	0	6
	D	584	33	3	21	143	397	50	50
	A	683	29	2	7	614	67	35	0
2	B	207	3	14	5	144	82	27	0
	C	114	5	0	0	40	78	0	6
	D	609	33	3	21	144	397	50	50
	A	743	32	2	8	633	97	35	0
3	B	171	3	16	4	110	57	27	0
	C	517	19	0	0	180	340	0	22
	D	184	15	1	20	140	135	50	34
	A	729	30	2	7	633	95	35	0
4	B	207	3	14	5	140	62	27	0
	C	222	8	0	0	78	148	0	9
	D	457	28	3	20	97	319	50	47
	A	917	40	3	14	801	132	35	0
5	B	193	3	13	4	124	62	27	0
	C	228	8	0	0	85	148	0	9
	D	279	18	2	14	0	184	50	47
	A	682	30	2	7	586	95	35	0
6	B	237	6	15	8	144	82	40	0
	C	275	10	0	0	98	183	0	10
	D	421	23	2	17	110	268	38	46
	A	704	30	2	7	609	95	35	0
7	B	302	4	14	6	148	96	32	0
	C	165	6	0	0	20	146	0	10
	D	444	29	3	19	114	291	46	46

Table II-22: Energy and Non-Energy Mineral Resource Potential, (Cont'd)

Alternative	Category	Potential For Non-Energy Minerals				Potential for Energy Minerals			
		Low	Moderate	High	Very High	Low	Moderate	High	Very High
	A	1038	45	4	15	905	143	48	0
8	B	168	2	12	4	99	55	32	0
	C	97	4	0	0	35	49	0	22
	D	312	18	3	13	76	204	32	34
	A	1132	50	9	19	999	157	48	0
9	B	132	1	7	3	69	42	32	0
	C	123	4	0	0	44	83	0	5
	D	230	13	3	10	42	204	33	51
	A	703	30	2	8	609	95	35	0
10	B	302	4	14	6	198	96	32	0
	C	165	6	0	0	20	146	0	10
	D	445	29	3	18	110	291	46	46
	A	628	30	2	7	614	67	35	0
MAX PNV	B	238	3	14	4	144	82	27	0
	C	308	11	0	0	40	78	0	6
	D	389	25	3	20	144	397	50	50
	A	1167	29	2	12	999	157	48	0
MIN LVL	B	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0
	D	449	40	17	20	106	309	65	56

10. Road System

Changes Since the Draft EIS

A new table has been added comparing the amount of first decade road construction needed for each alternative.

There are now about 807 miles of road on the Forest. The high timber output alternative requires 2,230 more miles be built for access to all the area proposed for timber harvest (See Table II-29 at end of chapter). All arterial and collector roads would be built by the end of the third decade in all alternatives. All local roads would be built by the end of the seventh decade in all alternatives, with only reconstruction and maintenance occurring in decades 8-15. Road management will vary by alternative depending on the amount of new road construction. For all alternatives, 70 percent of new roads will be closed to use.

Access roads to the Forest to facilitate public use and administration of the land are also needed. The amount of access road needed does not vary significantly between alternatives. This is indicative of the general lack of access to the Forest boundary. In some alternatives, an access trail would serve the need adequately while in others a road is needed. Figure II-19 shows the amount of all types of roads needed for the alternatives.Table II-23 shows first decade road construction for each alternative.

Figure II-19: Total Road Network By Alternative
(Miles)

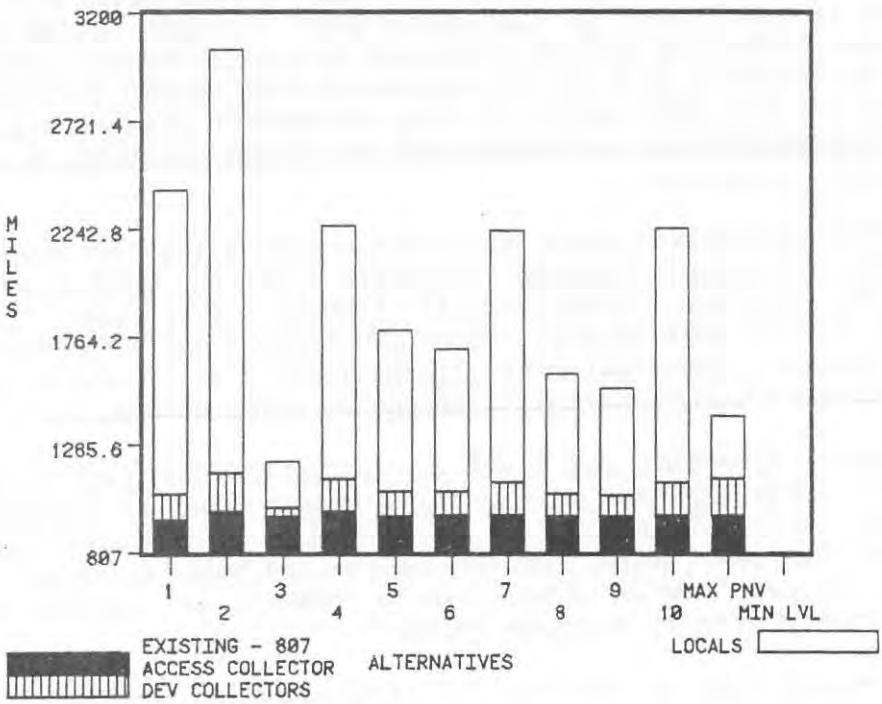


Table II-23: Miles of Road Constructed in the First Decade *

	ALTERNATIVES									
	1	2	3	4	5	6	7	8	9	10
Number of Miles	215	287	87	163	132	136	215	103	102	192

* In all alternatives there would be additional road reconstruction.

11. **Access**

Since the Draft EIS, this section has been added to discuss access needs on the Gallatin. Access needs are tied directly to the objectives of each alternative. High development alternatives, like Alternative 2, would require more access roads to be built to support the timber program. Low development alterantives, like Alternative 3, 8, and 9 would require more trail access. Very few additional access roads would need to be built for timber harvest. The type of access, trail or road, changes by alternative. The need for access does not change by alterative. These access points have been inventoried and evaluated in the Gallatin National Forest Access Report, 1977. This report has been incorporated into this FEIS as an inventory of access needs and it was assummed that all alteratives would meet these access needs in various ways.

12. **Fire Management**

Wilderness areas on the Forest have been or are being evaluated for application of fire management prescriptions. Prescriptions prepared for the Absaroka-Beartooth Wilderness range from immediate control in areas where public safety or other resource values are important to monitoring only where it is desirable to restore fire to the ecosystem. Outside wilderness, land proposed for timber production will be protected from wildfire but prescriptions may allow fire to become a part of the ecosystem development on other lands. Alternatives vary in the application of fire management prescriptions by the amount of land recommended for wilderness and the extent of wildlife and range improvement programs using fire.

An analysis of fire protection costs and consequences using the Level II Fire Analysis process (Planning Records) suggests little difference between alternatives. The results, summarized in Figures II-18 and II-19, show Alternative 2 to be the most costly. This alternative has high value timber investments to protect. The least cost alternatives, i.e., 3 and 5, provide a low protection investment with a moderate amount of acres burned.

Land use assignments determine the level of protection for each alternative. Lands managed for timber emphasis provide for a higher level of protection than others. Fire suppression responses-- control, contain, or confine-- also differ for each proposed land use. Where resource values are high, a control response is necessary to protect these values, while contain or confine are more appropriate on lands with lower tangible values.

The use of prescribed fire is greatest in Alternative 2 because of its high levels of timber and range management combined with a moderate level for

wildlife. Prescribed fire usage is least in Alternative 3 where the lowest timber and range management levels outweigh a high level for wildlife.

Prescribed fire will be used to maintain or improve wildlife habitat and from 300 to 1,725 acres would be scheduled annually in the different alternatives.

Figure II-20: Annual Expected Fire Protection Costs and Acres Burned

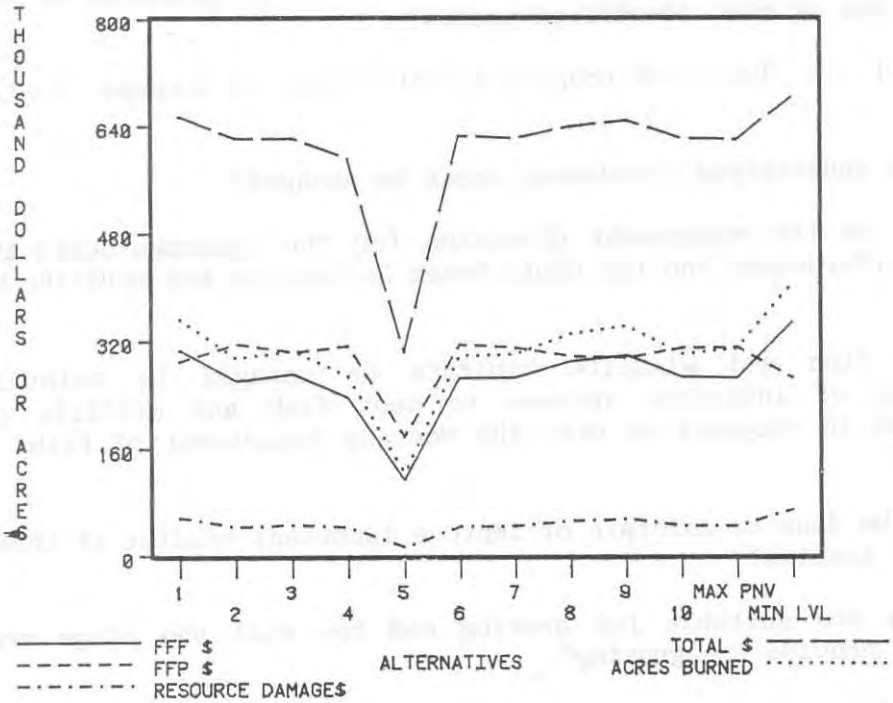
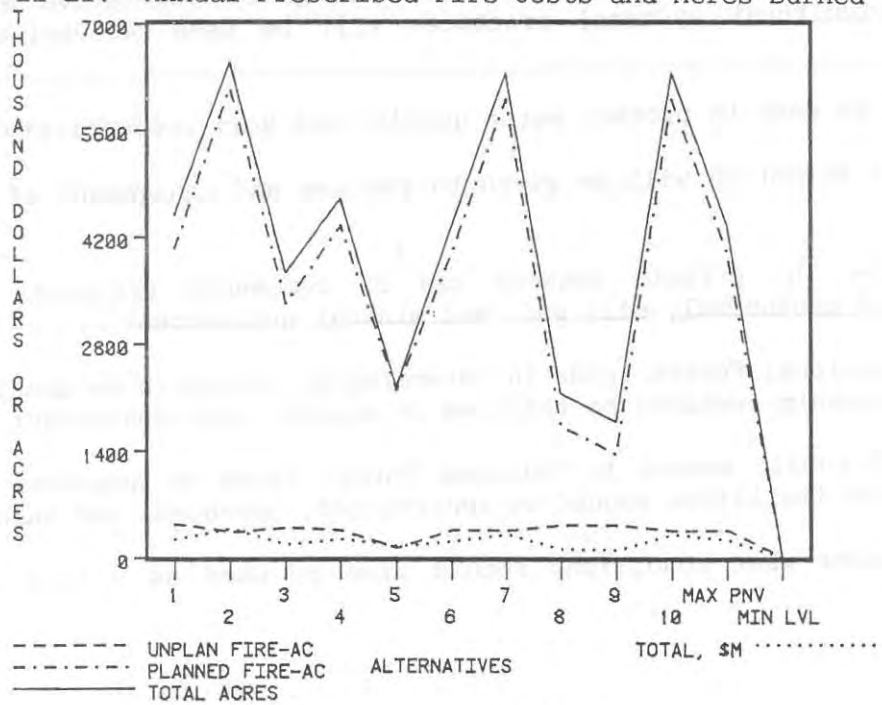


Figure II-21: Annual Prescribed Fire Costs and Acres Burned



13. Issues Considered in Alternatives

The alternatives were designed to respond in various ways to eight of the major issues. Some issue have measurable indicators of how each Alternative responds to that ssue. Some issues do not vary by Alternative.

The issues, concerns, and opportunities addressed in the Forest Plan are:

1. How will the Gallatin Forest provide a broad spectrum of recreation opportunities to meet identified emands?

2. How should the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area be managed?

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

4. What will be the management direction for the Absaroka-Bertooth and Lee Metcalf Wildernesses and the Cabin Creek Recreation and Wildlife Management Area?

5. How will fish and wildlife habitats be managed to maintain viable populations of indicator species to meet fish and wildlife objectives established in cooperation with the Montana Department of Fish, Wildlife, and Parks?

6. What will be done to maintain or improve important habitat of threatened or endangered species?

7. What lands are suitable for grazing and how will the range resource be managed to provide for grazing?

8. What should be the level of timber harvest that can be scheduled on lands available, suitable, and capable for timber production? What mix of products best meets this schedule? What range of vegetative management (i.e., silvicultural systems) practices will be used on various forest types?

9. What should be done to protect water quality and soil productivity?

10. What special attention will be given to the use and management of riparian areas?

11. What will be the effects between use of renewable resources and the management of geothermal, oil, gas, and mineral activities?

12. How should National Forest lands in intermingled ownership be managed? How will landownership problems be resolved to support land management goals.?

13. Where should public access to National Forest lands be acquired and what transportation facilities should be constructed, operated and maintained?

14. Where and under what conditions should fire be used as a tool for land management?

15. How will the Gallatin National Forest better coordinate its activities in the Greater Yellowstone Area?

16. What can be done to reduce below-cost timber sales on the Gallatin?

17. Does the Forest contain rivers which should be considered for classification under the Wild and Scenic Rivers Act?

The following Figures illustrate the degree to which certain quantifiable issues were met by the various alternatives. Each alternative is compared to the Current Direction Alternative (Alternative 1).

Figure II-22: Comparison of Alternative 2 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

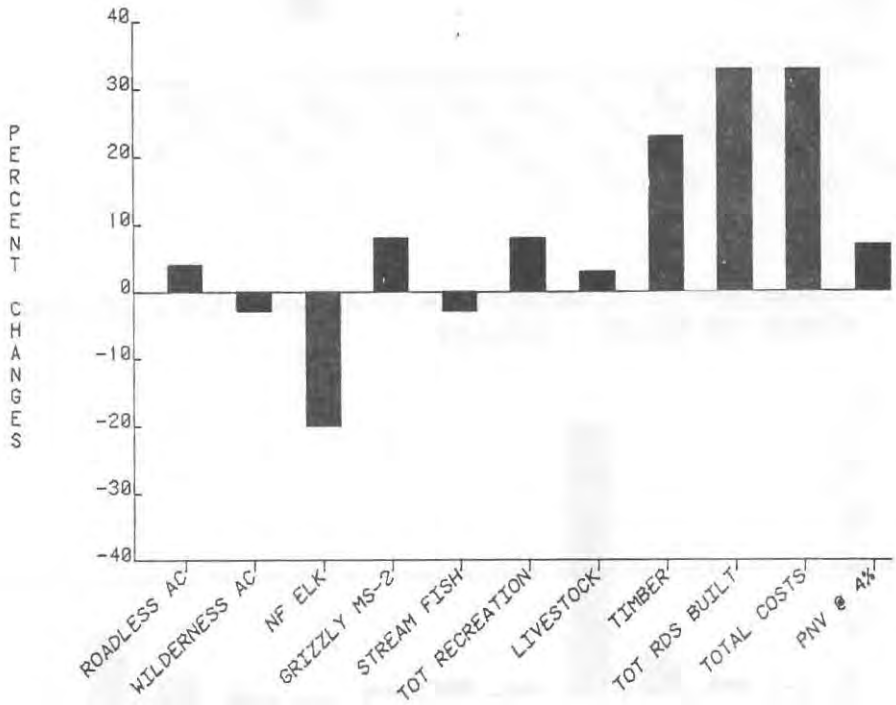


Figure II-23: Comparison of Alternative 3 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

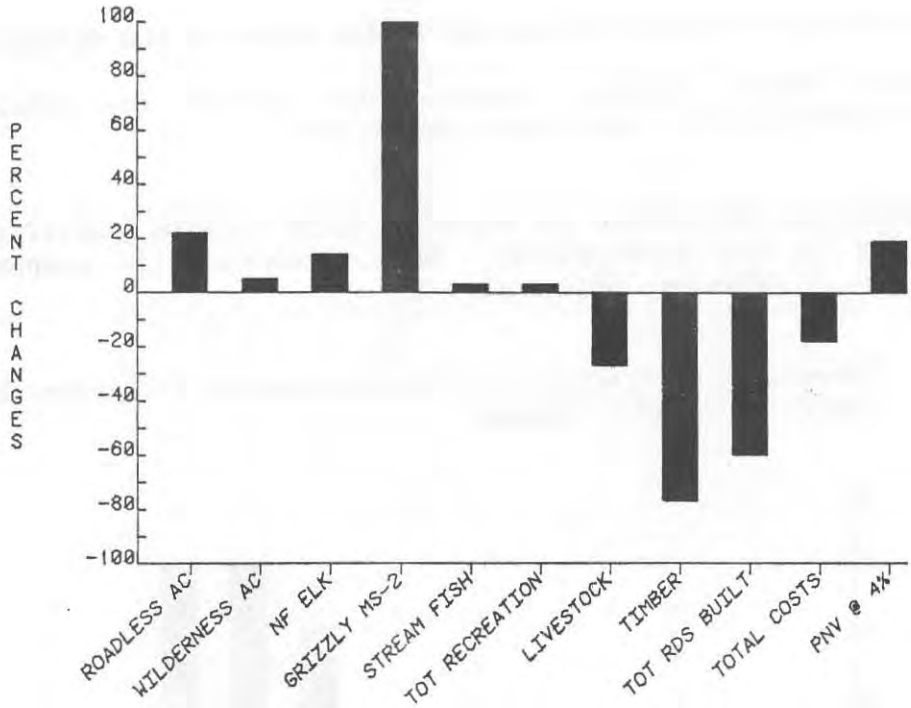


Figure II-24. Comparison of Alternative 4 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

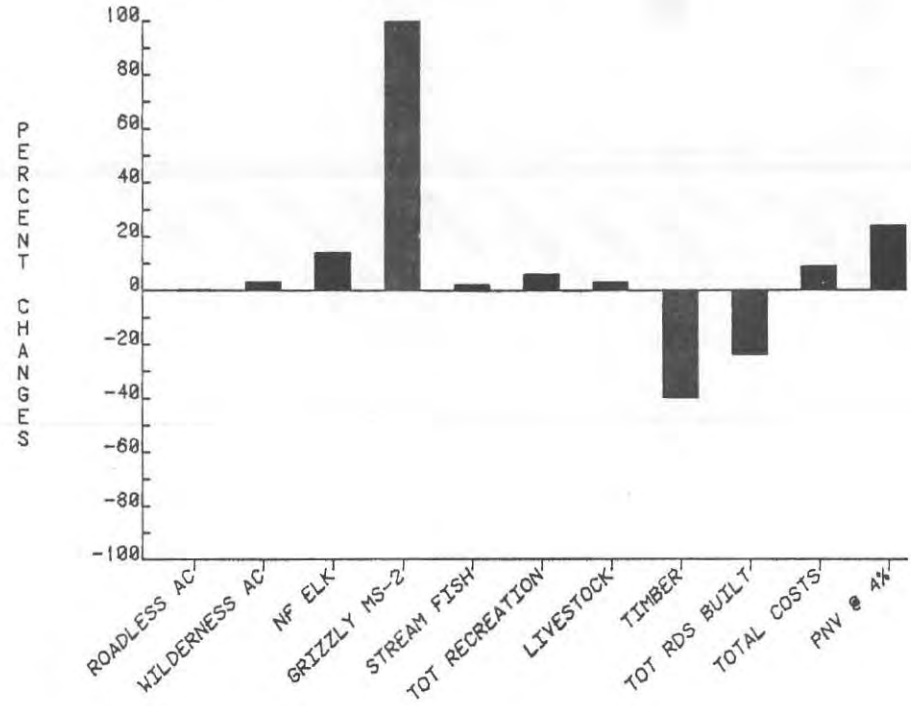


Figure II-25: Comparison of Alternative 5 to Alternative 1 (Current Direction) Changes in Decade 1 Outputs

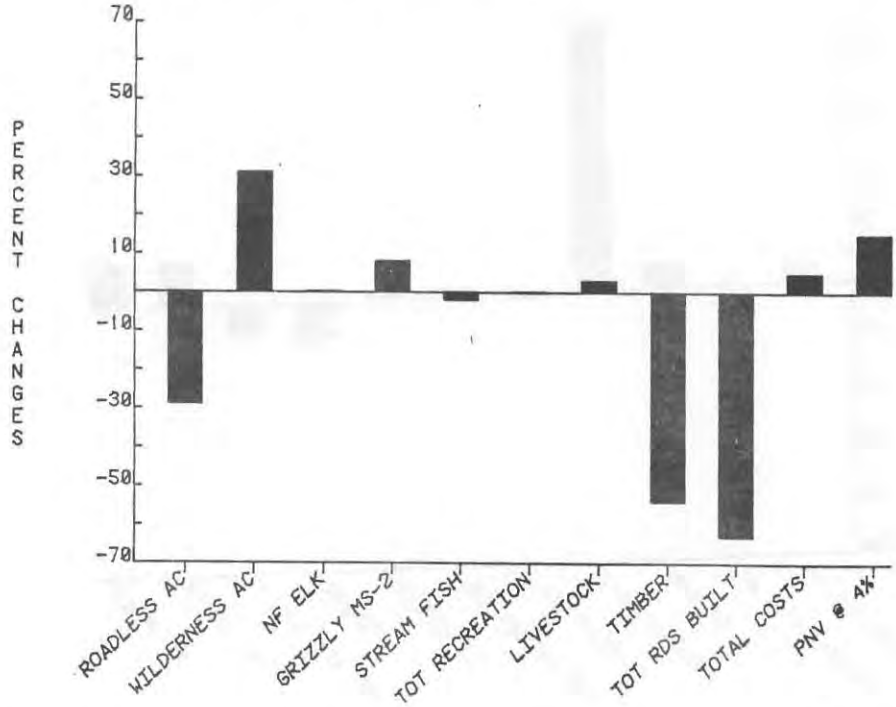


Figure II-26: Comparison of Alternative 6 to Alternative 1 (Current Direction) Changes in Decade 1 Outputs

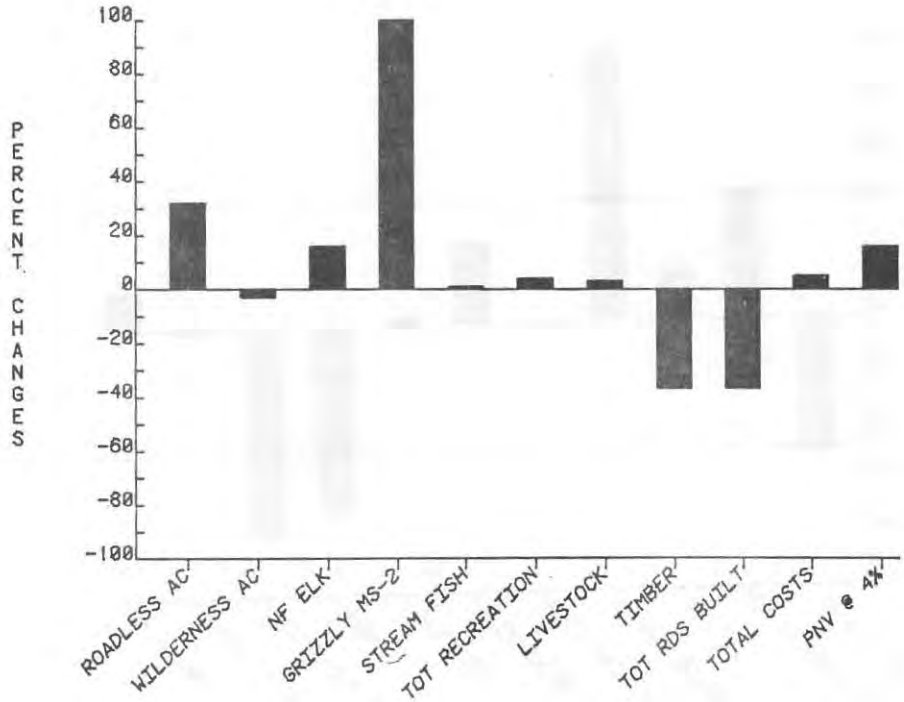


Figure II-27: Comparison of Alternative 7 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

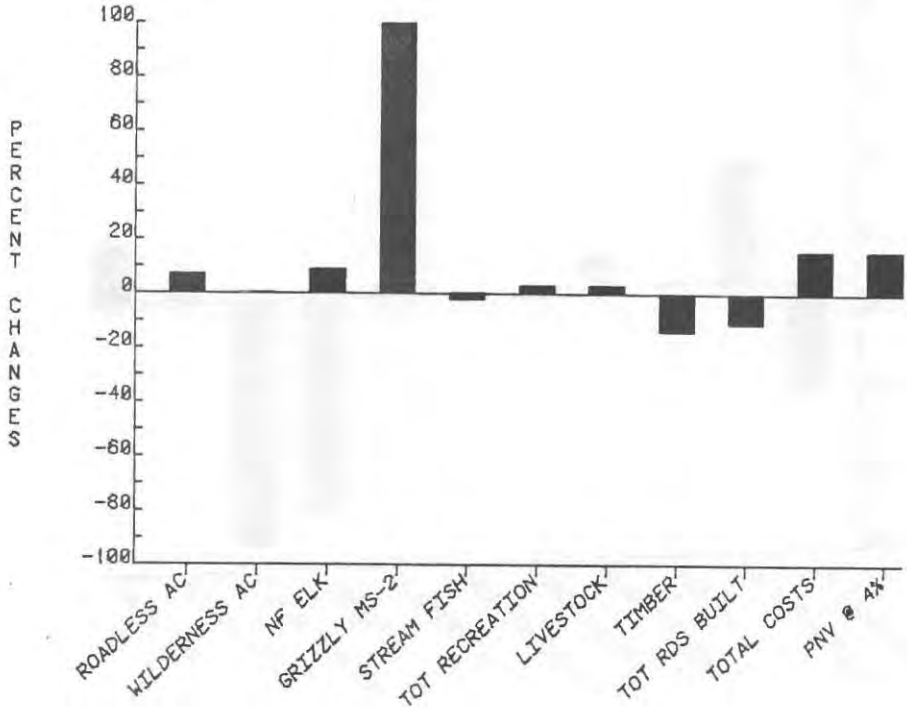


Figure II-28: Comparison of Alternative 8 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

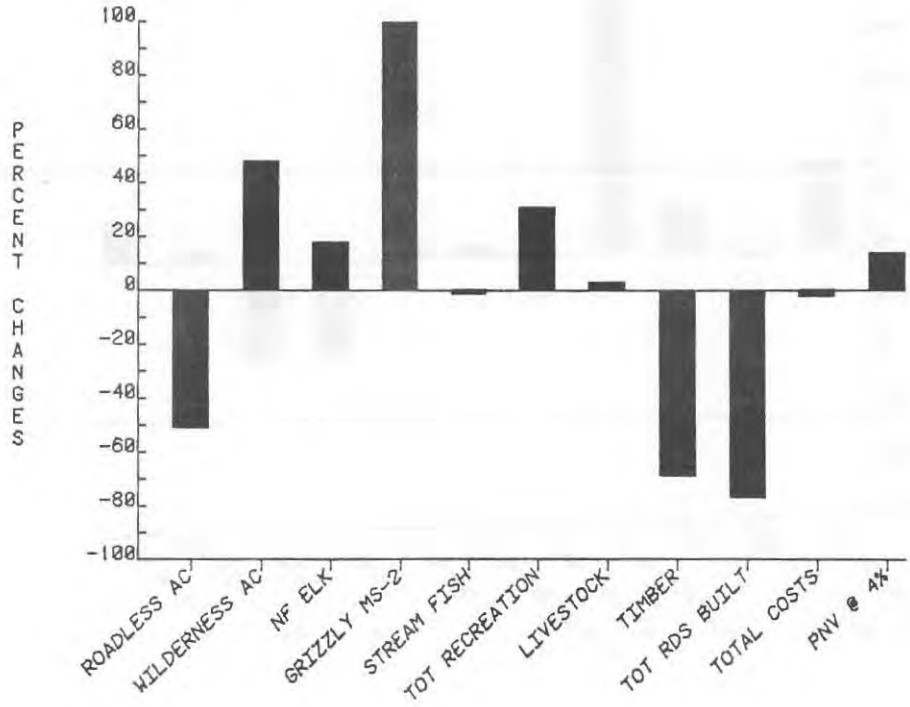


Figure II-29: Comparison of Alternative 9 to Alternative 1 (Current Direction) Change in Decade 1 Outputs

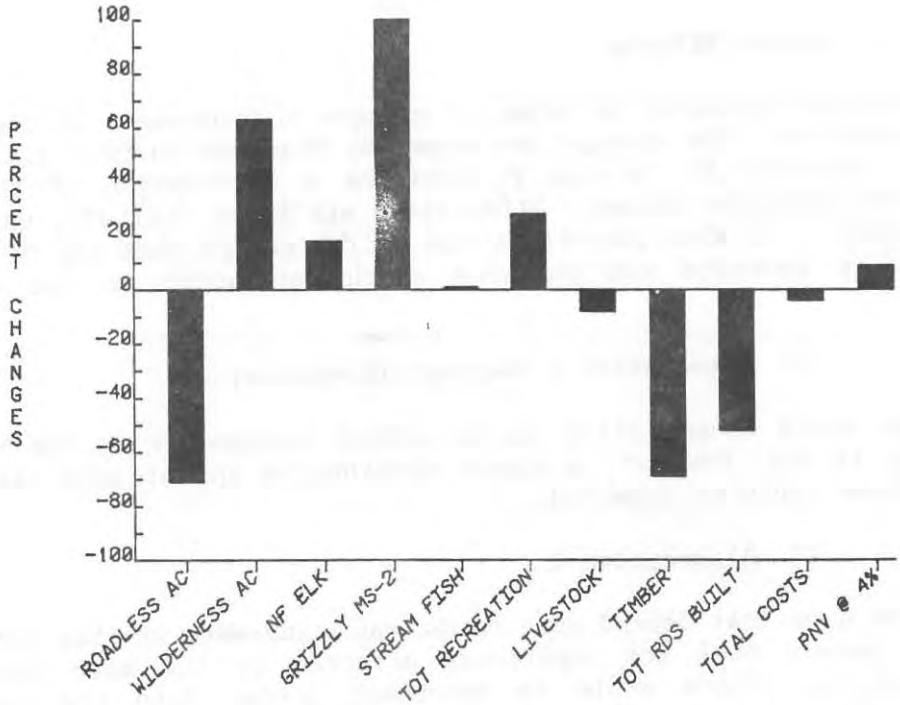
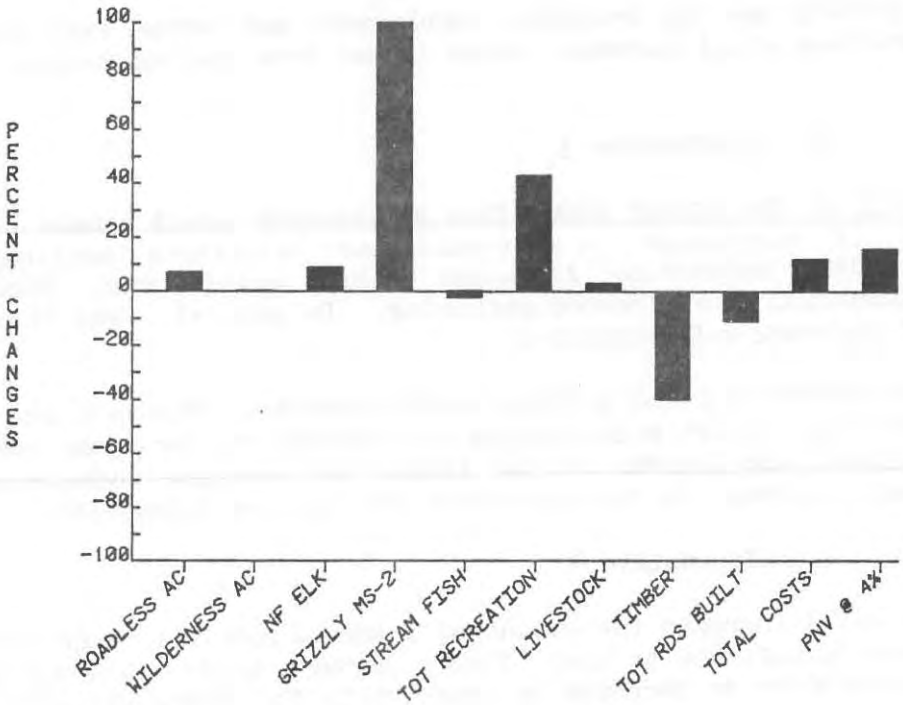


Figure II-30: Comparison of Alternative 10 to Alternative 1 (Current Direction) Change in Decade 1 Outputs



14. Social Effects and Economic Impacts in Gallatin, Park and Sweet Grass Counties

a. Social Effects

Social effects can be measured in terms of changes that occur. In the case of Forestwide alternatives, the changes are measured from the current situation or Alternative 1. Appendix B, Section V, contains a description of the social variables that can possibly change: lifestyles, attitudes, beliefs, values, and social organization. It also identifies the social groups that can be affected by the changes in resource use patterns which can occur in the different alternatives.

1) Alternative 1 (Current Direction)

This alternative would cause little social effect because it is the no change altentative. It is not, however, a static alternative and at some time in the future some changes could be expected.

2) Alternative 2

Opportunities for uses that depend upon roads would increase in this alternative and uses which people feel are negatively affected by the more roads would decrease in quality. There would be increased access into the Forest and increased uses taking place on unroaded land. There would be an increase in timber and grazing use. There would be increased opportunity for firewood gathering. Hunting and fishing would increase. More minerals and oil/gas exploration would take place via roads.

Outfitting and guiding use may decrease. Employment and income from the timber and grazing industries would increase, while income from the recreation industry might decline.

3) Alternative 3

The scenic quality of the Forest under this alternative would remain high. Use of and quality of experience in unroaded and wilderness settings would increase. Less timber harvest and livestock grazing would occur. There would be decreased opportunity for firewood gathering. In general, uses that depend upon roads would increase only slightly.

Opportunities for outfitting and guiding would increase. Minerals and oil/gas exploration would have strict stipulations so the effects on other uses would decrease. Employment and income in the timber and grazing industries would decrease, but would increase in the recreation and tourism industries.

4) Alternative 4

This alternative would increase the amount of roaded lands and, therefore, make more of the Forest accessible to use. Timber harvest would increase over the long run. There would be an increase in opportunity for firewood gathering and an increase in uses that depend upon roads. Funding for trail and facility construction and maintenance would remain at current levels so uses associated with these would not increase over the current situation. Big game hunting

opportunity would increase slightly. Fishing quality would be expected to decrease slightly. Livestock grazing would increase. Employment and income in the timber industry would decrease slightly in the short run but increase in the long run. The grazing industry would expand its employment and income while the recreation industry would remain similar to the current situation.

5) Alternative 5

A decrease in timber harvest and an increase in wilderness acres would be the greatest changes in this alternative. Employment in the timber industry would decrease. The perception of a more amenity-oriented type of management would exist.

6) Alternative 6

Because this alternative has very little development and road building in nonroaded lands, the opportunity for nonroaded use is high. Such things as hiking and horseback riding in near-natural settings would increase. This alternative would represent one of the largest changes in direction from a social perspective.

Opportunities for uses that depend upon roads would decrease. Access into the nonroaded areas would decrease. Access into the nonroaded areas would probably be limited to trails. Less timber harvest would occur than under the current situation and livestock grazing would increase. Outfitting and guiding could possibly increase. Opportunity for firewood gathering would decrease.

7) Alternative 7 (Preferred Alternative)

This alternative would provide for somewhat more developed recreation opportunity and investments in dispersed recreation. This includes trail and trailhead construction. Opportunities for dispersing uses would increase. Road construction in this alternative is similar to Alternative 4. Roaded uses of the Forest would increase. There would be more opportunity for firewood gathering, hunting, and fishing as more access in gained. Timber harvest would increase only slightly in the long run. Employment in this industry would remain quite steady. Employment in the livestock industry would increase because of an increase in livestock grazing.

8) Alternatives 8 and 9

The greatest change in these alternatives which would cause social impacts are the large amounts of roadless areas recommended for wilderness. This would cause a change in perception of the way the Forest is to be managed. Other changes are the decrease in timber harvest and, in Alternative 9, the decrease in livestock grazing.

Opportunities for use that depend upon roadless land and wilderness would increase in these alternatives. Employment in outfitting and backcountry types of recreation would increase. Employment in the timber industry would decrease. The grazing industry would be affected in Alternative 9.

9) Alternative 10 (Departure)

This alternative is similar in most respects to Alternative 7 except that timber harvest will exceed nondeclining sustained yield in the out decades. As with Alternative 7, there would be more developed recreation opportunity and more investments in dispersed recreation. Roaded use of the Forest would increase. Employment in the timber industry would increase over that with Alternative 7, particularly beyond the fifth decade.

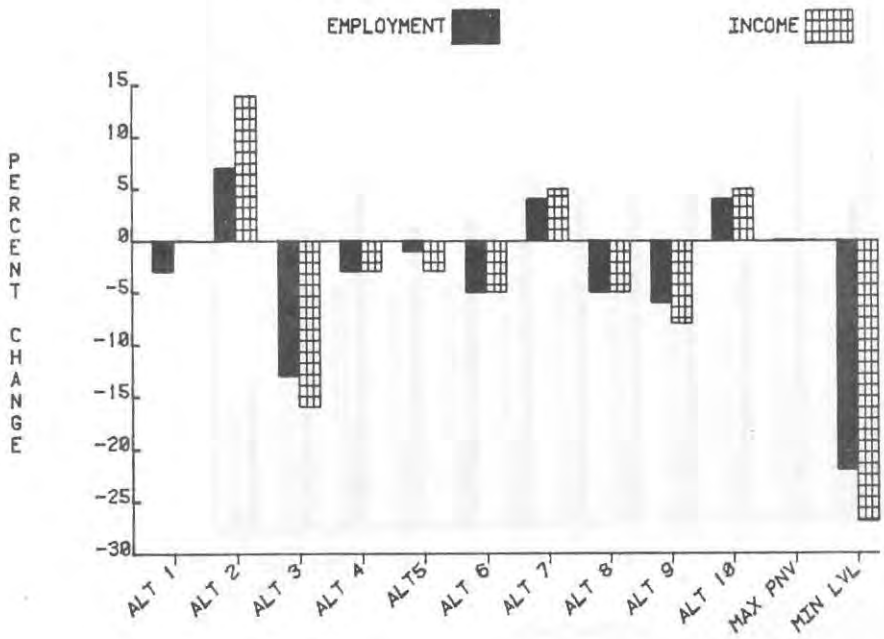
b. Economic Impacts

Changes in timber harvest, recreational use, livestock grazing, and Forest Service expenditures effect changes in personal income and employment primarily in Gallatin, Park and Sweet Grass Counties. Within this three-county area, Forest activities in 1980 were associated with an estimated 2,503 jobs and $37 million in personal income or about 12 percent of the total economic activity. These values include direct, indirect, and induced effects. Differences in employment and income among alternatives largely are due to changes in timber outputs and the resulting change in Forest expenditures. Figure II-31 shows the percent change in employment and income. These are relative changes and should not be considered absolute.

Affirmative Action groups (women, minorities, handicapped, and socially disadvantaged) are considered in terms of impacts by the various alternatives. Employment opportunities both in the number of jobs provided as well as the kinds of jobs available may be indicators of potential effects.

Alternatives 2, 5, 7, and 10 provide more jobs than the 1980 level. Those alternatives with increases could provide additional jobs for Affirmative Action groups who generally share higher than average employment rates. In general, Affirmative Action groups have not reached employment parity particularly within the higher paying jobs. Basic industries such as timber, minerals, and manufacturing are generally ones with proportionately higher paying jobs. Alternatives that expand these sectors and create jobs offer more opportunities for individuals in the Affirmative Action groups category to be hired and advance in employment (Montana Department of Commerce, 1984).

Figure II-31: Changes in Local Employment and Income in Decade 1



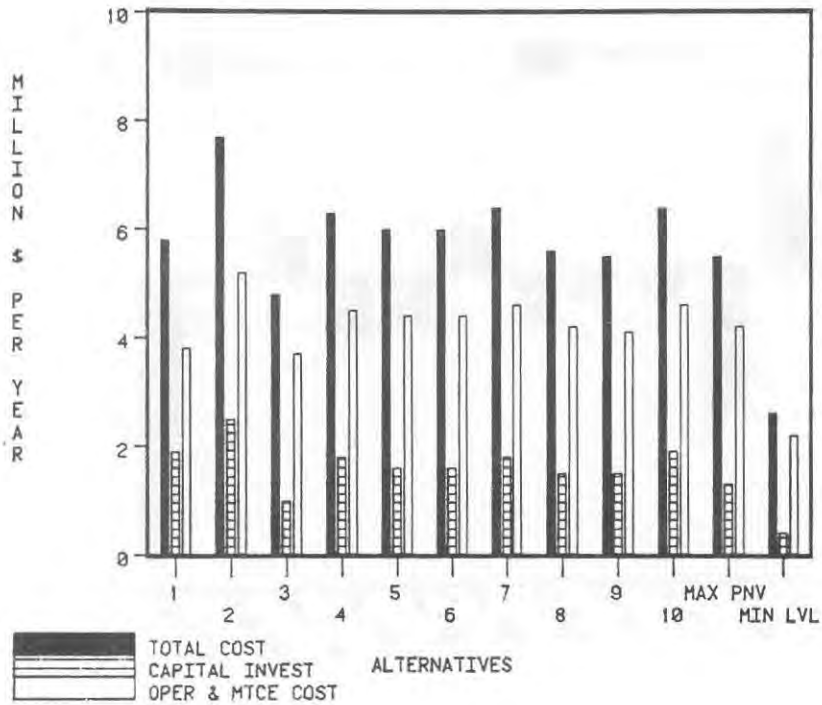
15. Economic Comparisons Among Alternatives

This section explains the significant tradeoffs that would occur among the quantified economic benefits and resource outputs. Major categories for discussion are dollar costs, dollar benefits (market and nonmarket), and the interrelationship between the two (Present Net Value).

a. Costs

The costs are the total expenditures necessary to implement an alternative. Costs include purchaser road credits, K-V funds, emergency fire control funds as well as general budget appropriations. Figure II-32 displays the total cost for Decade 1. Annual costs for decades 1, 3, 5, 10, 15, and total discounted costs are displayed in Table II-29. This table includes costs broken down by various, major resource areas. These should be considered estimates because of the difficulty in separating the costs of management activities to benefit specific resources. For example many road construction projects provide additional management opportunities to a wide range of resource areas including recreation, range, and fire management. These joint costs however, are often charged against a single resource such as timber.

Figure II-32: Average Annual Costs in Decade 1



Nearly half of the costs in all alternatives are for management activities which are not directly tied to resource outputs: General administration, fire control, and maintenance of Forest Service investments. These costs are estimated at $2.6 million/year for all alternatives. Road costs are projected to decrease in all alternatives after Decade 3 because of major access completion. The cost differences among alternatives are largely due to timber harvest and recreation management objectives. Alternatives with larger timber harvest objectives have higher road and timber management costs. Much of this increased cost is due to the planning of activities on increasingly more difficult terrain including steep ground and isolated timber stands. Alternatives with emphasis on nonmarket resources have higher recreation costs.

b. Benefits

The benefit value to the agency indicates the value of resources which have been assigned a monetary value. It includes actual receipts from timber sales, livestock grazing fees, campground fees, mineral leases, and special use fees, as well as additional values assigned to livestock grazing and recreation use. These assigned values recognize the monetary value over the actual value charged by the Forest for resource use.

Figure II-33 displays the benefits for Decade 1. The returns for Decades 1, 3, 5, 10, and 15 are displayed in Table II-29 (end of chapter). Table II-24 that follows this paragraph summarizes present value benefits and costs by resource. Total benefits increase for all alternatives through the planning period. This is largely due to advancing output levels of timber and recreation and the increase in value of these products. The unit prices are projected to increase as future demand for wood products and recreation opportunities increase.

Recreation use is projected to increase in the next 50 years along with the expected change in regional population.

In all alternatives the value from recreational activities accounts for more than 75 percent of total benefits.

Figure II-33: Average Annual Market and Nonmarket Values in Decade 1

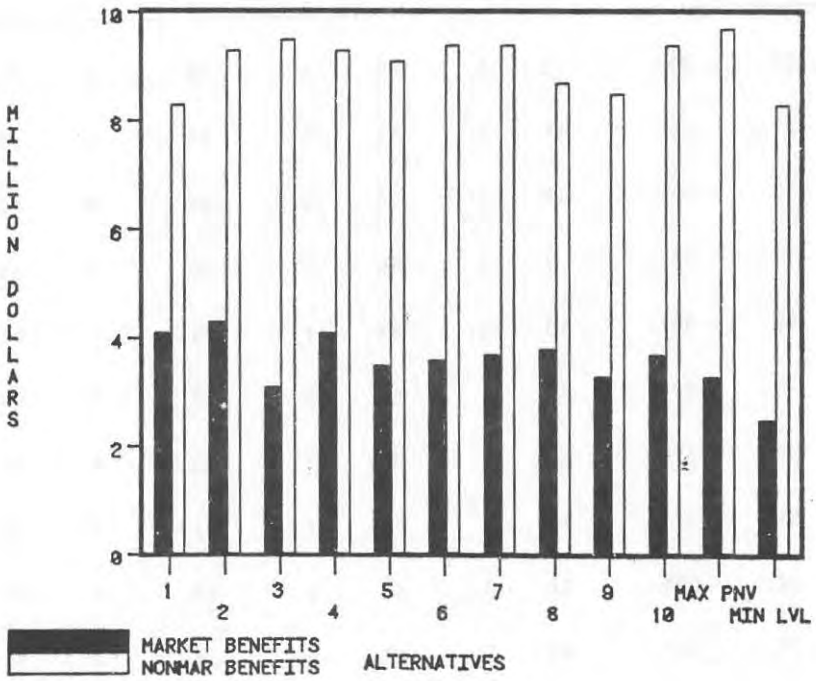


Table II-24: Present Value Benefit and Costs for Resource Groups (Millions of Dollars)

Alter-native/ Benchmark	Present Net Value	Present Value Benefits				Present Value Costs				
		Timber	Recreation	Range	Other	Timber	Roads	Recreation	Range	Other
MAX PNV	309	17	392	13	3	46	5	18	7	61
1	236	54	321	11	3	55	18	18	6	59
2	249	73	361	14	3	74	25	24	8	80
3	292	18	385	7	3	45	6	16	4	53
4	289	58	387	13	3	63	17	21	7	69
5	272	40	374	11	3	57	13	19	6	64
6	278	39	377	12	3	56	12	19	6	63
7	276	51	379	12	3	62	17	21	6	70
8	270	33	368	11	3	53	9	18	6	61
9	259	31	357	10	3	52	9	18	5	59
10	272	52	378	12	3	63	17	21	6	70
MIN LVL	208	0	272	0	3	10	0	10	0	33

The direct comparison of benefits and costs by individual resource can be misleading because all of the costs include non-seperable, multi-resource costs.

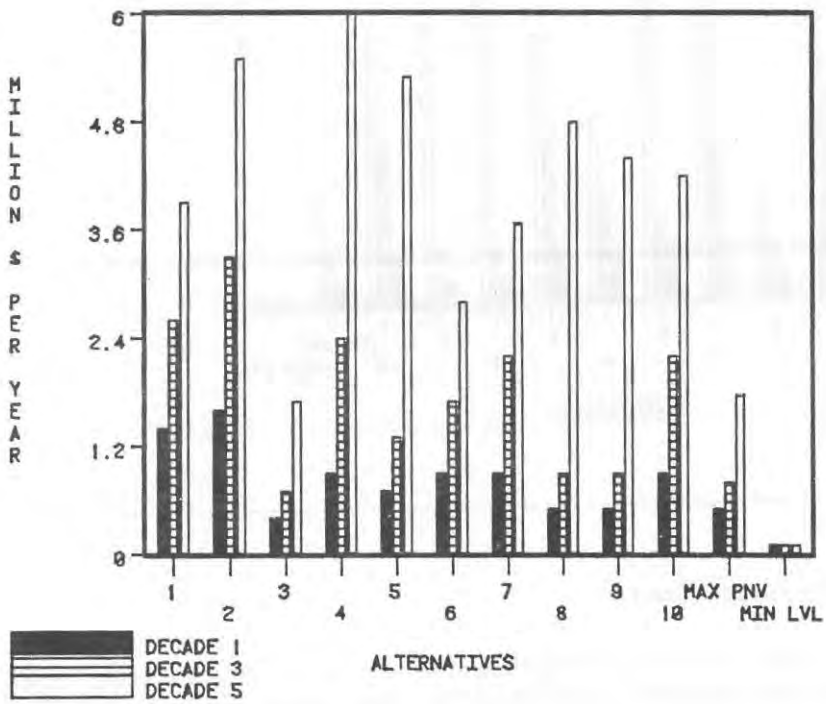
c. Returns to the U.S. Treasury

The returns to the U.S. Treasury are significant because of the contribution to the U.S. Treasury and because 25 percent of the returns are paid back to local governments (Figure II-34). The returns result from the sale of timber, livestock grazing fees, campground fees, mineral leases, and special use fees. Returns include cash payments and credit for roads built by timber purchasers. Receipts from mineral leases and special uses are estimated to be $115,000 per year in all alternatives. The estimates for timber receipts are significantly dependent upon projected real stumpage price increases which are based upon the assumption of future increased demand.

Figure II-34 displays the returns for decades 1, 3, and 5. The returns for decades 1, 3, 5, 10, and 15 are displayed in Table II-29 (end of chapter).

Returns are projected to increase over time in all alternatives because of the real stumpage price increase through the fifth decade and because the timber outputs increase in all alternatives. The differences in returns among alternatives in the same decade are due to differences in the value and volume of timber harvested. The value reflects the species mix, tree size, and logging systems.

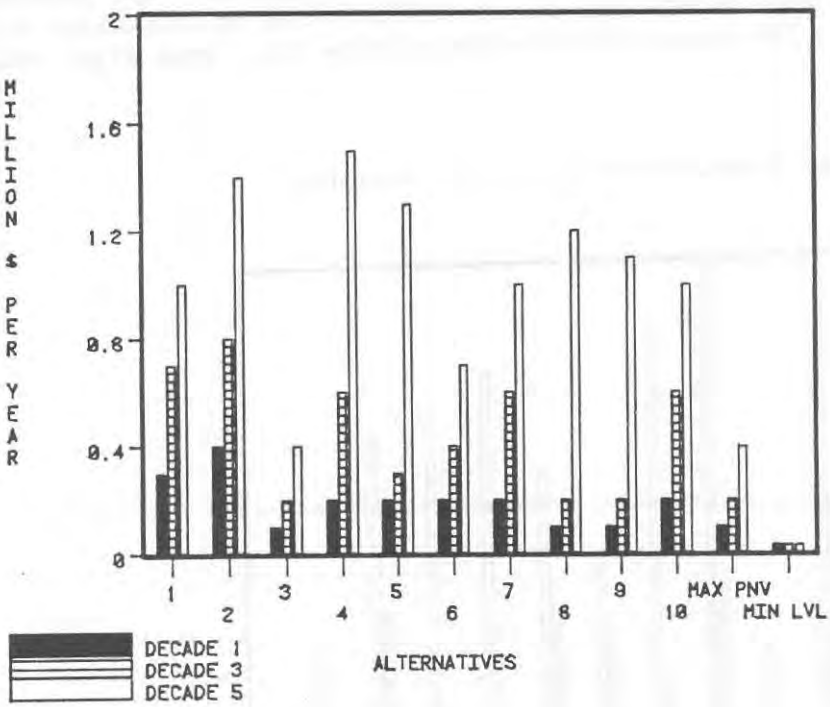
Figure II-34: Average Annual Returns to U.S. Treasury



d. Returns to States

Twenty-five percent of National Forest revenues are returned to the States in which the National Forest lies. These distributions are further appropriated to the various counties which contain National Forest lands. Counties which have major portions of the Gallatin Forest include Madison, Gallatin, Park and Sweetwater counties of Montana. Like returns to the U.S. Treasury, the projected returns to the counties are dependent on real stumpage price increases as well as the volume and quality of timber harvest. Figure II-35 displays the returns for decades 1, 3, and 5. The returns for decades 1, 3, 5, 10, and 15 are displayed in Table II-29 (end of chapter). Returns are projected to increase through the fifth decade in all alternatives because of the real stumpage price and timber harvest increases. The differences in returns among alternatives in the same decade are due to differences in the quality and quantity of timber harvested.

Figure II-35: Average Annual Returns to State of Montana



e. Discounted Costs

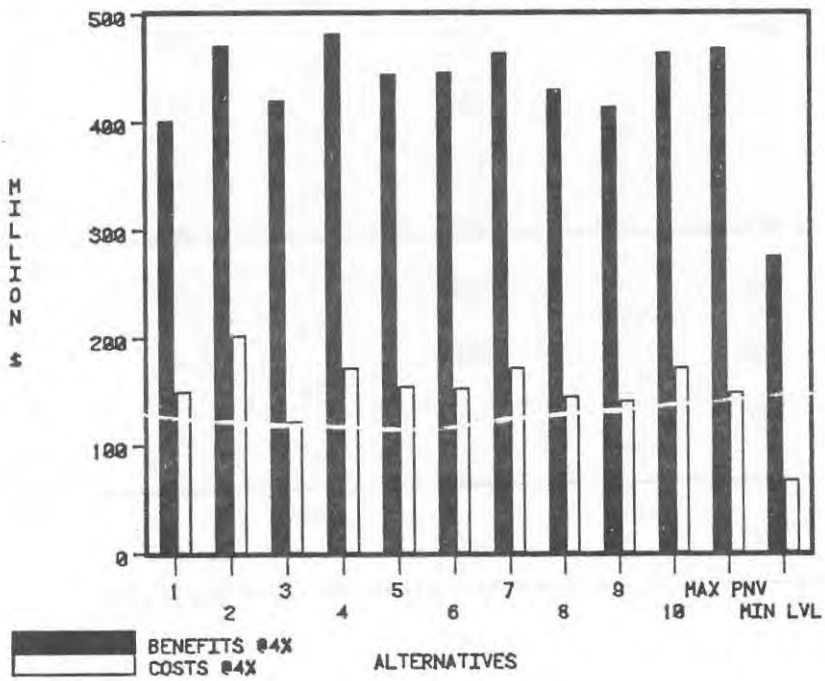
One measure of the cost of an alternative is the discounted cost which represents the equivalent payment required by the government to implement an alternative. The discounted cost is the sum of purchaser road credits, K-V funds, emergency fire control funds, and general appropriations for the 150-year period discounted at 4 percent. Table II-29 (end of chapter) displays the discounted costs by major cost category by alternative. The minimum cost for

federal ownership of the Forest is defined by the Minimum Level Benchmark as $67 million. The discounted costs of the alternatives range from $122 million for Alternative 3 to $202 million for Alternative 2. In general, the direct costs of the alternatives increase over the minimum level with the size of the timber program and recreation programs.

From 33-55 percent of the discounted costs in all alternatives is for activities not directly tied to land prescriptions and resource outputs: protecting existing investments, fire control, general administration, and road maintenance. These costs total $67 million for all alternatives. Timber management and road construction costs are proportional to the first decade timber objectives. These costs account for 42 to 49 percent of the total cost, and range from $51 million for Alternative 3 to $99 million for Alternative 2. Recreation and wilderness management costs contribute 12 to 13 percent of the costs and range from $16 million for Alternative 3 to $24 million for Alternative 2. Finally, range management contributes about 4 percent of the costs and is between $4 million and $8 million for the alternatives.

Discounted costs generally increase as the emphasis shifts from nonmarket to market resource management because the alternatives with nonmarket objectives have smaller timber and road construction programs. Alternative 3, a low development option, has the least cost while Alternative 2, the highest development alternative, has the greatest total cost. Figure II-36 shows the present value costs and benfits discounted at four percent.

Figure II-36: Present Value Benefits and Present Value Costs



f. Discounted Benefits

One measure of the value of an alternative is the discounted benefit which represents the equivalent payment to the Government if an alternative were implemented. Discounted benefits are the sum of market and assigned values for timber sales, range permits, recreation, and mineral leases for 150 years discounted to the present at 4 percent. Table II-25 displays the discounted benefits by major resource category by alternative. The value incidental to management activities is defined by the Minimum Level Benchmark at $275 million of which $272 million is from recreation use and the balance from special uses including mineral leases. The benefit values range from $386 million for Alternative 1 to $462 million for Alternative 4. In general, the benefit value increases with the size of the timber program and increasing opportunities for roaded-dispersed and developed recreation.

Table II-25: Present Net Value and Discounted Benefits and Costs

Alternative/ Benchmark	PNV	Change	Discounted Benefits	Change	Discounted Costs	Change
MAX PNV	309		436		127	
		-17		-23		-5
Alt. 3	292		413		122	
		-3		+49		+50
Alt. 4	289		462		172	
		-11		-31		-19
Alt. 6	278		431		153	
		-2		+14		+15
Alt. 7	276		445		168	
		-4		-18		-13
Alt. 5	272		427		155	
		0		+17		+17
Alt. 10	272		444		172	
		-2		-29		-27
Alt. 8	270		415		145	
		-11		-15		-4
Alt. 9	259		400		141	
		-10		+51		+61
Alt. 2	249		451		202	
		-13		-65		-52
Alt. 1	236		386		150	

The objectives for market and nonmarket resource depend upon the goal of the alternative. Market values (timber, livestock grazing, developed recreation, and minerals) contribute between 20 and 30 percent of total dollar value for the The objectives for market and nonmarket resource depend upon the goal of the alternative. Market values (timber, livestock grazing, developed recreation, and minerals) contribute between 20 and 30 percent of total dollar value for the alternatives whereas nonmarket resources (dispersed and wilderness recreation) contribute between 70 and 80 percent of total value. Market values primarily depend upon the amount and quality of timber sold. Nonmarket values are sensitive to the amount of dispersed recreation expected under each management program.

g. Present Net Value

The primary measure of economic efficiency is present net value (PNV) which is the sum of all market and assigned values for timber sales, livestock grazing permits, recreation use, and mineral leases less all management costs for 150 years discounted to the present at 4 percent. Because PNV reflects both the benefits produced and the costs required, it measures net monetary value to the Government under each alternative. The maximum PNV of the Forest is defined by the Max PNV Benchmark as $309 million which results from a high level of dispersed and developed recreation along with a relatively small amount of timber harvest beyond decade 3. This benchmark emphasizes those activities that are represented by monetary values.

The variation in PNV between alternatives is due to both differences in discounted cost and the variation in expected benefits. Those alternatives that depict a wide mix of cost efficient market and nonmarket outputs generally have the highest PNV. To a lesser extent, changes in PNV are due to holding off harvest of many suitable timberlands until the fourth decade when the standing volume is of significantly higher value than in earlier decades. See Figure II-37 for a comparison of present net values of all alternatives.

Table II-24 shows discounted benefits and costs by resource group. This table shows that recreation values make up the majority of the PNV on the Gallatin National Forest. Much of the change in PNV among alternatives, however, is due to changes in the management of the timber resource. In some alternatives, the benefits associated with the recreation resource assume a major role in determination of PNV. The range resource plays still less important a role. Discounted timber costs for the planning horizon are in excess of the discounted timber benefits.

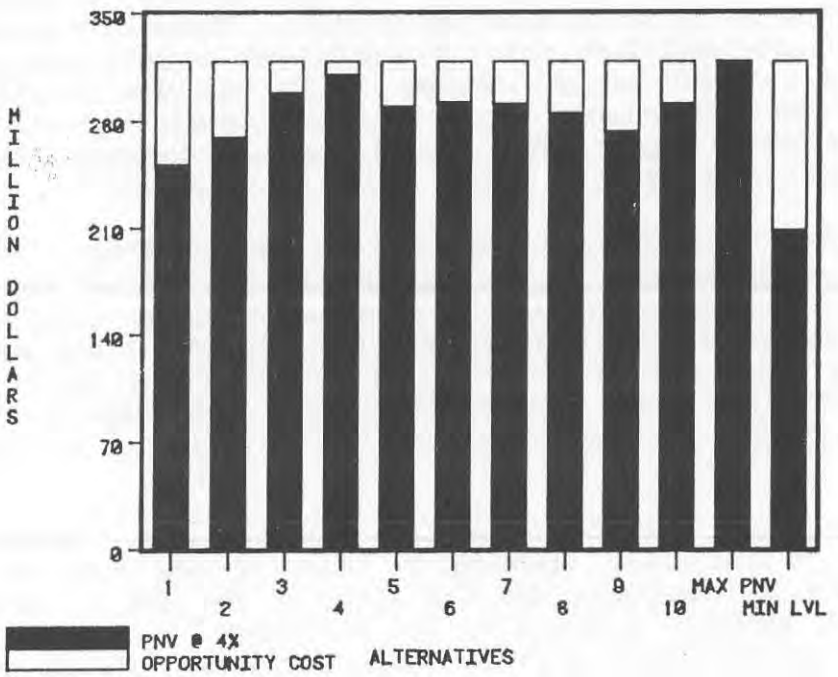
This indicates that there will be below cost timber sales. Timber sales, whether below cost or not, were assessed in terms of how they fit into a comprehensive program of management for the Forest. The mix of outputs and associated costs and benefits produced by the different alternatives are the result of selecting prescriptions which most efficiently meet the objectives of an alternative. Cost efficiency was considered at several points; in the development of the prescriptions, and in the selections made within FORPLAN from an array of prescriptions available for assignment to an area (see Appendix B, Sections II and IV for more detailed discussions). In spite of alternative and prescription cost efficiency objectives, negative returns occur for many of the alternatives in decade 1. Below cost sales will occur, particularly in the

first decade of implementation. By decade 5, projected receipts do exceed costs. A recent research study indiciates that efficient management and below-cost sales are not necessarily incompatible and that analysis of timber management economics needs to have a broader temporal and spacial perspective than the individual timber sale (Schuster and Jones, 1985).

It is the Forest's intent to avoid below-cost sales whenever feasible. Receipts, net receipts, discounted costs, and discounted benefits may serve as indicators of potential below-cost sale situations. Tables II-25 and II-26 display discounted costs and benefits for additional economic information on receipts, costs, and benefits.

In implementing any alternative, further project level analysis will be required prior to project activities. Regional Office direction requires that as part of the project level analysis, a feasibility analysis of each timber sale over one million board feet will be made to assure it has been designed with the most cost effective measures possible in keeping with environmental concerns. This feasibility analysis will examine strategic items in the sale design process to assure consideratin of economic impacts of these items on the sale value. In addition, a cash flow analysis of the sale will be done using current market conditions. These and other requirements of this analysis have been added to the Forest Plan.

Figure II-37: Comparison of Present Net Values and PNV Foregone



h. Receipts and Non-Cash Benefits

The portion of the economic benefits which are actual returns to the U.S. Treasury are called receipts. Receipts are projected to increase in all alternatives due to increases in real stumpage price through the fifth decade and the projected timber harvest level in some alternatives. In all alternatives each decade's net receipts increase more rapidly than costs. Net receipts are defined as receipts minus total Forest Service costs.

Non-cash benefits are the difference between the potential cash values of resources (market and non-market priced benefits) and the fees actually paid by users of those resources (receipts). They are benefits to individual users who are charged no fees or who are charged fees that are less than full economic values. Non-cash benefits are relatively constant across alternatives for any given time period; however, they do vary by alternative as a percentage of total benefits. In general, the proportion of economic benefits for which charges are not made increases as the level of timber harvest decreases and other resource goals are emphasized. Receipts, costs, and non-cash benefits are displayed in Table II-26.

Table II-26: Estimated Decade 1 Average Annual Receipts and Noncash Benefits with Projections for Decade 5. (Millions of Dollars)

	Decade 1				Decade 2			
Alter-native/ Benchmark	Net Receipts	Total FS Costs	Receipts	Non-Cash Benefits to Users	Net Receipts	Total FS Costs	Receipts	Non-Cash Benefits to Users
MAX PNV	-4.4	4.9	.5	12.5	-3.4	5.1	1.7	20.5
Alt. 3	-4.4	4.8	.4	11.9	-3.1	4.8	1.7	18.6
Alt. 4	-5.4	6.3	.9	12.6	-1.2	7.3	6.1	18.7
Alt. 6	-5.1	6.0	.9	11.9	-3.0	5.8	2.8	18.2
Alt. 7	-5.5	6.4	.9	12.1	-2.4	6.8	4.4	18.9
Alt. 5	-5.3	6.0	.7	12.2	-1.1	6.4	5.3	18.5
Alt. 10	-5.5	6.4	.9	12.2	-2.7	6.9	4.2	18.8
Alt. 8	-5.2	5.7	.5	12.0	-1.3	6.1	4.8	18.0
Alt. 9	-5.1	5.6	.5	11.3	-1.5	5.9	4.4	18.0
Alt. 2	-6.1	7.7	1.6	12.0	-2.3	7.8	5.5	17.3
Alt. 1	-4.4	5.8	1.4	11.0	-2.0	5.9	3.9	14.8

16. Summary of Net Public Benefits

The goal of Forest planning is maximization of net public benefits. 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) of producing priced and nonpriced outputs from Gallatin Forest lands. Thus, net public benefit represents the sum of nonpriced outputs plus the net value of priced outputs.

The 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 considered in this analysis are recreation quality and diversity, free or low cost goods, access within the forest, visual quality, threatened and endangered species, water quality, minerals including oil and gas, resource protection, amount of change and local lifestyles.

This section summarizes nonpriced benefits of the alternatives; the major indicators of these benefits are displayed by alternative in Table II-27.

a. Recreation Quality and Diversity

In all alternatives, quality as measured by the ability to disperse users, minimize conflicts, or provide a spatial distribution of diverse recreation settings, will decrease after 2 or 3 decades because more people will be using the Forest. Alternatives such as 3, 7, or 8 which provide for more trails and trailhead construction will be able to disperse users the best. Alternative 3, 6, 8 and 9, which have the greatest amount of undeveloped land, would provide the greatest opportunity for primitive type recreation. All alternatives would be capable of minimizing conflicts between different users by applying control and restriction. However, as more control and restriction becomes necessary, recreation quality may decrease.

b. Wilderness and Roadless

The value of maintaining more than a primitive recreation setting on the Forest is important. The qualities of natural integrity, natural appearance, and opportunities for solitude are important. Wilderness advocates have brought out several nonpriced benefits of these naturally-functioning systems; clean air and water, unblemished landscapes, free-roaming wildlife populations, spiritual fulfillment and a sense of freedom and dignity in an increasingly crowded and regimented world. Other nonpriced benefits include the natural gene pool and scientific values attached to wilderness.

c. Free or Low Cost Goods

The availability of firewood, poles, game meat, and fish is as dependent on the user's access to the National Forest as on the amount of these goods. Alternatives 1,2, 7 and 10 would provide for the most firewood and poles because of higher timber harvest volumes and more road construction. The dead timber from the mountain pine beetle epidemic would be more available to people in these alternatives because more roads are constructed. Alternatives 3, 6, 8 and

Table II-27: Present Net Value and Nonpriced Benefits by Alternative

	Unit of Measure	MAX PNV	1	2	3	4	5	6	7	8	9	10	MIN LVL
			Alternative										
Present net value	MM$	309	236	249	292	289	272	278	276	270	259	272	208
Nonpriced benefit													
Roadless Management	M acres	563	467	488	570	469	332	615	512	229	136	501	638
Wilderness management	M acres	716	741	716	780	763	968	716	738	1096	1204	716	716
Elk habitat potential in 50 years (NF lands only)	M elk	4.6	5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	6.4
Diversity-	Percent												
Seedlings	in 100 years	22	9	12	3	11	10	9	13	10	9	14	0
Poletimber		11	20	34	8	26	21	16	26	19	17	25	0
Sawtimber		2	24	33	4	20	16	16	23	14	13	23	9
Old growth		65	47	21	84	43	53	59	38	57	61	38	91
Stream fish habitat in 50 years	M catchable trout	494	493	491	514	491	516	516	509	516	517	514	523
Hunting quality index in 50 years	Percent		69	65	74	68	70	70	71	72	73	71	
Water yield increase in 50 years	M acre ft.	4	15	20	4	14	9	11	13	7	7	13	0
Sediment increase above base in 50 years	M tons	5	6	7	1	6	2	2	3	2	1	3	0
Available firewood per year Decade 1	M cords	1.8	10.8	14.3	1.7	4.5	3.5	3.9	7.4	1.4	1.4	7.4	1.4
Total trail system	Miles	2198	1454	2007	2318	2079	2342	2222	2104	2321	2388	2104	1300
Total road system	Miles	1811	2416	3041	1214	2259	1794	1711	2079	1601	1535	2247	807
Local employment in first decade	Average annual change in jobs from base	7	3	263	-256	-2	60	-59	162	-4	-76	182	-494

9, which have less road construction and access fewer new areas, would provide lesser amounts of firewood and poles.

Game meat would be more available in those alternatives which produce the largest big game numbers like Alternatives 3, 4, 6, 8 and 9. Alternative 4 would also produce more access to the animals because of road construction.

The measurement of hunting quality that was used in the analysis, the hunting quality index, should change only a slight amount between alternatives. Other qualitative factors of a hunting experience, such as bringing home game meat, or not having to spend several days getting a deer or elk, are benefits to some which might be provided by Alternatives 2, 4, 7, or 10.

d. Access Within the Forest

Even though access to the Forest boundary does not change much between alternatives, access to different parts of the Forest does. Also changing is the type of access - road or trail. The types of recreation uses that can take place often depend upon the type of access people have into areas. It is sometimes a matter of being able to drive into an area or else hike or ride a horse. Again, those alternative which provide for the most road construction would most change the access into unroaded parts of the Forest. For some people this is not a benefit, but for some it is. Alternatives 1, 2, 4, 5, 7, and 10 would best provide this benefit.

e. Visual Quality

Visual quality is considered a nonpriced benefit that has significant value to local people. Alternative 9 would have the highest visual quality objectives, followed by Alternatives 3 and 8. Alternatives 2 and 4 would have the lowest visual quality objectives and Alternatives 1, 5, 6, 7, and 10 would be intermediate.

f. Threatened and Endangered Species

Refer to Table II-29, to compare how the alternatives provide different amounts of grizzly bear emphasis and potential population capacity. Alternatives 7 and 10 provide the most emphasis and capacity and Alternatives 1, 2, and 5 provide the least.

g. Water Quality

Water quality does not have a price tied to it. The value of it to people must be measured in its maintenance. Figure II-22, portrays the increases in sedimentation above present levels by the different alternatives. Alternatives 3 and 9 would have the least increase and Alternative 2 the most.

h. Minerals, Oil and Gas

Those alternatives which have the lease restrictive land assignments for road construction and surface occupancy and those that would construct the most miles of road in the Forest which could be used for exploration and development have the highest benefits for minerals, oil and gas.

Alternative 2 would be most available followed by Alternative 1. Alternatives 4 and 5 would have slightly less land available for exploration and development. Alternatives 7 and 10 are intermediate and Alternatives 3, 6, 8 and 9 would be most restrictive.

i. Protection

Protection of the Forest resources from insects, disease, and fire over the long term can best be achieved by having an even distribution of timber age classes. This pattern of ages would be different than exists today, mostly in lodgepole pine, where there are larger stands of mature or over-mature trees which are susceptible to insect attack and fires. Alternatives which harvest the largest volume of timber on the largest land base would achieve the greatest degree of protection. Alternative 2 harvests the most volume on the largest land base. Alternative 1 harvests the next most volume but on a small land base. Alternatives 4, 7, and 10 harvest very similar volumes, but 7 and 10 have larger timber land bases than 4. Alternatives 5 and 6 have harvest volumes less than for 7 and 10 but greater than for Alternative 3. Alternative 3 would accomplish the protection benefit least well. It has the lowest harvest volume and least suitable timber land base.

See Table II-29 for an illustration of the harvest volumes and suitable timber land base.

j. Amount of Change

Alternatives are compared for overall amount of change from the current situation. Earlier in this chapter, changes were identified that are needed to correct existing problems or to react to new and changing situations. No change is generally not possible or even desirable, given the dynamics of forest resources and forest management. However, there is value for some people to minimize change (e.g., if larger mills were to close, the local ranchers would no longer have an opportunity to sell their timber).

All alternatives except Alternative 1 change the status of wilderness study areas and make recommendations for their allocation. Alternatives 1 and 6 would probably change the Forest least in the short-term. Alternative 7 would also change the Forest little from the current direction. Alternatives 2, 3, 8 and 9 would represent the largest changes in forest management objectives. Alternative 2 would increase emphasis on the production of timber; the development of minerals, oil and gas; and on livestock grazing. Alternative 3 would decrease emphasis on these resources and increase emphasis on recreation and wildlife management. Because of the large Wilderness recommendations in Alternatives 8 and 9 they too would represent a large degree of change. Alternative 4 would change current direction very little for the first 1 or 2 decades. After that, it would begin to increase timber and range outputs. The other alternatives cause more moderate degrees of change.

k. Local Lifestyles and Values

Goods and services available from the different alternatives that benefit local lifestyles have already been compared throughout this chapter as either priced or nonpriced benefits. Access to the Forest and the availability of differing

types of uses that people make of the Forest could have some small effect on lifestyles. Changes in employment and income that come from National Forest goods and services could cause some major changes in the lifestyles of groups of people employed in the timber, recreation and tourism, or livestock industries.

1. Employment

Local employment dependent upon the Gallatin National Forest resources currently totals aobut 2,500 jobs per year. Average first decade employment ranges from 2,000 jobs in the Minimum Management Benchmark to 2,800 jobs in the Max Timber Benchmark. Alternatives 2, 7, and 10 increse local employment from 6 percent to 11 percent over current rates. Alternative 5 increases employment slightly.

17. Major Tradeoffs Among the 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 that have structured this Forest Planning process. This additional information describes the tradeoffs that would occur among the net quantified benefits and the non-quantified benefits described in Section 15 and 16. Except for the quantified economic benefits, the adequacy of each alternative's attempt to address issues, concerns, and opportunities is subject to the subjective values individual reviewers attribute to the different resource mixes and degrees of response.

a. National, Regional, and Local Demand Outlook

To provide a framework for assessing responses to issues, concerns, and opportunities and the long term resource demands, the needs of the Nation, Region, and local communities are briefly reviewed in this section.

The Resources Planning Act projects total national demands to rise for all resources provided through management of the National Forests, including timber, forage, outdoor recreation opportunities, experiences associated with wildlife and fish (including hunting and fishing), water supply, and many amenity uses of forest and range lands. There is clearly an expectation of the public that while these resource demands should be met, resource values must be protected. Further, production of resources should not adversely affect opportunities for the public to use other resources.

The markets for commodity resources, such as timber or minerals, are usually regional or national markets though production is accomplished by local people. Some of the mineral resource and the range forage resource supplies through management have regional significance. The timber resource, a commodity with products sent to markets in the midwest and southeast, has significance more in terms of local production than in terms of the national market.

Generally the users of the Gallatin's outdoor recreation opportunities, wilderness, and wildlife and fisheries resources are local people or people from the region surrounding the National Forest. However, a large percentage of users are from around the nation. Use on the Forest, by other than local users, occurs in large part in the summer vacation period and during the fall hunting season when it is not unusual to have hunters from several states as well as

from the rest of Montana. Winter skiing also attracts people from the midwest. While the recreation use is expected to increase over the next fifty years, the capacity of the Forest to provide for that recreational activity is not expected to be exceeded except for big game hunting.

b. Economic Values and Responses to Major Issues, Concerns, and Resource Use or Development 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 tradeoffs between alternatives is required to help the decisionmaker decide which alternative maximizes net public benefits. 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. A comparison of alternative response to major issues is displayed in Table II-28.

Appendix A fully discusses each of the issues, concerns, and opportunities. The eight major issues with the greatest influence on the alternatives and indicators of responsiveness for each include:

1. How shall roadless areas and wilderness study areas be managed?
   - -- acres of wilderness and proposed wilderness
   - -- acres of roadless management

2. How will lands be managed for roaded and nonroaded recreation?
   - -- percent change in motorized, non-motorized and primitive recreation types.
   - -- percent of current roadless acres proposed for roadless and wilderness

3. How will fish and wildlife habitat be managed?
   - -- elk winter range capacity
   - -- percent of old growth on tentatively suitable timberlands
   - -- stream habitat for trout in thousands of catchable fish

4. How will the range resource be managed for livestock grazing?
   - -- thousands of AUMs in decades 1 and 5

5. What should the timber harvest level be?
   - -- volume of timber harvest
   - -- long-term sustained yield
   - -- suitable acres managed for timber production

6. What should be done to protect water quality?
   - -- percent water yield increase
   - -- miles of road construction/reconstruction per year

7. How much public access and how much new road construction will there be?
   - -- miles of road construction/reconstruction per year.

8. In addition, the nation as a whole has an interest in ensuring that the Forest is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced.
   - -- cash receipts
   - -- economic efficiency as measured by present net value
   - -- non-cash benefits to Forest users

c. Major Differences and Similarities of Individual Alternatives

Table II-28 identifies the tradeoffs between monetary goals and the public issues associated with each alternative. The following discussion further explores the relationships within and between each alternative for the financial (quantified) and nonpriced (generally qualitatively defined) components of net public benefits. The alternatives are listed in order of decreasing PNV.

Table II-28: Response of Alternatives to Major Issues and National Concerns

ISSUE INDICATOR	ALTERNATIVE 1	2	3	4	5	6	7	8	9	10
Timber										
Annual Average MMBF										
Decade 1 ASQ	25	31	12	16	11	17	21	12	12	21
Percent change from baseline	+32	+63	-68	-16	-42	-10	0	-58	-58	+10
Suitable timberland (M-Acres)	247	368	85	310	239	229	305	216	199	314
Long Term Sustained Yield (MMBF)	30	43	10	35	30	25	27	25	23	33
Wildlife										
Elk winter range capacity (M elk)	5.6	4.6	6.4	6.4	5.6	6.5	6.1	5.1	6.6	6.1
Percent of old growth on tentatively suitable timberlands in 100 years	47	21	84	43	53	59	38	57	61	38
Stream habitat for trout in thousands of catchable fish										
Decade 1	504	493	517	511	494	511	509	516	516	508
Decade 5	493	491	471	491	516	516	509	516	517	514
Watershed										
Percent water yield increase										
Decade 5	0.7	1.0	0.2	0.7	0.4	0.5	0.6	0.3	0.3	0.6
Decade 10	0.7	0.8	0.2	0.8	0.6	0.5	0.7	0.5	0.5	0.7
Roadless										
Percent of current roadless proposed for:										
Roadless	73	77	85	74	52	96	81	36	21	79
Wilderness	5	0	13	10	52	0	5	78	100	5
Percent of Hyalite-Porcupine-Buffalo Horn MWSA area proposed for:										
Roadless	83	80	39	63	0	100	92	0	0	87
Wilderness	0	0	61	22	100	0	0	100	100	0

Table II-28: Response of Alternatives to Major Issues, (Cont'd)

ISSUE INDICATOR	ALTERNATIVE 1	2	3	4	5	6	7	8	9	10
Recreation										
Developed										
Percent increase above baseline in 50 years	35	35	35	82	82	35	82	71	82	82
Motorized										
Percent increase above baseline in 50 years	41	49	38	48	34	41	34	30	28	34
Non-motorized										
Percent increase above baseline in 50 years	-4	10	41	20	7	31	20	-6	-16	20
Primitive										
Percent increase above baseline in 50 years	263	377	399	380	488	395	426	517	542	426
Range										
Thousands AUMs										
Decade 1	43	45	32	45	45	45	45	45	44	45
Decade 5	45	67	29	60	49	50	45	47	42	50
Minerals (Energy)										
Category A										
Total high potential (%)	31	31	31	31	31	31	31	43	43	31
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category B--										
Total high potential (%)	24	24	24	24	24	35	28	28	28	28
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category C--										
Total high potential (%)	0	0	0	0	0	0	0	0	0	0
Total v. high potential (%)	10	10	37	16	16	18	18	39	9	18
Category D--										
Total high potential (%)	44	44	44	44	44	34	41	29	29	41
Total v. high potential (%)	90	90	61	84	84	82	82	61	91	82

Table II-28: Response of Alternatives to Major Issues, (Cont'd)

ISSUE INDICATOR	ALTERNATIVE 1	2	3	4	5	6	7	8	9	10
Minerals (Non-Energy)										
Category A--										
Total high potential (%)	10	10	10	10	16	10	10	21	47	10
Total v. high potential (%)	22	22	25	22	44	22	22	47	59	25
Category B--										
Total high potential (%)	74	74	84	74	68	79	73	63	37	73
Total v. high potential (%)	16	16	13	16	12	25	19	12	9	19
Category C--										
Total high potential (%)	0	0	0	0	0	0	0	0	0	0
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category D--										
Total high potential (%)	16	16	5	16	11	15	16	16	15	16
Total v. high potential (%)	66	66	63	63	44	53	59	41	31	56
Quantified Costs and Benefits										
Present Net Values MM$	236	249	292	289	272	278	276	270	259	272
Net Returns MM$										
Decade 1	-4.4	-6.1	-4.4	-5.4	-5.3	-5.1	-5.5	-5.2	-5.1	-5.5
Decade 5 (Projected)	-2.0	-2.3	-3.1	-1.2	-1.1	-3.0	-2.4	-1.3	-1.5	-2.7
Non-Cash Benefits MM$										
Decade 1	11.0	12.0	11.9	12.6	12.2	11.9	12.1	12.0	11.3	12.2
Decade 5 (Projected)	14.8	17.3	18.6	18.7	18.5	18.2	18.9	18.0	18.0	18.8
Community Effects Issues										
Total Forest Related Jobs										
Decade 1	2506	2766	2247	2501	2563	2444	2665	2458	2427	2685
Decade 5 (Projected)	2745	3089	2626	2897	2954	2784	3079	2846	2809	3099
Total Forest Related Income MM$										
Decade 1	37	42	31	36	36	35	39	35	34	39
Decade 5 (Projected)	40	46	36	42	41	450	44	39	39	44

1) Maximum PNV Benchmark

The maximum PNV of the Forest, while meeting minimum management requirements, precluding timber management from existing wilderness, and meeting nondeclining timber harvest flow, is $309 million. The major contributing factor of this high PNV is the high recreation values of the Maximum PNV Benchmark. Timber harvest in decades 1 through 3 is low and increases slightly in decade 4 to 8 MMBF per year and remains constant until achieving a long term sustained yield of 10 MMBF. Projected livestock grazing and recreation use are relatively high. Wilderness remains at the current level of 715,700 acres, but roadless lands remain the highest of all alternatives at 637,700 acres. In other words, little roadless lands are entered for timber harvest. Of 64,500 acres of suitable timberlands, all but 3,800 acres are on roaded areas.

2) Alternative 3

This alternative has the lowest discounted cost together with a low level of market commodity production both in the short term and throughout the planning horizon. Additional access and timber stand treatment is very limited under this management regime although there would be extensive areas of undeveloped terrain available for possible increases in demand for backcountry use. This alternative has the largest amount of lands which would either be wilerness or remain unroaded. The PNV is $292 million.

This alternative reduces costs of present management by 20 percent. Investments in timber and range programs would be low. There is a reduction in timber harvest and livestock grazing. The recreation values remain comparatively high, but not as high as Maximum PNV. Few new roads would be constructed which helps to keep the costs down.

Reduced investments for recreation management would cause congestion at existing campgrounds and popular dispersed recreation areas such as lakes or easily accessed scenic areas. Trail construction and maintenance would decline, although these would be large areas of roadless lands that would be available for dispersed recreation.

Within the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area, 64,200 acres of National Forest land would be recommended for wilderness. This area would also encompass 16,100 acres of private lands which the Forest Service would attempt to acquire through land exchanges. Also within the boundary of the proposed wilderness is about 3,700 acres of State of Montana land which is administered by the Montana Department of Fish, Wildlife, and Parks as a wildlife range. This would probably not be acquired.

The capacity to produce elk would increase slightly by reducing livestock grazing on winter ranges. Low levels of development under this alternative would create some indirect benefits for wildlife, such as less disturbance.

The cost of this alternative in terms of foregone value as compared to the Maximum PNV Benchmark is approximately $17 million. This is due largely to increasing timber harvest in the first decade to 12 MMBF which requires having some of the 84,800 acres of suitable timberland in roadless land which therefore requires roading costs.

3) Alternative 4

This alternative portrays the most efficient scheme for accomplishing the 1980 RPA goals with little consideration to other planning issues. The discounted costs are comparably high at $172 million and discounted benefits are the highest of the alternatives at $462 million. Alternative 4 produces a net value of $289 million, the second highest of the ten alternatives. While the timber harvest level in the first decade is a moderate 16 MMBF, the harvest rate increases rapidly to meet RPA targets, capturing expected increases in timber market value in later decades. This alternative also provides a high level of recreational use both in developed and motorized classes. It has the highest recreation value of all alternatives and the second highest discounted timber values. However, it is the high cost of producing market goods in this alternative that decreases the PNV from Alternative 3 and Maximum PNV Benchmark.

Most RPA targets could be met. Increases would be apparent in elk forage, livestock grazing, timber harvest, stream trout, and in other areas. The part of the Hyalite-Porcupine-Buffalo Horn Study Area consisting of solid National ownership (about 22,100 acres) would be recommended for wilderness under this alternative. The Lionhead, Reef, and Republic Mountain roadless areas would also be recommended for wilderness. This alternative would add an additional 47,594 acres to the wilderness system.

The foregone value of this alternative compared to the Maximum PNV is about $20 million. What is gained by this loss of PNV is a higher timber harvest, both in the short term and long term, and the associated values that accompany it. These include employment, returns to the Treasury, and roaded types of recreation. Losses would include visual quality and big game habitat security.

4) Alternative 6

This alternative has a moderate level of outputs and, therefore, moderate costs, benefits, and PNV ($278 million). Development is restricted to currently roaded areas. This decreases the development costs of the alternative but the total PNV is less than Alternative 4 because the discounted values of timber and recreation are less. Timber benefits are less because the lowest levels and the long term sustained yield of this alternative is less than Alternative 4.

In this alternative, most of the present unroaded lands would remain unroaded while roaded lands would be intensively managed. Only 22,000 acres of unroaded lands would be included in the suitable timber base. No new wilderness would be created. Timber production, livestock grazing, and motorized recreation use would be concentrated within the roaded areas. Timber harvest would decrease slightly from present levels while livestock grazing would increase due to improved pasture management. Channel erosion and siltation of streams would exceed acceptable levels in some drainages as a result of intensive timber harvest on a small timber base.

Elk numbers would increase over present levels, due partly to habitat improvement projects carried out on roaded lands. Generally, access to nonroaded lands for recreation would be limited to the Forest's trail system. No new developed recreation sites would be built and existing sites would continue to deteriorate.

The $31 million value foregone of this alternative is due largely to the intensive management of timber and greater timber costs in relation to the eventual long term yield. Costs to non-priced benefits are risk to water quality in some heavily harvested areas and less access to the Forest for recreation. Benefits are a retention of most of the currently unroaded lands in a nonroaded condition.

5) Alternative 7

This alternative emphasizes the achievement of a broad range of issues and concerns. Balancing the wide array of resource issues creates a need for moderately high discounted costs and further produces relatively high discounted benefits and a moderate PNV ($276 million). This alternative has a lower PNV than Alternative 6 because of increased costs for timber development and recreation.

This alternative was chosen as the Preferred Alternative and is the basis for the Forest Plan. Alternative 7 proposes somewhat more livestock grazing than at present and timber harvest at present levels. These activities will be carefully managed to assure high water quality, good elk/deer winter range conditions, and a broad diversity of recreation opportunities. Alternative 7 would be the most favorable for grizzly bear recovery. Roads constructed into stands of bug-killed timber would provide good opportunities for firewood gathering.

In this alternative 21,460 acres of the Lionhead and 480 acres of the Republic Mountain roadless areas would be recommended as wilderness. In the Hyalite-Porcupine-Buffalo Horn Study Area, 23,102 acres of National Forest ownership would be managed as a recreational and scenic area and 33,260 acres would be given special management emphasis for wildlife. A total of 512,000 acres excluding wilderness would be managed as roadless.

A value foregone of $33 million in this alternative compared to the Max PNV Benchmark is a result of achieving vegetative diversity over a larger area by creating a suitable timber base that is larger than necessary to sustain the first decade harvest level. It is also a result of providing greater mitigation for water quality and wildlife, especially elk and grizzly bear. These increase the costs of management, the discounted costs of timber and range.

6) Alternative 5

A significant amount of additional wilderness is proposed in this alternative. This does not appear to effect discounted costs to a great degree. Instead, this alternative has moderate levels of most outputs, requiring moderate levels of expenditure and, therefore, moderate costs, benefits, and PNV ($272 million).

This alternative was designed to manage the Forest with an emphasis on economic efficiency. However, the long term timber values and long term recreation values are slightly lower than for Alternative 7, therefore reducing the PNV. Management policies would attempt to achieve a high degree of economic efficiency by the mix of goods and activities. However, the mix has not produced one of the higher PNV's because of lower timber and recreation outputs in the midle decades of the planning horizon.

Timber management would take place on 239,300 acres of suitable timberland, about a 4 percent decrease over the present timber base. The annual timber harvest over the next 10 years would be about one-half the present with increases in future decades.

Livestock grazing would not change much in the next 10 years. Elk habitat capacity on the Forest would remain constant. All of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area would be recommended for wilderness. This would close motorized recreation in the the area. The Crazy Mountains, Lionhead, Reef, and Republic Mountain roadless areas, along with a portion of the North Absaroka roadless area, would be recommended for wilderness. This alternative would include an additional 252,600 acres within the wilderness system on the Gallatin. Approximately 82,200 acres of this area is private land and 6,600 is State of Montana and City of Bozeman ownership. The resource outputs identified for this alternative are based on the assumption that the National Forest lands outside of the proposed wilderness additions would remain National Forest and not be exchanged for the acres of private lands inside the proposed wildernesses.

7) Alternative 10

This alternative is a harvest flow departure version of Alternative 7. There is little economic difference in terms of discounted costs or discounted benefits. This analysis demonstrates that PNV is not sensitive to a nondeclining yield constraint with the overall management design of Alternative 7. The PNV is $272 million. The reason this alternative has a lower PNV than Alternative 7 is because it now has a higher cost than Alternative 7.

This alternative is similar to Alternative 7 in most respects except that it exceeds the level of nondeclining timber flow, increasing timber harvest above the levels of Alternative 7. The departure situation starts about 70 years into the future and projects beyond.

8) Alternative 8

Wilderness is emphasized in this alternative to include an additional 380 thousand acres in the Wilderness Preservation System. Other resources are to be managed at economically efficient levels. Discounted costs required to implement this alternative are at the lower end of the spectrum at $145 million with discounted benefits also lower than most alternatives at $415 million. Net discounted value is in the moderate range accounting for low development expenditures and little increase in benefits derived from additional access. Like Alternative 5 this alternative suggests that economic efficiency is not highly sensitive to wilderness assignments at low to moderate levels of market commodity production. The PNV of this alternative is $270 million.

This alternative recommends 78 percent of the presently unroaded lands outside of existing wilderness as wilderness. A high degree of economic efficiency would be practiced on the remainder of the Forest.

The following roadless lands would be recommended for wilderness: the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area plus adjacent roadless lands; Chico; Reef; Republic Mountain; Crazy Mountains; Bridger Mountains;

Lionhead; Dry Canyon; and a major portion of the Northern Absaroka roadless areas. This alternative would provide an additional 380,300 acres within the wilderness system on the Gallatin National Forest. About 86,900 acres of this area is private land and 6,600 acres is owned by the State of Montana and City of Bozeman.

Primitive recreation opportunities would be enhanced due to the increased amount of wilderness. Off-road motorized recreation such as snowmobiling and trailbiking would be curtailed in the wilderness areas.

Elk winter range, if not exchanged to private owners, would be managed to increase capacity with a decrease in livestock grazing.

Timber harvest would be about one-half of the present situation and would adversely impact the area's timber industry. Opportunities to gather firewood would be greatly reduced.

9) **Alternative 9**

Like Alternative 8 this alternative also emphasizes additional wilderness designation with other resources being guided by efficiency. Wilderness Preservation System additions amount to 488,000 acres. Discounted costs for this alternative are $141 million (lower than Alternative 8) and discounted benefits $400 million (also lower than Alternative 8). The PNV is $259 million, lower than most alternatives indicating that even at these low levels of commodity resource production the PNV is markedly affected by the specific proposals for wilderness. This reduced PNV is due mostly to the low benefits from timber and recreation.

This alternative recommends that all of the existing roadless area of the Forest become wilderness. A high degree of economic efficiency would be practiced on the remainder of the Forest. This alternative would provide an additional 589,600 acres within the wilderness system. This increase includes 94,500 acres of private lands and 6,600 acres of State of Montana and City of Bozeman ownership.

The following comments assume that National Forest lands outside of the proposed wilderness additions would remain National Forest and not be exchanged for private lands inside the proposed wildernesses.

Primitive recreation opportunities would increase due to the large amount of wilderness. Off-road motorized recreation such as snowmobiling and trailbiking would be curtailed in the wilderness areas.

Elk winter range, if not exchanged to private owners, would be managed to increase capacity with a decrease in livestock grazing.

Timber harvest would be about one-half of the present level and would adversely impact the timber industry of the area. Opportunities to gather firewood would be greatly reduce.

10) Alternative 2

Alternative 2 is the alternative which provides a relatively high level of market outputs, the highest of the alternatives. Like Alternative 1 this one also depicts a high level of timber production in the first five decades, thus increasing costs for road development and timber activities in the short term. It has the highest discounted costs of all the alternatives at $202 million. In addition, this alternative also has one of the highest levels of discounted benefits at $451 million. The extensive, planned access would facilitate a large amount of developed and dispersed roaded types of recreation. The net effect of the increasing costs is a low PNV of $249 million. These high costs for timber and roading have the greatest effect on lowering this PNV.

This alternative emphasizes production of timber, livestock forage, and minerals. It attains the highest outputs of salable commodities from the Forest of any alternative. Costs would be high with this alternative because of the amount of resource investment and road construction required.

Recreation is not emphasized and big game numbers would decline. This alternative requires the greatest amount of roading. Public access to the Forest would improve under this alternative, but there would be increased sedimentation of streams with a loss to fish habitat. The Hyalite-Porcupine-Buffalo Horn Study Area would be recommended for nonwilderness. No additional wilderness would be established by this alternative.

11) Alternative 1

Alternative 1 emphasizes current production levels with little increase in financing. This alternative has the lowest recreational benefit of all the alternatives, a relatively high level of timber harvest, and a large amount of road development in early decades. Therefore, it has the lowest total PNV of $236 million. Reduced timber and recreation values cause this alternative's PNV to be lower than that of Alternative 2.

This alternative was based on the current management direction for the Forest. The alternative portrays what would happen if current direction were to continue as presently set through law, policy, existing unit plans, and project environmental analysis.

Current trends would continue for recreation, livestock grazing, and wildlife. The timber harvest would increase somewhat. No new developed recreation facilities would be constructed and some deterioration would continue in existing facilities. The Lionhead, Reef, and Republic Mountain roadless areas would be recommended for wilderness. This would add 25,500 acres ofthe Gallatin National Forest to the existing 715,674 acres of wilderness.

Table II-29: Resource Assignments and Average Annual Outputs, page 1
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Developed Recreation	M RVD	683												
Decade 1			803	803	803	803	803	803	803	803	803	803	803	803
Decade 3			922	922	922	1245	1132	922	1132	1168	1132	1132	1132	0
Decades 5, 10, 15			922	922	922	1245	1244	922	1244	1168	1244	1244	1244	0
Motorized Recreation	M RVD	700												
Decade 1			705	706	587	673	575	620	600	552	541	600	634	690
Decade 3			886	914	822	900	801	845	810	773	761	810	880	881
Decade 5			1059	1115	1036	1108	1007	1057	1004	973	960	1004	1085	1057
Decade 10			1459	1570	1497	1554	1438	1503	1421	1386	1377	1423	1530	1439
Decade 15			1874	2087	1897	2037	1869	1940	1875	1792	1778	1875	1965	1739
Non-Motorized Recreation	M RVD	400												
Decade 1			364	378	423	393	331	409	392	290	261	392	405	370
Decade 3			450	519	644	557	493	601	555	432	387	555	605	444
Decade 5			448	517	662	562	501	614	560	439	393	560	611	451
Decade 10			416	459	613	499	444	556	499	385	345	500	544	438
Decade 15			447	504	601	527	455	563	526	392	353	526	546	430
Primitive Recreation	M RVD	190												
Decade 1			189	272	288	274	352	285	308	373	391	308	310	186
Decade 3			248	356	377	359	457	374	399	484	508	399	402	244
Decade 5			318	456	483	460	591	479	516	626	657	516	520	313
Decade 10			462	663	702	668	647	696	539	698	743	529	544	455
Decade 15			462	663	702	668	647	696	539	698	743	539	544	455
Wilderness Management	M Acres	715.7	741.1	715.7	779.9	763.3	968.2	715.7	737.6	1096.1	1204.1	739.4	715.7	715.7
Roadless Management	M Acres	637.7												
Decade 1			572.1	596.4	573.5	556.6	370.4	631.4	584.1	257.4	149.3	583.1	637.6	637.7
Decade 15			466.8	488.2	569.6	468.8	331.8	615.3	512.0	229.1	135.5	500.7	633.9	637.7
Trail Construction/ Reconstruction	Miles/Yr	2												
Decade 1			7	12	9	13	15	15	16	15	16	8	13	3
Decade 3			7	12	9	13	15	15	16	15	16	8	13	3
Decade 5			7	12	9	13	15	15	16	15	16	8	13	3
Decade 10			5	7	5	8	9	9	9	9	9	5	8	3
Decade 15			5	7	5	8	9	9	9	9	9	5	8	3

Table II-29: Resource Assignments and Average Annual Outputs, page 2
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Total Trail System	Miles	1300	1454	2007	2318	2079	2342	2222	2104	2321	2388	2104	2198	1300
Visual Quality Objectives														
Preservation	M Acres	716	741	716	780	763	968	716	739	1097	1204	739	716	716
Retention	M Acres	31	125	107	188	93	101	238	131	64	60	131	151	235
Partial Retention	M Acres	558	531	386	657	418	337	472	462	214	199	444	672	784
Modification	M Acres	368	289	451	95	395	281	264	342	309	233	360	144	0
Maximum Modification	M Acres	62	49	76	16	67	47	45	61	52	39	61	53	0
Wildlife Habitat Improvement Targets	Acres	720	720	420	403	1500	932	935	600	935	403	950	300	0
Elk Habitat Potential	M Elk	9.8												
Nat. Forest And Private Lands														
Decade 1			9.8	8.7	10.6	10.6	9.8	10.7	10.3	10.8	10.8	10.3	8.8	10.6
Decade 3			9.8	8.7	10.6	10.6	9.8	10.7	10.3	10.8	10.8	10.3	8.8	10.6
Decade 5			9.8	8.7	10.6	10.6	9.8	10.7	10.3	10.8	10.8	10.3	8.8	10.6
Decade 10			9.8	8.7	10.6	10.6	9.8	10.7	10.3	10.8	10.8	10.3	8.8	10.6
Decade 15			9.8	8.7	10.6	10.6	9.8	10.7	10.3	10.8	10.8	10.3	8.8	10.6
Elk Habitat Potential	M Elk	5.6												
National Forest Lands														
Decade 1			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 3			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 5			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 10			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Decade 15			5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	4.6	6.4
Hunting Opportunity Index	5th Dec.	.72	.69	.65	.74	.68	.70	.70	.71	.72	.73	.71		
Grizzly Bear Emphasis	M Acres		454	457	641	536	457	495	818	641	641	754		
Fish Habitat Improvement	Struct	45	40	40	25	50	40	40	20	40	40	40	25	0
Stream Fish Habitat With Improvements	M Fish													
Decade 1			510	499	523	518	499	517	514	521	524	513	519	523
Decade 3			505	483	515	506	519	526	522	527	536	519	526	523
Decade 5			503	502	485	504	527	526	520	527	533	525	501	523
Decade 10			527	527	532	516	527	526	526	527	535	526	507	523
Decade 15			527	524	533	521	504	514	527	522	527	526	517	523

Table II-29: Resource Assignments and Average Annual Outputs, page 3
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Cold Water Fish Habitat Potential	M Fish	1553												
Decade 1			1548	1537	1561	1555	1538	1555	1553	1560	1557	1552	1559	1567
Decade 3			1539	1516	1546	1533	1553	1560	1555	1560	1564	1553	1564	1567
Decade 5			1537	1535	1515	1534	1560	1560	1553	1560	1561	1558	1538	1567
Decade 10			1560	1559	1562	1547	1560	1560	1560	1560	1563	1560	1545	1567
Decade 15			1560	1558	1564	1552	1538	1547	1560	1555	1555	1560	1554	1567
Stream Fish Habitat Without Improvements	M Fish	509												
Decade 1			504	493	517	511	494	511	509	516	516	508	515	523
Decade 3			495	472	502	493	509	516	511	516	520	509	520	523
Decade 5			493	491	471	491	516	516	509	516	517	514	494	523
Decade 10			516	515	518	503	516	516	516	516	519	516	501	523
Decade 15			516	514	520	508	494	503	517	511	511	516	510	523
Livestock Grazing Use	MAUM	43.4												
Decade 1			43.4	44.9	31.8	44.9	44.9	44.9	44.9	44.9	40.0	44.9	59.0	0
Decade 3			43.7	65.1	29.9	57.2	45.6	49.3	45.0	45.0	40.0	50.0	57.0	0
Decade 5			45.7	67.8	28.8	59.7	45.6	49.8	45.0	45.0	40.0	50.0	57.0	0
Decade 10			47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	56.0	0
Decade 15			47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	59.0	0
Allowable Sale Quantity*	MMBF	19.2												
Decade 1			25	31	12	16	11	17	21	12	12	21	6	0
Projected Sale Schedule														
Decade 3			25	35	6	26	11	17	21	8	8	24	6	0
Decade 5			25	35	9	35	30	17	27	27	25	27	8	0
Decade 10			27	39	10	35	30	25	27	27	25	33	8	0
Decade 15			27	39	10	35	30	25	27	27	25	33	8	0
Long-Term Sustained Yield	MMBF	30.6	30	43	10	35	30	25	27	25	23	33	10	0
	MMCF	7.5	7.4	10.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.4	2.6	0
Suitable Timberland	M Acres	394.9	246.7	367.6	84.8	310.2	239.3	228.6	305.0	216.0	198.6	314.0	64.5	0

* Includes noninterchangeable component of dead sawlogs and posts and poles

Table II-29: Resource Assignments and Average Annual Outputs, page 4
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Allowable Sale Quantity	MMCF	4.7												
Decade 1			6.5	8.0	3.1	3.9	3.0	4.1	5.6	3.1	3.1	4.1	1.5	0
Projected Sale Schedule														
Decade 3			6.5	9.0	1.5	6.0	3.0	4.1	5.6	2.0	2.0	5.6	1.5	0
Decade 5			6.5	9.0	2.1	8.7	7.0	4.1	6.9	6.3	5.8	6.6	2.1	0
Decade 10			6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	7.4	2.1	0
Decade 15			6.7	9.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.1	2.1	0
Reforestation	Acres	2041												
Decade 1			3120	3620	695	1370	940	2000	1960	415	456	2160	430	0
Decade 3			3190	4270	730	3080	930	2240	2160	512	527	2277	717	0
Decade 5			2630	3520	940	3590	2460	2090	2190	2192	1995	2355	837	0
Decade 10			2500	3140	660	3130	2320	1980	2160	2157	1973	2092	1372	0
Decade 15			2310	3300	950	2830	1730	2260	1660	1656	1409	2206	1124	0
Timber Stand Improvement	Acres	1680												
Decade 1			4110	4110	114	4110	2990	2986	960	2990	2990	960	1252	0
Decade 3			3063	2242	326	1083	710	736	1345	352	352	1326	430	0
Decade 5			3126	3851	565	2677	898	1184	2245	512	527	2277	717	0
Decade 10			1626	2042	774	2356	1739	2296	3017	1707	1493	2528	1256	0
Decade 15			1483	2025	736	2695	1801	1091	1604	1405	1334	3078	1788	0
Timber Age Class Distribution														
% In 100 Years														
Seedlings		9	9	12	3	11	10	9	13	10	9	14	3	0
Poletimber		5	20	34	8	26	21	16	20	19	17	25	8	0
Sawtimber		38	24	33	4	20	16	16	18	14	13	23	6	9
Old Growth		48	47	21	84	43	53	59	49	57	61	38	82	91
Fuel Treatment, Activity and Natural	Acres	1218												
Decade 1			3063	3625	522	1105	2220	1188	2960	2134	1766	3000	1143	0
Decade 3			3126	4270	565	2807	2250	1429	3160	1637	1213	4807	1307	0
Decade 5			2566	3521	769	3320	3444	1277	3190	3085	2409	4420	3488	0
Decade 10			2496	3174	654	3122	3264	1951	3160	3157	2449	6400	3858	0
Decade 15			2315	3336	784	2548	3103	1454	2660	3013	2214	5623	2545	0

Table II-29: Resource Assignments and Average Annual Outputs, page 5
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Water Yield Increase (Base = 2028)	M Ac.Ft.													
Decade 1			6	6	1	2	2	3	3	1	1	3	1	0
Decade 3			14	16	2	9	5	9	10	3	3	10	3	0
Decade 5			15	20	4	14	9	11	13	7	7	13	4	0
Decade 10			14	17	4	17	12	11	13	11	10	14	4	0
Decade 15			12	15	5	17	12	11	13	11	10	15	5	0
Minerals Management: Non-Energy Minerals														
Category A, Total	M Acres		746	721	785	768	974	721	743	1102	1210	743	721	1210
Low			708	683	743	729	917	682	704	1038	1132	703	682	1167
Medium			29	29	32	30	40	30	30	45	50	30	30	29
High			2	2	2	2	3	2	2	4	9	2	2	2
Very High			7	7	8	7	14	7	7	15	19	8	7	12
Category B, Total	M Acres		229	229	194	229	213	266	326	186	143	326	259	0
Low			207	207	171	207	193	237	302	168	132	302	238	0
Medium			3	3	3	3	3	6	4	2	1	4	3	0
High			14	14	16	14	13	15	14	12	7	14	14	0
Very High			5	5	4	5	4	8	6	4	3	6	4	0
Category C, Total	M Acres		119	119	536	230	236	285	171	101	127	171	319	0
Low			114	114	517	222	228	275	165	97	123	165	308	0
Medium			5	5	19	8	8	10	6	4	4	6	11	0
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
Category D, Total	M Acres		641	666	220	508	313	463	495	346	256	495	437	526
Low			584	609	184	457	279	421	444	312	230	445	389	449
Medium			33	33	15	28	18	23	29	18	13	29	25	40
High			3	3	1	3	2	2	3	3	3	3	3	17
Very High			21	21	20	20	14	17	19	13	10	18	20	20

Table II-29: Resource Assignments and Average Annual Outputs, page 6
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Energy Minerals														
Category A, Total	M Acres		741	716	780	763	968	716	739	1096	1204	739	716	1204
Low			639	614	648	633	801	586	609	905	999	609	614	999
Medium			67	67	97	95	132	95	95	143	157	95	67	157
High			35	35	35	35	35	35	35	48	48	35	35	48
Very High			0	0	0	0	0	0	0	0	0	0	0	0
Category B, Total	M Acres		229	253	194	229	213	266	326	186	143	326	253	0
Low			140	144	110	140	124	144	148	99	69	198	144	0
Medium			62	82	57	62	62	82	96	55	42	96	82	0
High			27	27	27	27	27	40	32	32	32	32	27	0
Very High			0	0	0	0	0	0	0	0	0	0	0	0
Category C, Total	M Acres		124	124	542	235	242	291	176	106	132	176	124	0
Low			40	40	180	78	85	98	20	35	44	20	40	0
Medium			78	78	340	148	148	183	146	49	83	146	78	0
High			0	0	0	0	0	0	0	0	0	0	0	0
Very High			6	6	21	9	9	10	10	22	5	10	6	0
Category D, Total	M Acres		641	642	219	508	312	462	494	347	256	494	642	531
Low			143	144	140	92	0	110	114	76	42	110	144	106
Medium			397	397	135	319	184	268	291	204	191	291	397	309
High			50	50	50	50	50	38	46	32	33	46	50	65
Very High			51	51	34	47	47	46	46	34	51	46	51	51
Total Roads Needed for Management (Decade 1-7)	Miles	800	2416	3041	1214	2259	1794	1711	2079	1601	1535	2247	1811	807
Road Construction-Total	Miles/Yr	20												
Decade 1			21.5	28.7	8.7	16.3	13.2	13.6	21.5	10.3	10.2	19.2	4.7	0
Decade 3			30.7	40.2	8.8	25.7	15.3	15.3	23.8	10.6	10.7	27.0	5.8	0
Decade 5			23.6	29.0	4.0	22.7	11.7	7.5	25.7	9.2	7.8	15.3	6.3	0
Decade 10			10.7	16.9	4.3	19.6	11.4	9.5	16.1	10.1	9.1	12.8	5.7	0
Decade 15			11.7	16.6	3.3	17.2	11.4	7.3	18.1	8.9	8.4	17.7	5.5	0
Collector Road Construction	Miles/Yr	8												
Decade 1			8.7	11.8	6.7	10.9	9.1	9.1	9.9	8.7	8.5	10.4	3.1	0
Decade 2			8.7	11.8	6.7	10.9	9.1	9.1	9.9	8.7	8.5	10.4	3.1	0
Decade 3			8.7	11.8	6.7	10.9	9.1	9.1	9.9	8.7	8.5	10.4	3.1	0
Decade 10			1.2	1.7	.4	1.6	1.2	.6	1.1	1.0	.9	1.1	1.4	0

Table II-29: Resource Assignments and Average Annual Outputs, page 7
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Purchaser Constructed and Optioned Roads	Miles/Yr	12												
Decade 1			12.8	16.9	2.0	5.3	4.1	4.6	8.0	1.6	1.7	8.8	1.6	0
Decade 3			22.0	28.4	2.2	14.7	6.2	6.2	13.9	1.9	2.2	16.6	2.7	0
Decade 5			23.6	29.0	4.0	22.7	11.7	7.5	15.8	9.2	7.8	15.3	3.2	0
Decade 10			9.5	15.2	3.9	18.1	10.2	8.9	15.0	9.1	8.2	11.7	2.6	0
Decade 15			10.5	15.1	3.0	15.7	10.3	6.4	16.9	7.9	7.5	16.7	2.4	0
Local Forest-Related Employment	Jobs	2503												
Decade 1			2506	2766	2247	2501	2563	2444	2665	2458	2427	2685	2574	2009
Decade 2			2745	3089	2626	2897	2954	2784	3079	2846	2809	3099	3003	2292
Local Forest-Related Income	$MM	38												
Decade 1			37	42	31	36	36	35	39	35	34	39	39	27
Decade 2			40	46	36	42	41	40	44	39	39	44	41	30
Total Costs	$M	5800												
Decade 1			5768	7695	4756	6290	6035	6038	6354	5652	5545	6442	4909	2599
Decade 3			5985	8166	4830	6860	5957	5963	6778	5368	5262	6892	5071	2676
Decade 5			5872	7764	4835	7281	6420	5781	6838	6106	5866	6884	5050	2727
Decade 10			5327	7679	5146	7501	6833	6337	7392	6613	6305	7180	5126	2727
Decade 15			5689	8024	5007	7524	6648	6357	6709	6355	6071	6995	5170	2727
Recreation Costs	$M	623												
Decade 1			674	908	599	746	716	729	751	673	664	763	601	379
Decade 3			673	914	612	789	698	709	752	668	758	799	619	390
Decade 5			729	963	659	918	849	755	884	812	787	886	663	398
Decade 10			707	978	696	950	907	832	969	877	844	940	670	398
Decade 15			738	1025	686	982	888	835	892	846	816	941	678	398
Range Costs	$M	197												
Decade 1			223	230	163	230	230	230	230	230	205	230	280	0
Decade 3			224	334	153	294	234	253	257	231	205	257	280	0
Decade 5			230	343	148	306	234	256	256	231	205	257	280	0
Decade 10			230	343	148	306	234	256	256	231	205	257	280	0
Decade 15			230	343	148	306	234	256	257	231	205	257	280	0

Table II-29: Resource Assignments and Average Annual Outputs, page 8
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Timber Costs	$M	1668												
Decade 1			2110	2815	1740	2301	2208	2209	2324	2067	2028	2356	1796	951
Decade 3			2189	2987	1767	2510	2179	2181	2479	1964	1925	2521	1855	979
Decade 5			2148	2840	1769	2663	2349	2115	2501	2234	2146	2518	1847	998
Decade 10			1949	2809	1882	2744	2500	2318	2704	2419	2306	2627	1875	998
Decade 15			2081	2935	1832	2752	2432	2325	2454	2325	2221	2559	1891	998
Other Costs	$M													
Decade 1			2257	3039	2005	2499	2396	2442	2514	2252	2223	2554	2011	1269
Decade 3			2253	3061	2049	2641	2336	2373	2620	2237	2204	2674	2074	1307
Decade 5			2442	3223	2205	3074	2842	2527	2958	2718	2635	2967	2220	1332
Decade 10			2367	3275	2330	3180	3037	2786	3243	2937	2825	3147	2243	1332
Decade 15			2471	3432	2297	3287	2972	2795	2987	2831	2733	3150	2269	1332
Road Costs (PC + CI)	$M													
Decade 1			592	821	266	555	531	471	597	459	451	603	233	0
Decade 3			808	1077	263	731	568	501	768	295	296	771	254	0
Decade 5			497	608	85	491	226	199	367	172	143	395	59	0
Decade 10			95	393	131	466	226	213	318	217	181	304	84	0
Decade 15			242	416	63	277	173	209	164	174	135	118	76	0
Purchaser Credit Rd Costs	$M	210												
Decade 1			87	118	16	42	47	44	63	29	27	65	12	0
Decade 3			162	208	15	104	58	55	129	26	27	129	12	0
Decade 5			174	213	30	172	79	70	138	60	50	138	21	0
Decade 10			20	120	42	145	70	68	98	69	57	94	26	0
Decade 15			73	128	18	81	50	64	45	52	39	30	24	0
Cap Inv Rd	$M	500												
Decade 1			505	703	250	513	485	427	534	430	424	538	221	0
Decade 3			646	870	248	627	510	446	640	269	269	642	242	0
Decade 5			323	395	55	319	147	129	238	112	93	257	39	0
Decade 10			74	274	89	321	156	145	220	149	124	210	58	0
Decade 15			169	288	45	196	122	145	119	122	96	88	52	0
Total Capital Invest costs	$M	1940												
Decade 1			1941	2527	1035	1777	1657	1629	1827	1498	1482	1857	997	384
Decade 3			2131	1784	1051	2071	1532	1541	2023	1164	1149	2086	1098	384
Decade 5			1867	2433	918	2106	1468	1297	1835	1344	1262	1900	943	384
Decade 10			1159	1862	1078	1942	1666	1351	1816	1671	1532	1698	926	384
Decade 15			1400	2030	907	1825	1450	1289	1486	1362	1266	1576	920	384

Table II-29: Resource Assignments and Average Annual Outputs, page 9
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Operations & Maint Costs	$M													
Decade 1			3828	5167	3722	4512	4378	4409	4526	4154	4063	4585	3911	2216
Decade 3			3855	5382	3779	4790	4424	4421	4754	4204	4114	4806	3972	2293
Decade 5			4005	5332	3917	5175	4952	4484	5003	4762	4604	4985	4107	2344
Decade 10			4168	5817	4068	5559	5168	4986	5576	4943	4774	5483	4200	2344
Decade 15			4289	5994	4100	5699	5199	5067	5223	4993	4805	5419	4250	2344
Returns to US Treasury	$M	804												
Decade 1			1389	1573	432	883	713	897	885	543	535	905	478	115
Decade 3			2618	3341	704	2450	1264	1673	2180	909	902	2231	762	115
Decade 5			3903	5496	1704	6058	5276	2751	4422	4753	4347	4217	1719	115
Decade 10			5390	7159	2033	6531	5543	4706	4044	5127	4621	5299	1407	115
Decade 15			7150	10031	2665	8148	6741	6520	5125	6373	5775	9157	1420	115
Returns to State	$M	201												
Decade 1			347	393	108	221	178	224	221	136	134	226	120	29
Decade 3			655	835	176	612	316	418	545	227	225	558	191	29
Decade 5			976	1374	426	1515	1319	688	1106	1188	1087	1054	430	29
Decade 10			2883	3933	1156	3682	3020	2635	1011	2784	2516	2944	352	29
Decade 15			1788	2508	666	2037	1685	1630	1281	1593	1444	2289	335	29
Special Use Returns	$M	97												
Decade 1			115	115	115	115	115	115	115	115	115	115	115	115
Decade 3			115	115	115	115	115	115	115	115	115	115	115	115
Decade 5			115	115	115	115	115	115	115	115	115	115	115	115
Decade 10			115	115	115	115	115	115	115	115	115	115	115	115
Decade 15			115	115	115	115	115	115	115	115	115	115	115	115
Range Returns	$M	67												
Decade 1			78	81	57	81	81	81	81	81	72	81	98	0
Decade 3			79	117	54	103	82	89	90	81	72	90	98	0
Decade 5			81	120	52	107	82	90	90	81	72	90	98	0
Decade 10			81	120	52	107	82	90	90	81	72	90	98	0
Decade 15			81	120	52	107	82	90	90	81	72	90	98	0
Timber Returns	$M	270												
Decade 1			1196	1377	260	687	517	701	689	348	348	710	265	0
Decade 3			2425	3109	535	2232	1066	1469	1975	713	715	2026	549	0
Decade 5			3707	5261	1537	5836	5079	2547	4217	4557	4160	4012	1506	0
Decade 10			5199	6924	1866	6308	5346	4502	3839	4931	4434	5094	1194	0
Decade 15			6955	9796	2498	7926	6544	6316	4920	6177	5588	8952	1207	0

Table II-29: Resource Assignments and Average Annual Outputs, page 10
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Total Market Benefits	$M													
Decade 1			4137	4332	3089	4110	3472	3656	3644	3771	3256	3665	3312	2524
Decade 3			5725	6615	3703	6631	5016	4824	5967	4764	4610	6018	4584	115
Decade 5			7018	8783	4695	10259	9365	5906	8545	8608	8391	8339	5877	115
Decade 10			11207	10446	5023	10731	9631	7861	8166	8982	8665	9421	5565	115
Decade 15			13323	13818	5655	12349	10829	9675	9247	10228	9819	13279	5578	115
Total Non-Market Benefits	$M													
Decade 1			8338	9272	9515	9347	9063	9442	9426	8717	8525	9413	9716	8305
Decade 3			10484	12335	13681	12797	12674	13239	12931	12141	11826	12849	14145	10345
Decade 5			11698	13976	15589	14497	14718	15079	14730	14230	13973	14668	16249	11658
Decade 10			14024	16777	18615	17226	16032	17933	15670	15683	15642	15582	176168	14105
Decade 15			15791	19049	19831	19187	17618	19491	17432	17138	17081	17413	18910	15031
Costs Discounted @ 4%														
Recreation/Wildlife	$MM		18	24	16	21	19	19	20	18	18	21	16	25
Range	$MM		6	8	4	7	6	6	6	6	5	6	7	0
Timber	$MM		55	74	45	63	57	56	62	53	52	63	46	10
Road	$MM		18	25	6	17	13	12	17	9	9	17	5	0
Other	$MM		59	80	53	69	64	63	68	61	59	70	53	33
Benefits Discounted @ 4%														
Recreation	$MM		321	361	385	387	374	377	379	368	357	378	403	272
Range	$MM		11	14	7	13	11	12	12	11	10	12	13	0

Table II-29: Resource Assignments and Average Annual Outputs, page 11
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Benefits Disc. @ 4% (Cont'd)														
Timber	$MM		54	73	18	58	40	39	51	33	31	52	17	0
Other	$MM		3	3	3	3	3	3	3	3	3	3	3	3
Present Value Benefits 4%	$MM		386	451	413	462	427	431	445	415	400	444	436	275
Present Value Costs 4%	$MM		150	202	122	172	155	153	168	145	141	172	127	67
Present Net Value 4%	$MM		236	249	292	289	272	278	276	270	259	272	309	208
PNV Foregone 4%	$MM		73	60	17	20	37	31	33	39	50	37	0	101
PVB 7 1/8%	$MM		193	227	209	229	212	217	222	207	198	221	220	149
PVC 7 1/8%	$MM		77	103	65	87	80	81	86	75	74	88	68	38
PNV 7 1/8%	$MM		116	124	144	142	132	137	134	132	124	134	152	111
Work Force	WYrEq	200												
Decade 1			227	303	190	250	240	240	252	225	221	255	196	104
Decade 3			233	318	193	270	236	236	266	214	209	271	202	107
Decade 5			228	302	192	284	254	228	268	242	233	270	201	109
Decade 10			212	302	204	294	271	251	292	262	250	283	204	109
Decade 15			225	316	200	298	264	252	267	252	241	279	206	109
Energy Consumption														
Decade 1	Billion		299	310	288	422	337	293	298	345	264	298	280	203
Decade 3	BTU's		352	400	357	426	378	371	403	370	363	403	389	245
Decade 5			385	433	401	477	460	413	458	439	440	458	482	275
Stream Fish Habitat With Improvements														
Decade 1			510	499	523	518	499	517	514	521	524	513	519	523
Decade 3			505	483	515	506	519	526	522	527	536	519	526	523
Decade 5			503	502	485	504	527	526	520	527	533	525	501	523
Decade 10			527	527	532	516	527	526	526	527	535	526	507	523

Table II-29: Resource Assignments and Average Annual Outputs, page 11
- decade 1 is planned, future decades are projected

Resource/Output	Unit of Measure	Base* Level	Alternative/Benchmark 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
Benefits Disc. @ 4% (Cont'd)														
Timber	$MM		54	73	18	58	40	39	51	33	31	52	17	0
Other	$MM		3	3	3	3	3	3	3	3	3	3	3	3
Present Value Benefits 4%	$MM		386	451	413	462	427	431	445	415	400	444	436	275
Present Value Costs 4%	$MM		150	202	122	172	155	153	168	145	141	172	127	67
Present Net Value 4%	$MM		236	249	292	289	272	278	276	270	259	272	309	208
PNV Foregone 4%	$MM		73	60	17	20	37	31	33	39	50	37	0	101
PVB 7 1/8%	$MM		193	227	209	229	212	217	222	207	198	221	220	149
PVC 7 1/8%	$MM		77	103	65	87	80	81	86	75	74	88	68	38
PNV 7 1/8%	$MM		116	124	144	142	132	137	134	132	124	134	152	111
Work Force	WYrEq	200												
Decade 1			227	303	190	250	240	240	252	225	221	255	196	104
Decade 3			233	318	193	270	236	236	266	214	209	271	202	107
Decade 5			228	302	192	284	254	228	268	242	233	270	201	109
Decade 10			212	302	204	294	271	251	292	262	250	283	204	109
Decade 15			225	316	200	298	264	252	267	252	241	279	206	109
Energy Consumption														
Decade 1	Billion		299	310	288	422	337	293	298	345	264	298	280	203
Decade 3	BTU's		352	400	357	426	378	371	403	370	363	403	389	245
Decade 5			385	433	401	477	460	413	458	439	440	458	482	275

Table II-29: Resource Assignments and Average Annual Outputs, page 12
Land Assignments by Management Emphasis for Alternatives (thousand acres)

		Management Emphasis							
Alternative/ Benchmark	Minimum Level	Developed Recreation	Dispersed Roaded Recreation	Dispersed Recreation Wildlife	Dispersed Recreation non-roaded	Big game	Timber	Range	Wilderness
1	563.5	5.4	0	86.8	0	1.7	245.1	91.7	741.2
2	123.1	5.4	107.5	111.7	144.9	0	367.6	159.4	715.7
3	127.0	5.4	120.0	390.8	202.8	16.2	64.2	28.9	779.9
4	98.5	5.4	95.3	169.1	144.1	50.0	260.2	149.4	763.3
5	18.2	5.4	100.7	178.6	135.7	34.5	203.3	90.7	968.2
6	83.8	5.4	111.4	219.6	313.3	46.7	175.4	64.3	715.7
7	131.6	5.4	52.7	286.4	118.2	58.8	210.4	134.7	738.0
8	17.1	5.4	24.3	154.9	76.5	31.8	183.0	146.2	1095.9
9	13.6	5.4	81.7	112.8	45.2	30.2	167.4	74.9	1204.1
10	131.6	5.4	52.7	267.5	118.2	58.8	227.0	134.7	739.0
Max.PNV	96.0	5.4	98.9	410.3	212.5	3.4	61.2	131.9	715.7
Min.Level	1014.3	5.4	0	0	0	0	0	0	715.7

CHAPTER III: AFFECTED ENVIRONMENT

This chapter describes the environment that may be changed by the implementation of Alternative 7 (Preferred Alternative) or other alternatives considered. This description is presented in two sections. Section A describes the physical, biological, and socio-economic setting and Section B describes the Forest's current resource situation. Most of the resource discussion focuses on the nonwilderness portion of the Forest.

Changes Since the Draft EIS

Because of new issues that arose during the public review of the Draft EIS and because of new developments on the Forest in the last year, this chapter on the affected environment has been changed to include:

- a discussion of the Greater Yellowstone Area and its significance to the Gallatin National Forest.

- a discussion of changes in grizzly bear management as a result of the biological opinion of the U.S. Fish and Wildlife Service.

- a discussion of the historic costs and receipts of timber sales.

  a discussion of the timber supply and demand situation in the Gallatin area.

- wild trout has replaced cutthroat trout as an indicator species.

- the current situation of oil and gas leasing on the Gallatin as a result of a recent court decision.

A. Physical, Biological, Social, and Economic Settings

1. General Setting

The Rocky Mountain region, of which the Forest is a part, 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 range from the semiarid and relatively warm valley bottoms through a broad range of cool, moist coniferous forests to the cold, moist subalpine and alpine region. The terrain above timberline is 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.

The Gallatin Valley in and near Bozeman contains the greatest concentration of population and commerce in the Forest's vicinity. Livingston, Gardiner, and the Paradise Valley that links these two communities also include important population and business centers. Big Timber, West Yellowstone, and Cooke City are other communities that rely on the nearby Gallatin National Forest lands for an important part of their employment and economic base. The presence of water supply, arable land, grassy foothills, National Forest land, outdoor recreation opportunities, and scenic beauty contribute toward a complex social and economic structure consisting of irrigated farming, ranching, timber production, and recreation.

The Gallatin National Forest is part of a larger area which has recently begun to be thought of as the "Greater Yellowstone Area". This area centers around Yellowstone National Park and includes six National Forests and two National Wildlife Refuges, plus Grand Teton National Park. All of these have separate administration and the different agencies manage for different objectives. Much of the area contains similar wildlife which has national significance. The grizzly bear, elk, big horn, bald eagle, trumpeter swan, and cutthroat trout, to name a few, are important species.

The Gallatin Forest's proximity to Yellowstone Park, in addition to the Forest's own recreational attractions, help explain high levels of recreational use. The Gallatin Forest has had more recreation use than any other of the 13 Forests in Region 1 in recent years.

2. Physical Setting

a. Topography

The Gallatin Forest consists of 6 mountain ranges and a high-altitude plateau. The rugged peaks and highlands of the Absaroka-Beartooth (A-B) mountains comprise the easternmost part of of the Forest. The A-B ranges consist mostly of rock and alpine terrain. More gentle terrain around the fringes of the A-B tends to contain more of the productive rangelands and timberlands. The Gallatin and Madison Ranges that face each other across the Gallatin River Canyon form the western half of the Forest. The Gallatin and Madison ranges contain peaks over 10,000 feet at the crests of the ranges, but also contain some lands below 8000 feet that provide timber, big game summering grounds, some big game winter range, and grasslands suited to livestock grazing. The Hebgen area consists mostly of a 7000-foot plateau at the northwest entrance to Yellowstone Park. The plateau contains 8,000-acre Hebgen Reservoir, popular with sportsmen. Most of the plateau is covered with lodgepole pine forest.

To the north, the Gallatin Forest includes the Bridger and Crazy mountain ranges. The Bridgers and related East Bridgers run about 18 miles northwest from a point about midway between Bozeman and Livingston. They contain peaks up to 9,800 feet as well as timberlands, big game populations, and other resources. The Crazy Mountains, the last range to be described, is an isolated range that begins about 15 miles north of Big Timber and east of Livingston. The Crazies have several peaks over 10,000 feet plus extensive rocky highlands. They contain some timberlands and considerable livestock grazing. The northmost parts of the Crazies are administered by the Lewis and Clark National Forest.

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	47
Moderate/Steep	40 to 60	28
Very steep	Over 60	25

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 slopes increase, management costs escalate, the potential for adverse impacts increases, and the range of management practices becomes restricted.

b. Climate

The climate for the Gallatin National Forest is typical of the Rockies east of the Continental Divide. It is characterized by warm summers with most of the precipitation falling as rain from April through the end of June, or in the high elevations as winter snows. Winters in this locale are marked by invasions of subzero arctic air followed by warm, dry chinook winds. Elevation has a major effect on the climate of parts of the Gallatin. The lowlands of the valley floors support sage and grasslands. The mountains are much cooler and often receive two to five times as much precipitation.

c. Geology and Soils

1) Geology

Much of the Forest's present geology is accounted for by episodes of mountain building which occurred about 60 million years ago. All but one of the Gallatin's mountain ranges were created by the overthrusting of rock strata. One range--the Crazy Mountains--was formed by a massive domal uplift. These violent events of the geologic past have left the rock of the Forest varied and complex. Bedrock ranges from Precambrian gneiss to the much younger Tertiary volcanic rock.

The many tilted fault-planes that comprise the Rocky Mountains may provide traps for oil and gas reservoirs. The rise and cooling of magma intrusions--such as comprise the so-called Stillwater Complex in the East Boulder area--has brought major concentrations of valuable minerals such as platinum and chromium close enough to the surface to be reachable by conventional mining.

2) Soils

Broad areas of clayey soils exist in the Absaroka Mountains, Bridger-Bangtail Mountains, Upper Gallatin Canyon, and parts of the Gallatin and Madison ranges. Other soils on the Forest are relatively course-textured, such as those found in the Beartooth Mountains, Crazy Mountains, the West Yellowstone sands area, and the Spanish Peaks. Much variation occurs in the vegetative productivity and suitability of sites.

The landtype survey of the Gallatin National Forest (Davis, 1980 draft) indicates there are approximately 151,200 acres of highly sensitive soils outside of the Absaroka-Beartooth Wilderness. This is 12 percent of the total nonwilderness acreage.

All soils are susceptible to some increases in erosion if they are disturbed by management activities. The sensitive soils are susceptible to mass failures and soil movement and this can increase with surface disturbance.

d. Water

The Gallatin National Forest provides approximately 2,028,000 acre-feet of water to the Missouri River drainage during an average year. The quality of water being produced on the Forest at present is very high, as evidenced by the headwaters of three major Blue Ribbon trout streams on the Gallatin--the Madison, Gallatin, and Yellowstone rivers. Generally, the lakes and streams of the Forest sustain a prime cold-water fishery.

e. Visual Setting

About 23 percent of the Forest outside wilderness is adjacent to or readily visible from major highways or roads, recreational routes and use areas, and residential private land. Of this total, about 391,000 acres are foreground or middleground viewing areas immediately adjacent to major travel routes or populated areas and thus very sensitive to management activities which disturb the natural landscape. The remaining area is middleground where management activities should fit in to present a near natural-appearing landscape. Slope, season of year, and soil color also influence the ability of the natural landscape to absorb surface-disturbing impacts.

3. Biological Setting

The biological environment of the Forest is made up of the plant and animal communities and the interaction of the individual species of the two communities. This section describes general vegetative categories on the Forest. Wildlife species are discussed later in this chapter.

The Gallatin National Forest supports a diverse pattern of vegetation communities. The various vegetation types are zoned in a generalized elevational distribution. Typically, the mountain ranges of the Forest gradate from grasslands at the lowest elevations into limber pine and/or Douglas-fir forests, then into lodgepole pine, and finally into spruce or subalpine fir forests. Higher yet, whitebark pine continues to timberline and finally to alpine tundra or alpine turf.

A variety of ecosystems from riparian to alpine are represented on the Gallatin National Forest. About 1.3 million acres of the Gallatin's total 1.7 million acres are forested. Of these forested acres, about 462,700 are classified as available and capable for timber management activities. The primary commercial tree species, stated as percentages of the Forest's timber, are lodgepole pine (50 percent), Douglas-fir (30 percent), alpine fir (10 percent), and spruce (10 percent). This productive forestland is most commonly located below 8,000 feet in elevation.

Bunchgrass, forbs, and related species of flora comprise the more valuable forage on the Forest's rangelands. Some sheep grazing occurs in high alpine meadows during the summer. Most of the Forest's cattle grazing takes place at lower elevations on grass/sagebrush rangeland. Elk use these same ranges. Browse plants like bitterbrush are eaten by deer.

Riparian areas are adjacent to streams or other water and are characterized by their distinctive wetland vegetation. Riparian vegetation serves to filter and reduce sediment reaching streams; protects stream banks; and provides habitat, forage, and browse for wildlife and domestic livestock. It is estimated that 80 percent of the vertebrate species on the Forest use riparian areas some time in their life cycle. Riparian areas also retard flood runoff and help sustain stream flow during dry periods of the year.

Management activities which can have the greatest effect on riparian areas and their vegetation are road construction, mineral activities, livestock grazing, and timber harvest. Changes in riparian vegetation have the greatest effect on fish and dependent terrestrial species of animals.

4. Social and Economic Setting

The primary social and economic impact area for the Forest is Gallatin, Madison, Park and Sweet Grass Counties in Montana. The Forest has lesser impact on Carbon and Meagher Counties.

a. Population

In 1980, almost 63,000 people lived in Gallatin, Madison, Park, and Sweet Grass counties, about 25 percent more than in 1970. Gallatin County is the third fastest growing county in the State. Between 1970 and 1980 the county grew by 31.9 percent. Madison, Park, and Sweet Grass have changed very little in population since 1960. There is potential for a sharp rise in population in Sweet Grass County over the next 5 years if certain large mining projects presently being initiated are brought to completion (see following section). Some estimates show the population of Sweet Grass County doubling as a result of these projects.

The population in both counties is predominantly white. There are small numbers of Native Americans, Blacks, and Asians. The tabulation that follows gives more information on population in the Forest's principal four counties:

County	Population		
	1960	1970	1980
Gallatin	26,000	32,505	42,865
Madison	5,200	5,014	5,448
Park	13,200	11,197	12,660
Sweet Grass	3,000	2,980	3,216

b. **Economy**

1) **General Description**

Gallatin and Park counties, plus Madison County from Ennis eastward, have experienced significant economic growth. The basic industries which influence the growth of this area are: Montana State University, agriculture, manufacturing, tourism, and government. Manufacturing earnings in this area increased 100 percent from 1970 to 1978 with the wood products industry earnings 50 percent higher. Largest growth was the establishment of an electronics firm and a mobile home manufacturing plant. Tourism and associated trade industry for this area experienced a 78 percent growth in the same period. At present, one in every six dollars spent in Montana on tourism is spent in Gallatin, Park, or eastern Madison counties (Bureau of Business and Economic Research, 1980).

Sweet Grass County is a stable county whose economy has changed little since 1950. Its workforce of 1,500 people is primarily dependent upon agriculture. Sweet Grass County stands to change considerably with the strong possibility of the opening of a platinum mine on the National Forest. A labor force of 500 may be needed to operate the mine.

Jobs and income associated with activities on the Gallatin National Forest are distributed among a large number of resource uses. Therefore, it appears that there is no single resource the community as a whole is dependent upon. It is important to note, however, that a significant proportion of the total area employment is attributable to Forest uses. Total employment in the area is currently around 22,000 work years, with 14 percent of that related to National Forest outputs.

2) **Economic Variables**

Economic effects of National Forest management, as tied to the Forest resource outputs and their use by local industries, are measured in terms of the amount of employment and income generated from those resources.

The economic base of the "Bozeman trade area," which also includes Livingston, Belgrade, and all or part of Gallatin, Park, and Madison Counties, is derived from seven basic industries (University of Montana, 1980):

1. Montana State University -26%
2. Agriculture -21%
3. Railroads -15%
4. Manufacturing -13%

5. Tourism and trade -12%
6. Federal government -10%
7. Mining - 3%

Montana State University and the agriculture sector contribute almost one half of the total earnings of the area. This sector is expected to remain stable in the future althrough other sectors are growing faster. From 1970 to 1978, manufacturing and tourism increased in total earnings by about $9 million. Earnings in manufacturing industries doubled in those eight years and earnings from tourism grew by 78 percent.

Wood products industries in 1978 provided little more than one half of the earnings in manufacturing. Approximately 1 in 6 dollars spent in Montana for lodging was spent in the Bozeman trade area in 1977. This is a result of the area's recreation opportunities, its location on main travel routes to Yellowstone Park, and Bozeman's position as a regional trade center.

3) Employment and Income

Forest resource outputs are important to the economy of the area, providing about 17 percent of the jobs. This means that approximately 2,576 direct, indirect, or induced jobs are attributable to Gallatin National Forest activities. See Table III-1 for an employment distribution by user/employee groups.

Table III-1: Gallatin National Forest Contribution to Employment (Jobs)

Employers	3-County Employment Total	1980 Forest Person-Years	Forest Contribution (% of Total)	Rank
1. Misc. Agriculture	545	47	8.6	9
2. Livestock	252	21	8.1	10
3. New Construction	879	20	2.2	15
4. Mtc. & Repair Const.	279	18	6.6	12
5. Misc. Manufacturing	1,001	32	3.2	14
6. Food and Kindred	205	34	16.4	7
7. Logging and Mills	345	76	22.1	4
8. Other Wood Prod.	685	18	26.6	2
9. Trans., Comm. & Util	1,629	105	6.4	13
10. W-Sale & Ret. Trade	3,536	703	19.9	6
11. Fin., Insur. & R.E.	720	52	7.2	11
12. Hotels and Motels	928	444	47.8	1
13. Misc. Services	2,850	591	20.8	5
14. Eating & Drinking	1,549	393	25.4	3
15. State & Fed. Govt.	162	22	13.6	8
TOTAL	15,565	2,576		

The total amount of income attributable to the outputs (1980) of the Forest in 1978 dollars was $36,850,100. The major sectors in terms of income produced are displayed in Table III-2.

Table III-2: Employment Sectors and Income ($)

Sector	Income ($)
Hotels & Motels	2,338,500
Eating & Drinking	2,581,900
Wood Products Industry	2,477,400
Trade	8,741,400
Government	324,200

Not included in this analysis are the potential impacts associated with accelerated mineral development on and adjacent to Forest lands.

4) 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. Much of the fluctuation is due to cyclical timber harvests.

Some examples follow of Forest receipts. In 1978 dollars these were:

Dollars	Year
178,693	1979
114,883	1980
530,448	1981
554,471	1982

5) Forest Employment and Budget

Employment in work-years was 307 in 1980, 316 in 1981, and 282 in 1982. The average annual budget for 1980-83 was $7 million (1978 dollars). Excluding inflationary effects, the annual budget increased to 1981, and then has been decreasing.

In 1981 and 1982 annual budget allocations were:

Activity	Percent of Budget
Timber management and road building	41
Recreation, wildlife, minerals, soil, and water	19
Other costs, including administration and fire	40

Source: Forest budget records.

c. Lifestyles

1) General

The population and economic changes that have occurred in communities near the Gallatin Forest can be attributed to the environmental setting. People live in the area because of the picturesque rural mountain environment, rich in its historic and cultural heritage. Native residents appreciate those values, and those characteristics have attracted a steady stream of new immigrants to the area, ranging from those escaping chaotic urban life, to retirees and young people seeking self-sufficient, outdoor-oriented lifestyles.

Many people see the Forest as being very important in their lives. At public workshops people have said that activities such as hiking, camping, picnicking, hunting and fishing, snowmobiling and skiing, and firewood gathering are significant. Watersheds, big game, livestock, minerals, oil/gas, and timber are resources which people have identified as important to them.

2) How Users See the Forest

National Forest management can potentially have social and economic effects on the communities and groups of people that live close enough to use the Forest and the goods and services that come from it. Social effects are an outcome of people's perceptions of the Forest (what it means to them), how they use it, and the kinds and amounts of outputs that come from the Forest. Economic effects are a result of the outputs that come from the Forest which are converted into monetary values (dollars). These outputs enter into the economic structure of an area by providing employment and income to people. The two effects are portrayed in Table III-3.

Table III-3: Social and Economic Effects

Social Effects		Economic Effects	
Perception	Use	Outputs	Dollars
People have a perception of what the Forest could and should be used for.	Dictated by peoples' perception of the Forest. (That is, the resources of the Forest are defined by the way people percieve and use the Forest.)	The way people use the Forest determines the outputs: -pleasure -satisfaction -fulfillment -firewood -fish -meat -berries -timber -minerals -grazing	Some of the Forest outputs are converted into employment and income by industries. -recreation -timber -grazing -minerals -returns to counties

3) Social Variables Affected by Forest Management

Social effects of National Forest management are tied in many ways to peoples' perception and use of the Forest and the consequent outputs, employment, and income. Some social variables that could change are:

1. Lifestyles - These are the ways different segments of the population live, including their work, their leisure activities, their relationships with families and friends. How do Forest service management activities affect these?

2. Values, Beliefs, Attitudes - These variables are reflected in people's likes and dislikes, their aspirations, hopes, and fears. What do people like and dislike about Forest Service activities? How can Forest Service actions affect peoples' hopes and aspirations? Are there things people fear the Forest Service will do to change their aspirations?

3. Social Organization - This is the way a society is structured--its institutions and the forces that can bind them together or tear them apart.

   What Forest Service actions or changes in management can effect community cohesion and stability? Is there anything the Forest Service could do to affect such social institutions as the family, the economy, work and leisure activities, and politics?

4. Populations and Land Use - Might Forest Service decisions and management change population structure and distribution in local communities or affect land uses adjacent to the National Forest?

4) Local Communities

Different communities use the Gallatin National Forest differently and perceive it differently. They also maintain different industries which rely on Forest outputs. The most significant uses and industries of the various communities are summarized in Table III-4:

5) Groups Interested in Forest Management

Across all the communities which are directly affected by Forest Service management, there are groups of people either formally or informally banded together to express their views on the management of Forest resources and on the uses that can come from the Forst. People in these groups have a vested and legitimate interest in Forest management. Some of the things they are often concerned about are: being able to maintain their patterns of use on the Forest, the way the Forest may change, the increasing scarcity of the resources they value, how the resources are protected, being able to use the Forest, and others.

Table III-4: Community, Use Group, and Industries

Community	Major Uses	Industries
Big Timber	Hunting, fishing, grazing firewood, packing, outfitting, post & pole cutting	Grazing,mining, and outfitting industries
Livingston (includes Clyde Park/ Wilsall and Paradise Valley)	Hunting, fishing, hiking, snowmobiling, grazing, trailbiking, outfitting, camping, prospecting, timber harvest	Grazing, timber
Gardiner/ Cooke City	Hunting, fishing, snowmobiling, packing, mining, outfitting	Timber, recreation (outfitting), and mining industries
West Yellowstone	Tourism, fishing, resorts boating, snowmobiling, camping, skiing, firewood, timber harvest, guiding	Recreation, resort
Bozeman	Hunting, fishing, camping, hiking, firewood, timber harvest	Timber, recreation

There is often a conflict between the ways different user groups perceive of the Forest and the resources and how the resources should be used. There is also often conflict between the user groups and the Forest Service over the way the Forest should be managed. These conflicts also arise from differences in perception of the Forest. Some of the groups of people that could be affected and will have different levels of acceptance of varous alternative management schemes are:

1. Hunting and fishing groups - They want continued quality hunting and fishing with activities which would protect these resources. Hunters would like more access into the Forest.

2. Wildife Organizations - They are concerned with the maintenance of good habitat for all wildlife. Often they define good habitat as being those lands which are undeveloped or managed in near natural condition.

3. Hikers and Skiers - People in this group want a quality experience when they go into the Forest. For them, this means good trails and enough access points to disperse people. A quality experience for some is being in an area which is undeveloped.

4. Landowners - This group incorporates the use of the National Forest lands into the use of their own adjacent or intermingled land. They want compatible use, which means--for some--management of National Forest lands

with the same objectives they have for their land. For others it means eliminating the effects of National Forest management by keeping roads and trails from crossing their land.

5. Snowmobilers/ORVs - Their main desire is to keep areas of the Forest from being restricted to their use.

6. Wilderness groups - They want major portions of the unroaded lands on the Forest either designated as wilderness or managed in a near natural condition. Using the presently roaded portions of the Forest as they are currently used is acceptable to them.

7. Timber Industry - They want the productive timber lands to be available for harvest with the Forest Service responding to the local industry needs. They do not like to see what they consider unnecessary restrictions placed on timber harvest.

8. Grazing Industry - They would like to see more National Forest lands available for livestock grazing. They are concerned that grazing not be restricted because of possible conflict with other users and resources such as wildlife and recreation.

9. Resort and Tourism Industry - They want to see the qualities which now attract tourists and recreationists protected. Forest management which emphasizes recreation uses is desired.

10. Outfitting Industry - They are concerned with restrictions which limit their use of the Forest. Decisions which change the management of large areas now in near natural condition to a more developed state would affect them.

11. Mining, Oil/Gas Industries - They are concerned with land prescriptions and management which would put restrictions on or increase the costs of exploration and development of minerals or oil and gas.

12. Utility Industries - They are concerned with land prescriptions which would put restrictions on or increase the cost of powerlines, pipelines, etc.

13. Others - No other groups or categories of people are known to have special needs or concerns about the management of the resources of the Gallatin National Forest. No issues, geographical areas, resources, or resource groups are known to have special concerns for minority or civil rights groups at this time. It is possible certain areas or resources of significance may become important if identified by Native Americans as being an integral part of their heritage. Known resources (cultural) are being protected under the auspices of the Antiquity Act of 1906 and the American Indian Religious Freedom Act of 1978.

B. Current Resource Situation

1. Recreation

Recreation use is measured by recreation visitor days--where one day equals 12 hours of use. In 1980, 2,022,000 recreation visitor days were recorded on the Forest. Thirty-four percent of this use was at developed recreation sites and 66 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.

a. Developed Recreation

Developed facilities on the Forest include campgrounds (37), picnic areas (14), developed downhill ski areas (2), boat launches (5), and a visitor information center at Earthquake Lake. Forest campgrounds presently can accomodate 902 families, and additional capacity is provided by private campgrounds close to the Forest. Also classed as developed sites are end- of-road or trailhead facilities for those embarking on dispersed recreational experiences.

The Gallatin Forest has a capacity for developed recreation use approximately 23 percent greater than is currently used. Over the past ten years, an average of about 683,000 recreation visitor days' use per year has occurred on the Forest's developed sites, including ski areas. Projecting current trends into the future, by 1985 there will be 802,900 RVDs of developed recreation use, and by 1995, 922,000. On this basis, the current capacity of 884,400 recreation visitor days would be surpassed before 1990.

Two opportunities exist for increasing capacity: (1) Additional Forest Service investment in developed recreation sites (e.g., campgrounds), and (2) additional private investment in ski areas or campgrounds on National Forest land. Also, in any alternative there is a large potential for the private sector to supply developed recreation on private lands adjacent to or inside the National Forest boundary. Most of this could come from expansion of the Big Sky and Bridger Bowl ski areas and the construction of the Ski Yellowstone ski area.

b. Dispersed Recreation

In 1981 the Gallatin provided 1,532,400 recreation visitor-days (RVD's) of dispersed recreation, up from the 1,339,100 RVD's in 1980. Major activities associated with dispersed recreation in 1981 were:

Type of Recreation	RVD's Use
Automobile Travel	297,000
Hiking-Horseback-Bicycle	266,000
Fishing	214,000
Camping	183,000
Hunting	166,000

Winter sports, such as cross-country skiing and snowmobiling, are not broken out separately but are an important and growing source of recreational activity

on the Forest. Hunting activities tend to be seasonal, and can considerably increase concentration of use in popular areas during the fall and early winter. Approximately 234,000 of the above RVD's occurred in designated wilderness areas.

Some commercial dispersed recreational use occurs. In September of 1983 there were approximately 57 outfitter/guide permits in effect on the Forest (Gallatin Resource Records). Much of this is professionally-guided fall hunting activity, but there are also guided camping/sightseeing trips during the summer months.

The dispersed recreation use was also classified as motorized, nonmotorized, and primitive (wilderness) use:

Dispersed Recreation Type	RVD's Use in 1980
Motorized	750,000
Nonmotorized	468,000
Primitive	121,000

c. Recreation Trails

The Gallatin is served by 1,853 miles of inventoried trails. Of this total, 838 miles serve the Absaroka-Beartooth and Lee Metcalf wilderness areas and 1,015 miles serve the nonwilderness lands. Approximately 28 percent of this total 523 miles of trail is identified as in need of repair or relocation. Most trails needing repair are located outside the existing wildernesses. The remaining 1,330 miles of trails are in adequate condition. An average of 2 miles of trail per year are constructed or reconstructed under the current program. National Recreation Trails found on the Forest are shown in Table III-5.

Table III-5: National Recreation Trails on the Gallatin National Forest

Trail Name	Miles One-Way	Comment
Palisade Falls Trail	.66	Trail to 98-foot waterfall
Bridger Mountain Trail	24.00	Traverses most of the Bridger Range
Garnet Mountain Trail	4.00	Leads to summit and abandoned fire tower
Gallatin Riverside Trail	3.25	Provides numerous fishing access points
Boulder River Natural Bridge and Falls Trail	.28	Parts are suitable for handicapped
Two-Top Snowmobile Trail	28.00	Loop begins and ends at West Yellowstone

Refuge Point Cross-Country Ski Trail	2.9	Provides vistas of the 1959 earthquake area.

d. **Wild and Scenic Rivers**

Background

The purpose and authority for study of wild and scenic rivers is established in the Wild and Scenic Rivers Act of October 1, 1968, as amended. Under the authority of the Act, the Forest is charged in the land management planning process with the identification of potential inclusions in the Rivers System. As a result, streams on the Forest were analyzed for their eligibility and potential classification in the System.

River Eligibility and Potential Classification

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.

The eligible river segments have also been assigned a potential classification of wild, scenic or 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, four rivers were identified as eligible and potential classifications assigned. They are:

1. Boulder River - Approximately twenty-two (22) miles of this river within the National Forest boundary are eligible for inclusion into the Wild and Scenic Rivers System. The river segment is described as begining at the National Forest boundary and extending upstream to Box Canyon guard station (this is the junction of the East Fork and the Boulder). The entire segment is eligible for potential classification as recreational. The river courses through the Absaroka Mountain Range and is surrounded by a scenic backdrop of mountains and the relatively narrow valley in which the river is located. Near the Forest boundary is an outstanding geologic feature known as the Natural Bridge. Here the entire river goes under a natural rock bridge and spills out below its original channel elevation.

The river is used for white water sports particularly during spring peak flows. The river supports a high quality trout fishery which is nationally known. Five National Forest campgrounds are located on the river and there are several private church camps, guest ranches and recreation residences. The river corridor is very popular for recreation. The river is located within a narrow half mile wide corridor surrounded by the Asaroka-Beartooth Wilderness. The Boulder County road parallels the river segment. National Forest development along the stream is for public recreation. The channel is free of significant man made improvements. The potential river classification for this segment is recreational. Approximately 9 miles (40%) of the river channel within the National Forest is privately owned.

2. Yellowstone River -Approximately 16 miles of the Yellowstone River are located within the National Forest boundary. The river segment is located between the National Forest boundary and the boundary of Yellowstone National Park. Approximately 2.5 miles of the river has National Forest ownership on both sides of the channel. National Forest land is located on one side of the river for an additional 2.5 miles. Eleven miles (70%) of the river bank is privately owned. The Yellowstone River was found to be eligible for its scenic and recreational values. Yankee Jim canyon is the only white water on the upper Yelowstone and is located on National Forest land. This segment of the river is very popular for floating and kayaking. The entire segment supports a important trout fishery and has good populations of the Yellowstone cutthroat trout. Float fishing on this segment is a popular sport. The Yellowstone is a navigable river and, as such, fisherman can fish and walk the river below the high water mark making it very attractive to fisherman on shore. One tract of National Forest land at Corwin Springs is bighorn sheep winter range with bighorn sheep watering at the river. The Northern Yellowstone elk herd winters on either side of the Yellowstone river. The scenic back drop to the river segment is the Absaroka and Gallatin Ranges. The Devils slide which is a interesting geologic feature is visible from the river.

US Highway 89 parallels the river on the east and a county road and abandoned railroad grade parallels the river on the west. Four public access roads reach the river segment. Numerous private roads and developments are located along the river banks. Agricultural activities on private lands include grazing, hayland, some row cropping and vegetable farming. The river channel is largely unchanged by man's activities. The potential classification is that of a recreational river.

3. Madison River -Approximately 8 miles of the Madison river below Hebgen dam to the National Forest boundary is considered eligible under the Act. The entire 8 miles is in National Forest ownership. The segment includes Quake Lake which was created by an earthquake in 1959. The lake is narrow and the rivers volume flows through the lake. The slide and the lake are geologically outstanding and are a significant part of the reason for eligibility. The river also contains a nationally known trout fishery and is used by nesting bald eagles and ospreys for a feeding area. The fishing and the interpretive value of the area make recreational use high. The scenic values along the Madison are very important as it parallels a main entrance route to Yellowstone National Park.

The presence of a major highway paralleling the river and the associated recreational development is the reason this segment has potential classification as a recreational river.

4. Gallatin River -Approximately 39 miles of the Gallatin River is located inside the National Forest boundary. Approximately 25 miles of the river is within National Forest land. An additional 2 miles has National Forest ownership on one bank with private ownership of lands on the opposite shore. Approximately 2 miles of the stream pass through State of Montana lands. The remaining 10 miles of stream pass through private lands. The river segment begins at the National Forest boundary and extends upstream to the Yellowstone National Park boundary. The river is very popular for a variety of recreational activities including white water rafting and kayaking, fishing, and hiking. The Gallatin River fishery is nationally know. The scenic backdrop of the river is the Madison and the Gallatin Ranges which range from steep cliffs, to broad tree covered mountain sides and to snow capped peaks.. The views of the river from the highway which parallels the entire segment are very scenic. The route is a main access route to Yellowstone National Park. The channel is largely unchanged by man's activities, however there is some evidence of rip rapping and some minor diversion structures. A portion of National Forest lands have been developed for recreational use and there is development on private lands. For these reasons the river has potential classification as a recreational river.

The eligibility and potential classification determinations 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 for a group of eligible rivers on the Forest, at a later date. Forest planning records can be referenced to understand the details and to understand the interactions leading up to the eligibility and potential classification determinations.

2. Cultural Resources

The historic and prehistoric sites that exist on the Forest are protected by the National Historic Preservation Act and other mandates. Surveys conducted have uncovered several hundred sites, 53 of which are eligible for inclusion on the National registry of Historic Places. The majority of these sites are prehistoric with buried components. There are also a few historic sites - generally buildings - which are eligible.

Over 70 prehistoric archaeological sites have been identified on the Forest. Prehistoric peoples traveling seasonally into the northern part of what is today Yellowstone National Park crossed and re-crossed parts of the Forest. Some of the artifacts they have left include projectile points, scrapers, and similar objects dating from the Late Middle Period (3,500 B.P. through 1700 B.P.). To give a few examples of the more interesting sites, at least two pictograph caves with designs painted by primitive peoples are located on the National Forest. A driveway made of stones and presumably used by prehistoric people to herd and kill elk is located on the Forest near Gardiner.

Historical sites on the Forest include log buildings erected by some of the earliest settlers, including original Forest Service administrative buildings. Many other evidences of early settlement and industry exist on the Forest, such as coffer dams, logging flumes, or evidences of gold- and silver-rush mining activities.

3. Wilderness, Roadless, and Special Areas

The Gallatin National Forest contains two wilderness areas, the Absaroka-Beartooth and Lee Metcalf wildernesses. The Forest also contains the congressionally designated Cabin Creek Wildlife/Recreation Area. Wilderness and Congressionally designated areas are displayed in Table III-6 .

Table III-6: Wilderness and Congressionally Designated Areas

Category	Gallatin Forest Acres	Other Forest Acres	Total Acres
	Wilderness		
Absaroka Beartooth	580,562	346,812	921,600
Lee Metcalf	135,112	97,874	232,986
Total			
	Special Areas		
Cabin Creek Recreation and Wildlife Area	36,752	0	36,759
Hyalite-Porcupine-Buffalo Horn MWSA Area	155,000	0	155,000

a. Absaroka-Beartooth Wilderness

The Absaroka-Beartooth (A-B) Wilderness is located within the Big Timber, Gardiner, and Livingston Ranger Districts on the Gallatin National Forest, and the Beartooth Ranger District on the Custer National Forest. It is located in southwestern Montana in Park, Stillwater, Carbon, and Sweet Grass counties and encompasses the Absaroka and Beartooth Mountain Ranges. There are 580,562 acres of this wilderness on the Gallatin National Forest and 346,812 acres on the Custer National Forest. This wilderness includes the Absaroka Range to the west and the Beartooth Range to the east.

Landforms in the Absaroka portion of this wilderness are characterized by some steep rocky ridges; rolling mountains and foothills; and landflows. Elevations range from 5,500 feet on the Main Boulder River to 11,200 feet on Mt. Cowan. Streams in this area meander down broad, glaciated valleys. Grass and trees occur on the lower, more gentle slopes while mountaintops are usually rocky.

The Beartooth Mountain Range contains some of the most rugged terrain in Montana. Elevations range from 5,200 feet on the Stillwater River to 12,800 feet on Granite Peak. Peaks, glaciers, deep canyons, and high tundra plateaus dominate the landscape. Numerous lakes dot the high and often treeless plateaus.

The climate of the A-B Wilderness approaches that of the subarctic at higher elevations, while in the lower basins and valleys below 6,000 feet the climate is less harsh. Snow accumulates throughout the winter, comprising all or part of the source of 14 major streams, including the Boulder River, Stillwater River, and Clark's Fork of the Yellowstone.

Grizzly bear are found along the southern boundary of the A-B Wilderness, and some areas along the southern boundary are classified as grizzly bear Management Situations 1 and 2. The chief use of the A-B Wilderness is for primitive recreation, although some livestock grazing continues to take place within the boundaries as provided for in the Wilderness Act.

b. **Lee Metcalf Wilderness**

The Lee-Metcalf Wilderness was created by Congress in 1983. It consists of portions of the former Taylor-Hilgard MWSA area together with what was formerly the Spanish Peaks Primitive Area. The area consists of 135,112 acres on the Gallatin National Forest plus 97,874 acres on the Beaverhead National Forest.

The Lee Metcalf Wilderness runs about 55 miles north and south, taking in almost the full length of the Madison Range, and is from 4 to 24 miles east to west. Bordering the center of the area on the east is the Big Sky Resort. Here, roads and ski area developments extend to the top of the Madison Range for about 5 miles. The northern part of the area, which was formerly the Spanish Peaks Primitive Area, has a well developed trail system together with high, scenic peaks and high cirque lakes that are very popular with recreationists. The more southern portion of the area also contains scenic peaks and lakes, but is more remote and less often visited.

Topography is highly variable. Glaciated relief is characteristic of most of the Lee Metcalf, with rocky prominences separated by U-shaped valleys and many cirque basins. A more subdued and moderately rolling landscape characterizes the remaining area. Elevations range from 6,000 to over 11,000 feet. Some of the prominent landmarks include Lone Mountain, the Helmet, Sphinx Mountain, Koch Peak, and Hilgard Peak.

The Madison Range has climate comparable to that of the Absaroka-Beartooth ranges, described in the section immediately above. Major streams draining the area are Bacon Rind and Snowslide Creeks, flowing east into Yellowstone Park; Cedar, Bear, Indian, Wolf, Moose, Squaw, Papoose, and Hilgard creeks flowing south and west into the Madison River; Hell Roaring and Cascade creeks, flowing east into the Gallatin River; and the extreme headwaters of numerous other drainages.

Vegetation consists of sagebrush, grasslands, and scattered trees at lower elevations. As elevation increases, lodgepole pine becomes dominant. Mountain meadows and open parkland are common at the higher elevations. The southern two-thirds of the study area near the crest of the Madison Range is dominated

by exposed bedrock, sparse tree cover, and brush and grasses where soils have developed. Stands of timber are generally found at midslope above the sparsely forested winter range. Forested terrain is more common in the northern two-thirds of the study area.

The Lee Metcalf has a number of features of interest. The southern portion of this wilderness contains grizzly bear occupied habitat, which includes the Monument Peaks country. Major recreational activities that take place in the area include mountaineering, fishing, rock hounding, big game hunting, and ski touring. The study area is part of the Overthrust Belt and may contain oil and gas reserves.

c. Cabin Creek Recreation and Wildlife Area

The Cabin Creek Recreation and Wildlife Area was established through passage of the Lee Metcalf Wilderness and Management Act of 1983. The Act, as described in Chapter II lies between two portions of the Lee Metcalf Wilderness and contains 36,752 acres of land. The area is the headwaters of the Wapiti, Little Wapiti, Beaver, Cabin, and Teepee Creek drainages. The area has good habitat for elk and grizzly bears. The legislation provides that the area will remain in its undeveloped or roadless condition and be managed to protect its wildlife and recreation values.

Changes Since the Draft EIS

The Proposed Forest Plan recommended that motorized trail vehicles less than 40 inches wide would be permitted on designated routes from September 1 to December 1 if the use would be compatible with the protection and propagation of wildlife. Since that time, additional analysis has been done and several meetings have taken place with the U.S. Fish and Wildlife Service in regards to possible effects of the activity on grizzly bears. As discussed in Chapter II of this EIS, the dates for the activity have been changed to July 15 through October 30. The informal consultation with the U.S. Fish and Wildlife Service indicated this change will not have a negative effect on the grizzly bear.

d. Roadless Areas

While 41 percent of the Forest is wilderness, another 7 percent comprises a Congressionally designated wilderness study area (the Hyalite-Porcupine-Buffalo Horn Area). Still another 22 percent is roadless and undeveloped. The remaining 30 percent has been developed for timber harvest and minerals activity, including access roads.

As a result of revised NFMA regulations in 1983, the Forest is reevaluating roadless areas. The areas considered include the H-P-BH Montana Wilderness Study Area, lands recommended for wilderness in RARE II, plus unroaded lands that were previously released from wilderness consideration. The roadless areas are displayed in Table III-7. In all, 11 areas totaling 488,400 acres are being evaluated for wilderness suitability. Table III-8 reviews the wilderness characteristics of the 11 roadless areas. Appendix C contains more details on the characteristics and values of each roadless area. The Madison roadless area which contains 149,259 acres has been released from further evaluation for wilderness by the Lee Metcalf Wilderness Bill.

Table III-7: Roadless Areas and Roadless Area Resources

Roadless Areas	Acres	Tentatively Suitable Timber (Acres)	Suitable Range (Acres)	Minerals[1] Energy (Acres)	Minerals[1] Non-Energy (Acres)	Wildlife Winter Range (Acres)	Fishery Streams (Miles)
1550 Dry Canyon	2,160	2,152	0	2,160	0	0	0
1963 Lionhead							
--Gallatin NF	32,780	7,200	2,030	0	0	2,300	3.5
--Targhee NF	15,400	6,500	2,470	0	0	0	2.5
H1548 Hyalite	22,224	2,600	0	0	0	0	3.4
J1548 Gallatin Fringe	44,482	21,969	7,095	9,600	0	7,100	3.6
G1548 Gallatin Divide	91,403	31,000	2,500	34,800	0	25,491	22.4
1543 Bridger	45,402	16,664	4,326	44,000	0	3,996	32
1541 Crazy							
--Gallatin NF	70,498	21,091	3,128	62,350	880	360	40
--Lewis & Clark NF	16,600	4,489	1,427	16,600	0	940	8
1742 Box Canyon							
--Gallatin NF	1,747	771	680	1,747	0	0	0
--Lewis & Clark NF	9,900	3,455	3,733	9,900	0	3,580	2
1547 Chico	10,855	3,724	0	0	0	1,600	0
1912 Beartooth							
--Gallatin NF	4,720	890	0	0	0	0	1.8
--Custer NF	1,280	0	0	0	0	0	0
1545 Republic	700	0	0	0	700	0	0
1914 Reef	2,170	711	0	0	480	0	0.8
1371 North Absaroka							
--Gallatin NF	159,259	56,021	20,700	66,411	92,973	47,500	28.9
--Custer NF	19,240	17,600	4,000	17,362	12,000	3,150	6
Total							
--Gallatin NF	488,400						
--All Forests	550,820						

[1] "High" and "Very High" ratings only.

Table III-8: Wilderness Characteristics of Roadless Areas

Roadless Areas	Wilderness Attributes	Public Interest
1550 Dry Canyon	Natural integrity is unimpaired. The area shows no sign of man's works. Natural appearance is affected by some clearcutting visible along the northern and western boundaries. The area is near West Yellowstone but can be considered remote because of lack of human activity in the area. The area meets the size criterion for wilderness consideration due to its 5-mile common border with Yellowstone Park.	No interest has been expressed in this area for wilderness or any other management uses.
1541 Crazy	Natural integrity of the area is presently not affected except by the Cottonwood Road on the southwest. Natural appearance is unimpaired. The size of the area meets criteria for wilderness classification. There are good opportunities for solitude except for a few popular trails and destination points The presence of checkerboard ownership would make managability difficult.	A number of individuals and groups have expresssed concern about protecting the naturalness of the Crazies. The area is included in "Alternative W" as proposed by the Montana Wilderness Assn.
1543 Bridger	Natural integrity is affected by an electronics site and by minor disturbances associated with Bridger Bowl Ski Area. Natural appearance is impeded somewhat by lack of topographic screening. Solitude is good in most of the area except for some trails at peak season. Less than half of the area meets criteria for remoteness. The area meets size criteria for wilderness consideration.	Little or no interest has been expressed by the public in wilderness consideration for this area.
1548 Gallatin	Natural integrity is unimpaired except for a two electronic sites, an electronic snow course, and some logging and roading impacts along the edges of the area.. Natural appearance is unimpaired for the Hyalite portion, rather seriously affected in the Goose-Levinski area and parts of the Mt. Ellis and Eightmile portions. About 70 percent of the area would be suitable for primitive recreation. All of the area would meet size criteria for wilderness consideration. Managability would be affected by considerable checkerboard ownership throughout the area, except in the Hyalite Peaks portion which is solid National Forest. The area contains grizzly bear occupied habitat.	Groups advocating wilderness tend to support a wilderness recommendation for all or parts of the area. Snowmobilers are strongly opposed to wilderness classification because the Big Sky Snowmobile Trail traverses 17 miles of the area. Groups concerned about grizzly bear recovery advocate roadless management for the south part of the area. Timber and minerals interests oppose wilderness classification for the area.
1963 Lionhead	Generally, natural integrity is unimpaired and the capability of the area for wilderness is high. The area is primarily classified as suitable for primitive recreation with portions of the area near the portal areas and lower valleys classified as semiprimitive nonmotorized and semiprimitive motorized. The area meets size requirements for wilderness capability. Opportunity for solitude is high.	The area was included in the Alternative W proposals of both the Idaho and Montana conservation groups during the 1978 RARE II process and this view has been restated in the July 1983 Alternative W Wilderness proposal of the Montana Wilderness Assn. Timber, minerals, and snowmobiler interests oppose wilderness classification for this area.

Table III-8: Wilderness Characteristics of Roadless Areas (Cont'd)

Roadless Areas	Wilderness Attributes	Public Interest
1371 N. Absaroka	This area consists of 12 separate units. Natural integrity varies by area. The Jardine and Emigrant-Mill units have been considerably broken up by road corridors; Jardine exists as 5 pieces and Emigrant-Mill as six. Neither of these areas have a discernable core. Both the East Boulder and Deer Creeks segments are penetrated by roaded corridors but still preserve natural integrity in most of their area. The Mineral Mountain and Mt. Abundance pieces show evidence of past mining activity. Timber harvest has occurred in East Boulder, Emigrant-Mill, Deer Creeks, and Jardine, and is planned for Livingston Peak, Strawberry Creek, and Dome Mountain. Despite these exceptions, most of this large area possesses a high degree of natural integrity. With the exception of a few areas such as Emigrant-Mill and Jardine, most of Area 1371 presents a natural appearance. Impacts are isolated or could be removed by bounary adjustments. Units with good opportunities for attaining solitude in all or most of their area include Deer Creeks, East Boulder, Meyer Creek, Livingston Peak, Dome Mountain, Tie Creek, Strawberry Creek, and the Knowles Peak portion of Emigrant-Mill. The rest of the area has limited potential for solitude because of nearby towns, nearby resource activity, limited size, or other factors. Primitive recreational opportunities are available in most of Area 1371. Generally, motorized use is light or nil in much of 1371 due to lack of access and rugged topography. However, snowmobile use is heavy in the segments of 1371 near Cooke City. The Mineral Mountain unit at present has more motorized use than nonmotorized use. The Stillwater Complex, a geologic formation that has attracted past and current mining activity, underlies all or part of the East Boulder, Mt. Rae, and Meyer Creek units of 1371. The presence of 32,200 acres of grizzly bear occupied habitat is a distinctive feature of the area's southern part. The Strawberry Creek unit is about half privately owned in a checkerboard pattern that would pose problems of managability.	"Alternative W," a proposal supported by the Montana Wilderness Association, has advocated wilderness for Mt. Rae, Tie Creek, Livingston Peak, Strawberry Creek, and the southern 2/3 of Emigrant-Mill. Public interest in the other parts of Area 1371 for wilderness does not appear high, partly because of the placement of the A-B Wilderness boundaries in 1978 which excluded the 1371 segments from wilderness classification at that time. In 1978 nearly all interest groups were in agreement not to include Meyers Creek, Deer Creeks, East Boulder, Mineral Mountain, and Mt. Abundance units in the A-B Wilderness. There is no evidence that public opinion has changed for these areas. Snowmobiling is very popular in the Big Timber area and in the Gardiner, Silver Gate and Cooke City areas. Snowmobilers who enjoy the sport in these areas are opposed to more wilderness along the present borders of the A-B.

Table III-8: Wilderness Characteristics of Roadless Areas (Cont'd)

Roadless Areas	Wilderness Attributes	Public Interest
1547 Chico Peak	Natural integrity is generally unimpaired. Disturbances that do exist do not extend to the area's core and could be excluded by boundary adjustments. The core of the area offers opportunities for solitude, primitive recreation, and the practice of outdoor skills. The area meets size criteria for wilderness classification.	Little interest has been expressed in advocating this area for wilderness by either individuals or organizations.
1545 Republic	The Republic area is small, rugged, and retains its primaeval character. The area is significant in that it would lend more consistent natural boundaries to the adjoining N. Absaroka Wilderness. Natural integrity is affected in places by mine workings along the north and east boundaries. Natural appearance is not much impaired. The area can meet size criteria for wilderness because it adjoins the North Absaroka Wilderness. Recreation opportunity classifies as semiprimitive nonmotorized. Opportunity for solitude is limited by the proximity of the Beartooth Highway and views of neighboring towns.	Interest has been expressed in this area for wilderness by the general public. The Montana Wilderness Assn. has included the area in their Alternative W proposal. In the RARE II study, 480 acres of the area were recommended by the Forest Service as an extension of the North Absaroka Wilderness.
1912 Beartooth	Natural integrity of this area is seriously affected in places. The northern part of the area offers wilderness opportunities comparable to the adjoining A-B Wilderness. However, the Kersey Lake segment has a number of evidences of man, and contains inholdings developed for summer homes. Some evidence of old mining activity can be found in both the Kersey and Long Lake portions of the area. A jeep road runs the length of the Long Lake segment. About two-thirds of the area meets criteria for semiprimitive nonroaded, and one-third, semiprimitive roaded. Solitude can be difficult to obtain in much of the area during certain times of the year. Size criteria are met because the area adjoins the A-B wilderness.	This area has not been advocated for wilderness by any wilderness groups. Because of the high levels of snowmobile use in this area, many residents of nearby towns as well as snowmobilers who visit the area are opposed to wilderness classification.
1914 Reef	This area possesses a high degree of natural integrity. The evidence of man that does exist is mostly localized and inconspicuous. Portions of the area not adjacent to Highway 212 are natural in appearance. About half the area offers primitive recreation opportunities; the other half of the area cannot be so classified due to the presence of U.S. 212. Away from the highway, solitude is easy to obtain. This area is contiguous with a larger roadless area on the Shoshone National Forest. The Reef area can only meet size criteria for wilderness if the adjacent area on the Shoshone is classified for wilderness.	The Montana Wilderness Society has included this area in their Alternative W wilderness proposal. Following the RARE II study, the Forest Service recommended 427 acres of this area, comprising the Reef geologic formation, for wilderness. Residents of Cooke City and snowmobilers are opposed to additional wilderness in this area.

4. Watershed

The overall environment of a watershed is tied most directly to the soils that are present, its topography, vegetation, and, of course, its streams and rivers. The quality of the water reaching the streams is affected by soil sediment.

The quantity of water reaching the streams can also change if the vegetation is removed by timber harvest, wildfire, or grazing. Large increases in water quantity flowing from a watershed have the potential to degrade or destroy a stream channel and its fisheries habitat and cause downstream flooding. Most of the heavy runoff occurs during the late spring-early summer months when snow is melting and heavy rains occur.

The ability of a watershed to moderate this runoff is important for several reasons: to maintain good stream channel stability, to reduce the possibility of flooding, and to deliver sufficient quantities of water later in the summer months for downstream users.

At present, Forest Service monitoring of watercourses indicates that forestwide natural sedimentation rates are about 117,500 tons of sediment per year. Sediment load is highest during the period of spring runoff. Current management practices are estimated to produce an increase of 4.7 percent over this natural producton on a forestwide basis.

Most of the man-caused increase comes through the effects of roading, although resource activities such as timber harvest and livestock grazing can affect sediment rates. Mitigating measures--such as good road location and design, or use of cable logging on steep slopes or unstable soils--can reduce expected sedimentation. Likewise, proper distribution of animals on grazing allotments can substantially reduce grazing-related sedimentation in riparian areas.

Other factors that can influence soil erosion and sediment production include mining and oil/gas activity. The short term effects of these activities can be partly mitigated by stipulations in the operating plans. Most mining and oil/gas impacts are typically associated with roading, drill pad construction, or drainage and leaching of mine tailings. The long-term effects of these activities are closely linked to the opportunties to restore the site. Several major mining activities are planned on the Forest, and there is a real possibility of some oil and gas activity on the Forest over the next 50 years.

Because of natural fuel loadings, the Forest has high potential for hot wildfires. Hot wildfires consume both standing vegetation and detrius, volatilizing much nitrogen and sulfur. A hot fire can expose the soil, destroy natural soil structure, kill micro-organisms, and cause hydrophobic surface soil. These factors increase surface runoff and erosion, and decrease soil productivity.

Major storage reservoirs on the Forest include Hyalite, Mystic, and Hebgen lakes. There are three municipal watersheds on the Gallatin Forest. Bozeman is the largest municipality served from waters originating on the Forest. The Forest also has 91 special use permits for water-related facilities, such as water lines, stock watering facilities, reservoirs, and irrigation ditches.

Streamflow arising on the Forest is used to irrigate 439,000 acres of cropland and hayland in five counties.

5. Minerals and Energy

The Gallatin has some known areas of significant minerals potential and some areas of high interest for oil, gas, and geothermal exploration. In recent years increasing value of some minerals has caused a renewed interest in mining on the Forest.

A wide variety of mineral commodities known or thought to occur on the Gallatin National Forest are shown in Table III-9.

Of all the mineral activities listed above, the exploratory and pilot activities in the Boulder River area for platinum and chromium, and near Jardine for gold, are by far the most significant. These activities could lead to a major mining operation, generating many jobs in the Big Timber and Gardiner/Jardine areas.

The change that could take place in this part of the physical environment is the removal and depletion of the mineral or hydrocarbon. Of equal significance is the change that this removal can cause in other parts of the physical environment.

The development of minerals or oil and gas is dependent on the demand for and discovery of the resource. The 1872 Mining Law (as amended) establishes the procedure for staking, and requirements for holding and patenting mining claims on Federal lands, and identifies miner's right. Oil and gas leasing is regulated by the Department of Interior.

An oil and gas environmental assessment prepared by the Forest in 1980, documents the possible environmental consequences associated with leasing and provides the basis for the Forest's lease recommendations (except for the Hebgen Lake District). The environmental analysis to support the oil and gas leases was declared to be in violation of NEPA and the Endangered Species Act in a 1985 Federal Court decision. The court ruled that all Gallatin National Forest oil and gas leases covered by this environmental analysis be set aside. This court decision is under appeal to the Ninth Circuit Court of Appeals. These oil and gas leases have been suspended pending the outcome of this lawsuit. New leases and subsequent lease reissuance will undergo additional analysis as required by NEPA, tiering to this EIS by incorporation by reference the information presented in this EIS. Leases covered by the Hebgen Lake Oil and Gas Environmental Analysis are still valid. This environmental analysis is incorporated into the Forest Plan FEIS.

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 for any land under Forest Service jurisdiction, (Interagency Agreement, June 19, 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. BLM is a cooperating agency and 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 and documentation which meet NEPA requirements.

Table III-9: Some Significant Mineral Occurrences on the Gallatin National Forest.

Mineral	Location	Activity
Gold, Silver, Copper, Lead, Zinc	Forestwide--mainly Jardine and Cooke City areas	Exploration, past mining
Platinum Group Minerals--Chromium, Nickel	Stillwater-Boulder River areas	Exploratory adits, pilot development
Travertine	Gardiner	Active mining
Phosphate	Hebgen Area	Large, proven deposits
Oil & Gas	Madison, Gallatin, Bridger, Bangtail ranges	255,716 ac. of leases granted, 57,463 more ac. applied for
Coal	Crazy, Gallatin, and Madison ranges	Past mining
Geothermal	Corwin Springs, Island Park areas	Leasing activity suspended indefinitely

6. Facilities

a. Roads

The Forest currently has 807 miles of Forest development roads on its inventoried system. Approximately 250 miles are maintained annually by the Forest Service. An additional 10 to 15 miles are maintained under cost-share agreement by Burlington Northern Co. Another 250 miles are intermittent use roads and are generally closed. The remaining mileage is generally maintained at a primitive standard and experiences very low traffic volumes. All of the system roads are additionally maintained by timber purchasers, miners, and other permittees when used for ongoing commercial operations.

There are an estimated 1,000 miles of uninventoried roads within the Forest boundary. These vary from wheel tracks to old jammer roads. They are of

limited value to most Forest Service activities, although some are very important to intermingled private owners and off-road vehicle users.

The Forest is currently constructing and reconstructing 5 to 10 miles of major access roads each year. An additional 15 to 20 miles of single use roads are constructed each year in connection with the timber sale program. This would vary between the different alternatives.

b. **Transmission Lines**

The Gallatin presently has a number of existing powerline corridors crossing Forest Service land. A corridor that passes through Flathead Pass in the north Bridgers contains 230-kv and 161-kv powerlines side by side. This corridor crosses a total of about 3 miles of National Forest lands.

The Clyde Park to Emigrant 161-kv powerline which is planned and for which a permit has been issued will cross about 1-3/4 miles of National Forest in the northeast portion of the Gallatin Range. Application has been received and evaluation is in progress for an additional 69-kv transmission line from Emigrant to Gardiner. Depending on the centerline selected, this line could cross approximately 6.4 miles of National Forest land.

A 69-kv line which passes up the Gallatin Canyon crosses about 12 miles of National Forest lands. In addition, the Hebgen area contains three powerline corridors. One powerline--the Duck Creek 44-kv line-- crosses about 20 miles of National Forest in the vicinity of West Yellowstone. The Targhee pass 44 kV line crosses Targhee Pass and terminates at West Yellowstone. In that same vicinity, the Macks Inn 115-kv line serves a power substation near West Yellowstone; the line reaches the West Yellowstone area from Macks Inn, Idaho, through Reas Pass. The Macks Inn line crosses about 12 miles of National Forest lands.

The Bonneville Power Administration has documented a number of potential powerline corridors crossing the Gallatin National Forest. These corridors may never be utilized, but could be the site of powerlines at some point in the future. The location of these lines is detailed in Section IV-A, 19.

7. **Visual Quality**

The Gallatin National Forest lies within the Northern Rocky Mountains physiographic province, and is subdivided on the basis of landforms, vegetation patterns, and water features into two "landscape character types": (1) the Yellowstone Rockies, and (2) the broad valley Rockies. That part of the Gallatin National Forest that lies south of Interstate 90 is within the Yellowstone character type, whereas the Bridger and Crazy Mountains typify the broad valley character type.

Approximately 42% of the Forest is classified as wilderness or other special area. These areas include the Absaroka-Beartooth Wilderness, the Lee Metcalf Wilderness, and the Cabin Creek Management Area. The Absaroka forms a spectacular middleground backdrop to the Paradise Valley, the Spanish Peaks (in the Lee Metcalf Wilderness) dominate the southern skyline from I-90 and Bozeman, and the Madison Range (also in the Lee Metcalf Wilderness) towers

over the Madison River valley between Quake Lake and Ennis. These areas are all middleground or background to sensitive recreation travel routes.

The special areas described above are unmodified natural areas with no evidence of human activity. The visual quality objective applied to these areas is preservation (P). (For an explanation of this and other visual quality objectives, see Table III-10).

About 23% of the Gallatin National Forest is comprised of foreground and middleground areas near sensitive travel routes. These areas include the basal scarps of the Absaroka, Gallatin, and Madison Ranges, as well as some of the scenic high country that is heavily used by recreationists, through which sensitive trails pass (examples are the Gallatin Divide and the interior of the Crazy Mountains). Most of these areas are currently undisturbed by management activities, and they are highly visible to motorists or trail users. They also have a relatively low capacity for absorbing landscape-altering activities, and disturbances to the natural character of such areas would be noticeable unless handled in a very sensitive way. These areas have been assigned a visual quality objective of retention (R).

Another 23% of the Forest lies between the sensitive foreground areas and the scenic mountain backdrop. Some of this area is unseen from major travel routes or is not highly visible or sensitive, whereas other middleground areas are quite visible. In general, this area includes forested, moderate-elevation areas with high scenic values, and a moderate to high capacity to absorb the visual impacts of management activities. These areas have been assigned a visual quality objective of partial retention (PR).

Less than 13% of the Forest is considered moderate to low in scenic quality or is unseen from sensitive travel routes. Much of the area in this category includes major drainages that are not seen from highways, and areas that have been significantly modified by timber management and roading in the past. This area is forested, moderate elevation, and has a relatively high capacity for absorbing visual impacts of management. Because this area is to be managed primarily for timber, and because most of it is not visually obvious to motorists or trail users, it has been assigned a visual quality objective of modification (M).

The growing season on much of the Gallatin National Forest is short, and the recovery rate of vegetation in disturbed sites is frequently several years. Short-term deviations from the visual quality objectives will sometimes have to be accepted, but in all areas recovery from disturbance should be well on its way within 5 years.

In 1981 the entire Forest was assigned Visual Quality Objectives based on the visual management system. This inventory was modified to accomodate management prescriptions for the preferred alternative. The adopted VQO's tend to reflect a higher standard for visual quality than did the initial VQO's (Table III-10).

Table III-10: Characteristics of Areas to Which Visual Quality Objectives Were Applied.

VQO	SCENIC QUALITY	MANAGEMENT ACTIVITIES	VISUAL SENSITIVITY
Preservation	Mostly very high	No activities occur in these areas	Low to high
Retention	Moderate - High	Are not noticed by the average viewer	Moderate - High
Partial Retention	Moderate - High	Are visually subordinate to natural landscape	Moderate - High
Modification	Low - Moderate	May dominate the natural landscape, but are not in glaring contrast	Low - Moderate
Maximum Modification	Low - Moderate	May dominate foreground but blend with natural landscape when viewed from a distance	Low

Table III-11: Initial Visual Quality Objectives (VQO's) Vs. Adopted VQO's[1]

	Visual Quality Objectives			
	INITIAL VQOs		ADOPTED VQOs	
	acres	percent	acres	percent
Preservation	508,600	29	717,000	42
Retention	240,800	14	390,800	23
Partial Retention	556,900	32	394,600	23
Modification	338,000	20	221,600	13
Maximum Mod.	83,400	5	3,500	<1

[1]Comparison between initial VQOs based on the visual management system (left) and adopted VQOs which take into account management direction for prescriptions made for the Forest Plan (right).

8. Wildlife and Fish

The Gallatin Forest provides habitat for approximately 330 wildlife species. Only a few species will be discussed in detail: Endangered and threatened species, certain hunted and fished species, and species that have special habitat needs.

Species richness or diversity now exists on the Forest because of a broad variety of habitats available. The best way to support thriving populations of most species is to assure a good distribution of vegetative types and various successional stages of these types across the Forest. Wildlife species most vulnerable to habitat changes are those which depend on a unique habitat condition for their survival.

Wildlife species diversity depends upon the diversity of vegetative habitats and their structure. Changes in this diversity can be caused by natural catastrophies (wildfire, landslides, earthquakes) and by the hand of man in the harvest of renewable resources. Therefore, under management, diversity can be planned and implemented over time in desired locations.

a. Big Game

Well distributed native elk herds, two large migratory elk herds, and a large native population of mule deer are the most heavily hunted wildlife species on the Gallatin. Stable populations of moose, bighorn sheep, mountain goats, black bear, and white-tailed deer are also hunted, but less intensely. The current estimated population of mule deer that summers on the Forest is 13,700. Deer winter off the Forest primarily. The habitat for these big game species can be changed by management activities. Management activities that change elk habitat are assumed to affect the habitat of many of these species similarly.

Numerous separate populations of elk are found on distinct summering and wintering areas across the Gallatin Forest and on adjacent and intermingled private land. Currently, the total wintering elk population is approximately 9,800. Summer range on the Forest is estimated to be capable of supporting as many as 32,000 elk while the winter range appears to only be able to support a maximum potential of 12,600 elk (8,400 elk on National Forest land). Elk winter range is the limiting factor for the Forest's elk numbers. However, summer range is also important.

Of the current total wintering elk populations (9,800 elk) about 5,600 elk winter on the National Forest and about 4,200 elk winter on private and State lands in and adjacent to the Forest boundary. Generally, these population estimates refer to elk resident on the Forest plus average elk numbers from three large migratory elk herds that summer in the Yellowstone National Park but winter in the Forest. Exact numbers of Yellowstone Park elk coming onto the Forest during any one year depend upon the severity of the winter, but are generally from 2,500 to 5,000 animals.

Management activities on both the National Forest and private lands can change big game habitat. This would include the removal of security cover by timber harvest, grazing competition with domestic livestock, or road construction in

security areas and winter range. Changing habitats would bring about changes in big game species population size and composition.

Big game populations can change substantially due to factors which are outside the control of the Forest Service. Some examples are severe weather conditions, development of lands adjacent to or intermingled with National Forest land, or the management of the hunting seasons by the Montana Department of Fish, Wildlife, and Parks.

The Montana Department of Fish, Wildlife, and Parks objectives for big game is to increase harvest and increase hunter use. For example, their objective for elk is to provide an increased elk harvest of 22%, an increase of 13% in hunters, and a 27% increase in hunting recreation.

b. Waterfowl and Raptors

Wetlands along the Yellowstone, Gallatin, and Upper Madison River tributaries provide significant nesting, rearing, resting, and molting habitat for an estimated 77 varieties of ducks, geese, swans, cranes, and shorebirds. In the fall, as many as 900 Canadian geese and 4,800 ducks have been observed in this lake region of the upper Madison River.

The Gallatin also provides habitat for 14 species of raptors (hawks, falcons, and eagles) and nine species of owls. Very little change would be anticipated for these species because of forest management.

c. Indicator Species

The Forest carefully considered 12 wildlife species for management indicator species status (Planning Records). The species identified below were finally selected because of their special interest to the public and as indicators of the effects of different alternatives on the ecosystem as a whole:

Species	Rationale
Grizzly Bear	Threatened species
Bald Eagle	Endangered species
Elk	Hunted, public interest, sensitive to forest and range management
Wild Trout	Fished, sensitive to water quality and riparian habitat management
Goshawk	Dependent on old growth Douglas-fir

Other candidates for management indicator species that were considered include the hairy woodpecker for old growth alpine fir forest, Shira's moose for riparian/wetland areas and old growth alpine fir forest, mule deer for shrub/grassland, and the meadowvole for meadow/grassland habitats. These species were not finally chosen as indicator species for various reasons. It some cases, it was uncertain how well the species could be monitored (e.g.,

mountain vole). In other instances, it was felt that species already listed could serve as indicators for similar habitats (e.g., elk for mule deer or moose).

d. Fisheries

All fish found on the Gallatin National Forest are coldwater species. These include cutthroat, rainbow, brown, golden, and brook trout, rainbow-cutthroat trout hybrids, arctic grayling, and mountain whitefish. There are no anadromous fish or threatened or endangered fish within the Forest. The Yellowstone cutthroat, upper Missouri cutthroat, and arctic grayling are classified by the State of Montana as "Species of Special Concern" (Flath, 1981).

The Forest contains 1,052 miles of fishing streams and 18,800 acres of lakes which contain about 1,553,000 catchable trout. The Forest is estimated to have a total stream catchable trout population of 509,000. The Forest's lakes contain an estimated 1,044,000 catchable fish. Some of the high lakes on the Forest are barren and do not contain a fishery ("Fisheries Analysis," Planning Records).

The Gallatin's fishery is of national interest. Three major rivers that cross the Forest--the Gallatin, Madison, and Yellowstone--are classified as "Blue Ribbon" streams of national significance. Many small tributaries provide spawning and rearing habitat to the downstream fisheries and influence both the quantity and quality of water in the fisheries.

Wild trout have been designated one of the Forest's selected wildlife indicator species. Wild trout and other trout populations will be monitored, along with certain characteristics of trout habitat. Wild trout numbers will also serve as an indicator of possible adverse impacts to riparian zones. Wild trout are a good indicator of water quality because they require very clean, cold water.

No changes are anticipated in the lake and reservoir fisheries due to Forest management. However, the State of Montana could change their creel limits or stocking practices which might change the short-term populations.

Changes in stream fisheries populations would result from different amounts of sedimentation produced and differing amounts of habitat improvement.

The Montana Department of Fish, Wildlife, and Parks objectives for fisheries is to preserve the lakes and streams that support wild trout and to provide for a 16% increase in recreational fishing.

e. Threatened or Endangered Species

The Forest provides habitat occupied by two endangered species (bald eagle and peregrine falcon) and one threatened species (grizzly bear). The gray wolf is discussed in this section since the Gallatin was once part of the gray wolf's range, although no viable wolf packs now exist on the Forest. All these species are classified as either threatened or endangered under the Endangered Species Act of 1975. As such, the species and their habitat receive a special protective status in all Federal programs and activities.

1) Bald Eagle

The endangered bald eagle winters along the Yellowstone, Gallatin, and Madison rivers. The Upper Madison River Basin inside the Forest is also a nesting territory for three reproductive pairs of bald eagles. Currently, a bald eagle habitat managment plan provides coordination guidance for the Upper Madison nesting sites (Johnson and Puchlerz, 1982). This plan is incorporated into the Forest Plan.

2) Grizzly Bear

a) The Yellowstone Ecosystem

Portions of the Gallatin Forest are occupied by the threatened grizzly bear. Management of the grizzly and its habitat in the Greater Yellowstone Area is guided by an approved Grizzly Bear Recovery Plan (USDI, 1982) which names three States, two National Parks, and five National Forests as cooperators toward recovery and delisting of the grizzly bear.

This recovery plan provides for 6 grizzly bear ecosystems in the contiguous 48 states. The recovery plan suggests (p.3) that the Yellowstone Grizzly Bear Ecosystem receive first priority emphasis for recovery because of its large data base, ongoing research, and its widely accepted management guidelines.

A variety of land uses in and adjacent to occupied grizzly habitat is creating conflict between the grizzly and man. Man-caused mortality of the grizzly--especially among breeding-aged females--is the major cause of the current downward population trend (USDA and USDI, 1980).

Grizzly bears will be managed on the Gallatin Forest within the context of the Yellowstone Ecosystem recovery effort (Table III-12). The Gallatin presently has 493,350 acres in grizzly Management Situation 1, and 324,010 acres in Management Situation 2. Situation 1 areas "contain grizzly bear population centers and components needed for survival and recovery of the species." Situation 2 areas "lack distinct grizzly bear population centers-- may contain some bears and suitable habitat but may not be areas necessary for survival and recovery of species." In Situation 3, "avoiding grizzly-human conflict is a high priority, and grizzly bear presence will be actively discouraged" (USDI et al., 1979. Grizzly Bear Guidelines for the Greater Yellowstone Ecosystem). The population of the grizzly on the Gallatin would change with different management emphases in his "occupied habitat."

Table III-12: Situation 1, 2, and 3 Occupied Grizzly Bear Habitat (Acres)

Administrative Unit	Mgmt. Situation 1	Mgmt. Situation 2	Mgmt. Situation 3	Total
National Park Service	2,313,998	2,985	163	2,317,146
Bureau of Land Management	--------	2,800	--------	2,800
Private	----------Unstratified----------			54,845
Forest Service	1,667,390	1,543,100	26,500	3,245,990
Gallatin NF	493,350	324,010	1,000	818,360
Custer NF	5,507	105,008	0	110,511
Shoshone NF	412,000	819,600	17,400	1,258,000
Bridger-Teton NF	665,500	61,500	7,100	734,100
Targhee NF	171,390	217,000	1,000	389,390
TOTAL	3,981,388	1,548,885	29,018	5,623,136

A recovered grizzly bear population would contain 25 females with cubs-of-the-year. The present grizzly population can only be estimated. In 1959, Craighead and others (1974) estimated the grizzly population in the Yellowstone Ecosystem to be 222 bears. This equals a density of one bear to 38 square miles of occupied habitat. Craighead and others (1976) documented a population increase from 1959 to 1967 from 222 to 245 bears, and then projected a possible decline from 1967 to 1974 from 245 to 136 bears.

The interagency study team reports a 6-year norm for the period ending in FY 1986 of 14.5 females with cubs. The census efficiency is unknown. There is strong indication that the numbers of females with cubs are at least stable and may be increasing.

b) Gallatin National Forest

Within the Gallatin, occupied grizzly bear habitat is separated into 7 bear units. These bear units were determined from researched grizzly distribution data and were defined to include contiguous areas of grizzly home range. From southwest to northeast, the Gallatin's grizzly units are:

Unit Name	Shared With--
Plateau	Yellowstone Park, Targhee NF
Madison	Yellowstone Park, Targhee NF
Gallatin	Yellowstone Park, Private, State
Hellroaring/Bear	Yellowstone Park, BLM, State
Boulder	(Entirely on Gallatin NF)
Slough/Lamar	Yellowstone Park
Crandall/Sunlight	Yellowstone Park, Shoshone NF

The grizzly bear recovery objectives for the Gallatin (Grizzly Bear Standards and Guidelines for the Gallatin National Forest, 1984) are:

A. In partnership with cooperating agencies, strive to avoid man-induced bear losses on National Forest lands.

B. Manage all "MS-1" acreage on the Gallatin with grizzly bear as the primary emphasis.

C. Manage "MS-2 and -3" areas in occupied grizzly habitat to minimize grizzly/human conflict that could result in mortality or relocation of the grizzly.

Changes Since the Draft EIS

The U.S. Fish and Wildlife Service has given their "biological opinion" of the Draft EIS Preferred Alternative and judged that there would be "no adverse effect" on the well being of the grizzly bear if certain changes were made in the Final Forest Plan. These changes have been made. They are:

1. Apply timing and spacing standards for timber harvest in occupied habitat.

2. Continue to do more site-specific project analysis in occupied grizzly bear habitat using a cumulative effect process.

The U.S. Fish and Wildlife Servie has reviewed the FEIS Preferred Alternative. That consultation has determined that the Preferred Alternative would have "no adverse effect" on the grizzly bear.

Another change that is in process is the Grizzly Bear Recovery Plan Update. This effort is headed by the U.S. Fish and Wildlife Service in cooperation with the other agencies within the Greater Yellowstone Grizzly Bear Ecosystem and is expected to be completed in 1987. The purpose of the update is to refine the management situation lines based upon the latest information and bring the latest research into the recovery effort. The Gallatin will propose some

extension of the MS-1 and MS-2 lines. If these are approved in the Update they will be incorporated into the Forest Plan.

3) Other Threatened or Endangered Species

a) Peregrine Falcon

Surveys are currently being conducted to determine suitability of nesting habitat for the peregrine falcon and to determine activity at sites surveyed. Also, peregrine falcon are to be fledged from artificial ledges on the Gallatin National Forest in cooperation with the U.S. Fish and Wildlife Service, the Montana Department of Fish, Wildlife, and Parks, and the Peregrine Fund. This effort could result in a cluster of nesting peregrines on the Forest at some future date. The Forest in the past had native populations of peregrine falcon. Historical nesting territories of the peregrine falcon have been designated as essential habitat on the Forest (2670 Memorandum From Chief of Forest Service, 1977).

The U.S. Fish and Wildlife Service has reviewed the FEIS Preferred Alternative and determined that the Preferred Alternative would have a positive effect on the peregrine falcon.

b) Gray Wolf

There are no known gray wolves on the Gallatin or in the Greater Yellowstone Ecosystem, although a few sightings have been verified on the adjacent Beaverhead National Forest. The Gallatin National Forest has the capacity to support approximately five wolves on a yearly basis if they were to be re-introduced. There are no plans to re-introduce a wolf population.

9. Range

The current domestic livestock grazing level on the Gallatin National Forest is 39,150 Animal Unit Months (AUM's) per year from permanent range, plus another 4,249 AUM's from transitory range created by timber harvest. The Gallatin is estimated to have 173,378 acres of suitable livestock range open to grazing. Of this, about 77 percent is in good to excellent condition, while 23 percent is in fair condition.

At present, 164 permittees are grazing livestock on 148 active grazing allotments, which constitute approximately 165,800 acres of rangeland. Some existing allotments are currently unused, oftentimes to allow long-term recovery of forage. Changes in numbers of domestic livestock grazing on the Forest could result from a management decision.

10. **Timber**

About 1.3 million acres of the Gallatin's total 1.7 million acres are forested. Of these forested acres, about 440,000 are classified as available and capable for timber management activities. At present, the Forest has 395,000 acres in the timber base. About 33,600 acres of productive forest land are presently unavailable for timber and other wood products because they are being studied for wilderness suitability under the Montana Wilderness Study Act.

The primary commercial tree species, stated as percentages of the Forest's timber, are lodgepole pine (50 percent), Douglas-fir (30 percent), alpine fir (10 percent), and spruce (10 percent). This productive forestland is most commonly located below 8,000 feet. The Forest's timber sites are moderately productive and usually regenerate naturally after timber harvest and slash disposal, except for Douglas-fir which is difficult to regenerate because of cone losses to spruce budworm.

Multi-storied and all-aged stands characterize large areas of all forest types. This condition is attributed in part to past fire suppression activities. A majority of the Gallatin timber stands are over 100 years old. Within the lodgepole pine type, a serious problem exists: age class diversity is very limited. The vast expanses of mature and overmature lodgepole pine are highly vulnerable to mountain pine beetle attack and this pest is decimating lodgepole pine stands across the Forest. The same concentration of overmature timber poses a hazard of severe wildfire. (See "Protection" section below.)

A more even distribution of age classes attained by timber harvest or prescribed fire would considerably reduce risks from insects and wildfire. In decades to come the age structure of the Forest's managed timber base is expected to become more evenly divided between young growth, immature timber, mature timber, and old growth. Eventually, under a fully managed situation, these age structures would become uniform.

The potential timber harvest for the Forest is greater than has been harvested in the past. A larger timber base, as more drainages are accessed for harvest, would provide an opportunity to respond to several concerns. Past harvest has been concentrated on a relatively small part of the total capable base. This is because access was limited and roads were expensive to build in relation to the value of the timber. Once a part of the road system was established, it was easier to return to the same drainage for more volume until concerns of watershed damage limited more harvest. Broadening the base should alleviate the impacts on individual drainages.

Much of the area harvested in the past has been the less steep slopes. Consequently much of the volume available now will need to be harvested with special systems. An opportunity exists to provide a program of timber sales in these areas so operators can have some assurance they will be able to amortize the investment in special equipment necessary.

Much of the west side of the Forest has undergone a mountain pine beetle epidemic which has left large stands of mostly dead timber. The east side is expected to undergo a similar epidemic in the next few years. Over the next 10

years it is expected that more of the harvest will be spread to the east side of the Forest, thus allowing more volume to be captured there before the pine beetle reaches epidemic proportions on that portion of the Forest. There will also be an opportunity to capture some of the dead timber on the west side of the Forest as part of proposed timber sales.

Changes Since the Draft EIS

The following analysis and discussion of the timber costs and recipts for three years and the timber supply/demand situation has been added to this FEIS.

a. Timber Costs and Receipts

The majority of vegetation treatment that takes place on the Forest is accomplished through the timber harvest program. The timber program is sometimes used as an effective method of helping to meet other resource objectives on the Forest (such as providing access to unroaded portions of the Forest), for creating age class diversity and salvage of dead trees, and for roaded recreation.

The Gallatin National Forest generally receives less return on its timber program than it pays in development costs. This is due mainly to the high cost of initially building roads into the areas to be harvested. The cost of subsequent timber sales in the developed areas will be significantly less because much of the road system will be in place.

Table III-13 shows the costs and receipts of the timber program for 1983 through 1985. As shown, both costs and receipts vary from year to year depending on location of timber sale area, amount of road construction needed, and the market value of timber. These three years are indicative of recent years and illustrate the relationship between cost and receipts of Gallatin National Forest timber management.

Table III-13: Timber Program Costs and Receipts

COSTS (1000 DOLLARS)	1983	1984	1985
Sale Preparation	$528	$511	$465
Plans and Exams	265	306	431
Reforestation	822	825	668
Stand Improvement	106	71	42
Road Construction			
Capital Investment	451	183	682
Contributed	88	71	0
Purchaser Credit	330	89	134
	$2590	$2056	$2422
RECEIPTS (1000 DOLLARS)			
Timber Sale and Purchaser Credit	$532	$421	$484

Purchaser credits are those funds credited to timber sale purchasers for road construction completed by the purchaser. These credits are applied against the cost of stumpage.

Capital investment funds are paid directly to road construction contractors for the construction of timber roads. These funds are generally used to construct arterial or collector roads into initial entry timber sale areas. These roads are high standard roads designed to access the area for long term multiple resource management and generally remain open for public use. Capital investment funds are also available for construction of roads developed for recreation access and other uses: however, those expenditures are not included in these figures.

Contributed funds are paid directly to timber sale purchasers for the construction of roads on the sale area. These funds are generally used to construct local roads for the sale area. These roads are generally closed to the public, but will be used to complete cultural treatments and to access the forest for fire protection and subsequent timber entries.

As shown in the table, costs are greater than receipts. However, roads contructed for sales generating these receipts will be used to access sales in the surrounding area and to access future timber entries. The benefits of vegetative management as described above are also direct benefits of these expenditures.

b. Timber Supply and Demand Situation

Bid Area for Gallatin National Forest

The bid area for the Gallatin expands and contracts due to several factors, the most significant of which is timber price. In the past five years, the bid area has included Gallatin, Park and Sweet Grass Counties. The primary mills in this bid area are:

Brand S	Livingston, Montana
Plum Creek Timber Company	Belgrade, Montana
Lumber Enterprises	Gallatin Gateway, Montana
Idaho Pole Company	Bozeman, Montana
Park County Lumber Company	Livingston, Montana
B & J Sawmill	Reedpoint, Montana

Over the past ten years other mills outside this area have purchased timber from the Gallatin, these are:

Idaho Forest Industries	St. Anthony, Idaho
Louisiana-Pacific	Rexburg, Idaho

The mills in the first group also depend, to a small degree, on timber from the Beaverhead, Helena, and Lewis and Clark National Forests. However, their other major dependancy is on private timber from these same counties plus Madison and Meagher Counties.

Mill Capacity

The capacity of the local mills, as reported by them is as follows:

Mill	Capacity
Brand S	42 MMBF
Plum Creek	40 MMBF
Lumber Enterprises	6 MMBF
Idaho Pole	2 MMBF
Other	5 MMBF
TOTAL	95 MMBF

The 95 MMBF per year is current mill capacity and assumes a two-shift capacity for Plum Creek and Brand S. This is a change from the reported 56 MMBF capacity in the Draft EIS. The major change is that the Plum Creek Mill at Belgrade has come on line in the last five years since the first estimate was made.

The Brand S and Plum Creek mills are primarily stud mills and can utilize all species of wood and are capable of handling variable amounts of dead timber. The Lumber Enterprises mill produces boards and uses only green lodgepole timber. Idaho Pole Company produces power poles and uses only green lodgepole timber.

All mills within the analysis area except Plum Creek are considered as small business firms. The current SBA set-aside share for small business firms is 76%.

A number of factors combine to determine the competitiveness of individual firms. Factors contributing to mill competitiveness include mill efficiency, relative haul distances and associated costs, and the general ability of the mill to process the species and size of material being offered.

Timber Demand

One measure of potential future timber demand, if we assume full utilization of existing equipment, could be mill capacity. If the lumber price were high enough, the local mills might purchase up to 95 MMBF of timber. In a climate of high demand, the Idaho mills may again seek to purchase timber in the Gallatin market area.

Another proxy of demand, at least at current prices, is what the mills have harvested in the last few years from the various sources of available timber.

A. Gallatin National Forest

The following table illustrates the programmed sell from the Gallatin for the last six years.

Volumes Offered 1981 - 1986

	1981	1982	1983	1984	1985	1986	Average
LIVE: Regulated (Chgble)	8.6	12.9	14.74	14.23	13.98	13.54	13.00
Unregulated (Nonchg)	3.7	2.0	1.03	.36	.33	.10	1.25
DEAD: Regulated (Chgble)	11.1	9.69	2.84	2.36	5.34	1.46	5.46
Unregulated (Nonchg)	.4	1.08	4.61	.35	.30	.48	1.20
Subtotal	23.8 (79%)	25.67 (97%)	21.22 (99%)	17.30 (82%)	19.95 (99%)	15.58 (80%)	20.57 (90%)
TOTALS (Volumes Offered)	30.2	26.47	21.51	21.03	20.09	19.43	23.12

Approximately 18 MMBF of sawlogs is what the local mills have utilized in the past six years from the Gallatin.

B. Non-Forest Service Sources

Data from the State of Montana slash disposal records and analysis by the Montana Department of Natural Resources and Conservation (Timber Resources of Gallatin, Park and Meagher Counties December 1979, updated) indicate that an annual average of 39.4 MMBF of timber has been harvested from private lands in Gallatin, Park and Meagher Counties during the past ten years. In addition, mills from the Gallatin area have cut an average of 10 MMBF annually from private lands in Madison County.

Although this amount is somewhat over the sustained yield level, it doesn't explain the total drop in timber availability from private lands. More important reasons are economic viability of obtaining timber from small ownership parcels, legal access to private lands, and landowner decisions on whether or not to permit timber harvest on their lands.

C. Other National Forest Sources

The local mills also depend on timber from other National Forests in the area. During the past five year period these Forests have sold the following amount of volume:

	5 Year Sell Average
Beaverhead National Forest	21.6 MMBF
Deerlodge National Forest	13.3 MMBF
Helena National Forest	13.3 MMBF
Lewis & Clark National Forest	9.9 MMBF

The two major mills have reported harvesting a portion of their capacity from these other Forests. Brand S mill has harvested an average of 7 MMBF over the past five years.

Timber Supply

The area is not an isolated system. The major mills occasionally buy logs from more distant areas. There are a number of small sawmills within the area that frequently buy National Forest logs from non-manufacturers and sometimes buy logs directly. (Major examples are Park Lumber Company in Livingston, B & J Sawmill in Reedpoint and Timberline Sawmill in Big Timber.) In addition, mills from adjacent areas (Idaho Forest Industries in St. Anthony, ID, Louisiana-Pacific in Rexburg, ID, Aubury Logs Ltd. in Townsend, MT and Spring Creek Lumber Company in Judith Gap, MT) have been successful in the past in purchasing logs from the Gallatin National Forest.

Mills in the local area are currently getting about 18 MMBF of their volume directly or indirectly from the Gallatin National Forest. Their projections are that the supply available from corporate private lands, other private lands and from adjacent National Forests is decreasing. All mills within the area except Plum Creek are small business firms. The current SBA set-aside from the Gallatin National Forest is 76 percent of all sales.

The following table illustrates the potential volume available in the future from the Gallatin National Forest and other adjacent National Forests. This is not to imply that local mills are the only ones competing for this volume. These are final Forest Plan volumes.

	Total Programmed Sell
Gallatin National Forest	21.0 MMBF
Beaverhead National Forest	19.0 MMBF
Deerlodge National Forest	19.4 MMBF
Helena National Forest	16.0 MMBF
Lewis & Clark National Forest	14.0 MMBF

Private and State of Montana commercial timber lands in Gallatin, Park and Meagher Counties amount to 586,000 acres (Department of Natural Resources, 1979). Based upon a 1976 inventory, these lands contained a standing volume of approximately 2500 MMBF of timber, of which the State calculated a sustained yield on 2000 MMBF. Since that time, about 400 MMBF have been harvested. The same study cited previously estimated that a sustained yield from these lands would be 34-38 MMBF per year.

However, private timber owners have not managed their lands on a sustained yield basis in the past and would not be expected to in the future. Volume

harvested from these lands is very sensitive to lumber prices. Private land volume figures in Madison County which are accessible to local mills was not available. It is expected; however, that Plum Creek will continue harvesting at least 10 MMBF per year from their lands in Madison County for the next few years.

Based upon standing volume, current levels of private harvest could probably be maintained in the three-county area for 20 years before dropping off below the sustained yield level.

11. Protection

a. Fire

Fire has played an integral role in shaping and perpetuating forest and range ecosystems on the Gallatin National Forest. Historically, fire has maintained species and age diversity of forests, created habitat for many species of wildlife, played a major role in cleaning up generations of forest residues produced by tree mortality, maintained genetic traits that allow vegetative species to respond favorably to fire, and probably contributed to the accelerated breakdown of parent soils material.

Table III-14 illustrates an analysis of modern fire occurrence for the period 1970-1979. The analysis shows the ratio of person-caused to lightning-caused fires to be about 50:50. The table also shows that 96 percent of all fires in the past ten years have burned less than 10 acres. However, conditions during this period are representative of the more fire resistant growth stages. Only now, with the mountain pine beetle, are fuel conditions again becoming ripe for increased fire sizes.

The impact of past fire protection is most pronounced in the build-up of forest fuels. Fire protection has allowed forest stands to become more even-aged and susceptible to natural disease and insect epidemics. The subsequent epidemics allow fuels to build up and create conditions where resistance to control is rather high.

Table III-14: Fire Occurrence Between 1970-1979 on the Gallatin National Forest

Category	Person-Caused	Lightning-Caused	Total Caused	Average Per Year
Size Class				
0-.25 acre	167 (56.6%)	128 (43.3%)	295 (86.5%)	29.5
.26-9.9 acres	16 (50%)	16 (50%)	32 (9.4%)	3.2
10-99 acres	10 (90.9%)	1 (9.1%)	11 (3.2%)	1.1
100-299 acres	1 (50%)	1 (50%)	2 (0.5%)	0.2
300-999 acres	1 (100%)	0 (0 %)	1 (0.5%)	0.1
TOTAL	195 (57.2%)	146 (42.8%)	341	34.1/year
Cover Type				
Douglas-fir	42 (38.5%)	67 (61.5%)	109 (31.9%)	
Lodgepole Pine	107 (73.7%)	38 (26.2%)	145 (42.5%)	
Spruce	19 (67.8%)	9 (32.2%)	28 (8.2%)	
Subalpine	7 (24.1%)	22 (75.9%)	29 (8.5%)	
Grass/Brush	20 (66.6%)	10 (33.3%)	30 (8.9%)	
TOTAL	193	146	341	
Cost Class				
$0-100	135 (79.8%)	34 (20.2%)	169 (49.5%)	
$101-500	31 (33.3%)	62 (66.6%)	93 (27.3%)	
$501-1500	9 (19.6%)	37 (80.4%)	46 (13.5%)	
$1501-5000	9 (52.9%)	8 (47.1%)	17 (5%)	
$5001-25000	5 (62.5%)	3 (37.5%)	8 (2.3%)	
$25000+	6 (75%)	2 (25%)	8 (2.3%)	
TOTAL	195	146	341	

Source: Forest Fire Suppression Records

b. Insects and Disease

Insect and disease pests that affect present management policy or could affect future management include the following: (1) Mountain pine beetle in lodgepole and whitebark pine: (2) western spruce budworm in Douglas-fir, subalpine fir, and Engelmann spruce; and (3) dwarf mistletoe in lodgepole pine.

1) Mountain Pine Beetle

The current epidemic developed in lodgepole pine stands on the Bozeman-Gallatin and Hebgen Lake Ranger Districts in 1969 and 1970. Epidemic infestation now occurs on the Gardiner and Livingston Ranger District and is rapidly developing in susceptible stands on the Big Timber Ranger District. Aerial survey estimates showed 455,730 acres of lodgepole pine type and high elevation whitebark pine type were infested on the Gallatin National Forest in 1981. About 180,282 acres of lodgepole pine type are infested on privately owned lands.

2) Western Spruce Budworm

In 1981 spruce budworm defoliated 68,607 acres of Douglas-fir type on the Gallatin National Forest and adjacent State and private lands. The most severe defolation is occurring in drier Douglas-fir habitat types at low to mid-elevations. In those stands, many of the understory and smaller pole size trees have been killed or severely damaged. The exception is fringe areas where Douglas-fir trees have invaded the grasslands. These small trees, less than 10 feet high, are not usually damaged.

3) Dwarf Mistletoe

Dwarf mistletoe, Arceuthobium americanum, is present on lodgepole pine on the Forest. A survey made in 1978 showed 42 percent of the lodgepole pine stands to be infected. Growth loss was estimated to be 7.6 cubic feet per acre per year for an annual Forest-wide loss of 502.2 thousand cubic feet. The major effect of dwarf mistletoe is growth loss, but severe infestations may cause premature tree death.

12. Human and Community Development

Human and community development activities include programs that assist people and communities while enhancing Forest management. Proposed land uses and scheduling of outputs in any of the alternatives will not directly affect these programs, including their budgets.

The Gallatin is involved with both sponsored and hosted human resource programs. For sponsored programs, funding is appropriated by Congress and allocated to the Forest Service. For hosted programs, the Forest Service recieves no funding but provides support, such as worksites, supplies, and transportation. Human resource programs conducted on the Gallatin in 1983 are shown in Table III-15.

Table III-15: Human and Community Resource Programs (FY 1983)

Program	Number of Enrollees	Person Hours
	Sponsored Programs	
Senior Community Service Employment Program	2	562
	Hosted Programs	
Youth Employment Program	1	416
Volunteers	121	14,060
TOTAL	124	15,038

Source: Gallatin National Forest personnel records.

The figures in Table III-15 are lower for 1983 than was the case for 1980-1982. The CETA (Community Employment Training Act) program came to an end in September of 1983.

Another hosted program has already begun on the Gallatin during FY 1984. This is the Touch America Project (TAP). This program is expected to expand in later 1984 and 1985. The hosted Volunteers program is expected to expand considerably over the next year or two, and will likely involve 150 to 200 volunteers by 1985.

13. Land Location, Ownership, and Use Adjustments

The category of lands includes special uses, rights-of-way, withdrawals, ownership planning, and land adjustments. Because of the 416,000 acres of private land within the National Forest boundary (19.3 percent of the Forest total), these are major activities.

There are about 762 special use permits authorizing use of about 27,282 acres of Forest land and 273 miles of right-of-way. An additional 209 miles of road are managed in a cost-sharing agreement with Burlington Northern Railroad Co.

Because of the complex ownership situation and because of poor or no access to some areas, there is an ongoing effort to provide better access to private and public lands on many parts of the Forest. The Gallatin has secured about two

new public accesses each year for the last five years. Additional access has been granted for owners to reach private lands. Depending on the particular needs for access, either road or trail rights-of-way are obtained.

Purchases, exchanges, and donations of land are an ongoing practice. In the last 10 years, about 9,000 acres of private land have been purchased or donated. Exchanges result in further beneficial consolidations.

14. Air Quality

The Clean Air Act established wildernesses as Class II air quality areas. Protection of air quality is a factor to be considered in the management programs for the Forest's portion of the Absaroka-Beartooth and Lee Metcalf wildernesses. At present there are no natural or man-caused events in or near the Gallatin's wilderness areas that threaten air quality in the wildernesses. Protection of air quality in Class II areas will be a considered in fuels management programs and in the A-B Wilderness Fire Plan.

CHAPTER IV: ENVIRONMENTAL CONSEQUENCES

A. Introduction

This chapter forms the scientific and analytic basis for comparison of the alternatives, including Alternative 7 (Preferred Alternative), described in Chapter II. Environmental consequences are the expected effects of activities scheduled to implement an alternative. The applicable effects of all the major activities and resource programs are discussed. In the process, economic and social effects are discussed where applicable.

The place a particular activity or program occupies in this chapter has nothing to do with its importance. The consequences or environmental effects of a particular activity are described as quantitative or qualitative changes from the current situation in terms of significance, magnitude, and duration. Where applicable, the discussion identifies consequences that are direct, indirect, cumulative, or unavoidable. The relationship of short-term use of resources on long-term productivity is also discussed along with irreversible and irretrievable commitment of resources.

This chapter also discusses mitigation measures which have not been previously been mentioned. Mitigation has been built into the planning process. 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 other parts of this document or in special sections of the appendices and will not be repeated here.

All alternatives provide minimum management requirements to protect resources. As an example, all alternatives provide for a viable future population of elk. Some alternatives, however, through increased management emphasis will provide for larger elk populations. This may be accomplished by constraining activities which adversely affect winter elk habitat or by providing for improved habitat.

The format of this chapter is presented in a way which attempts to avoid redundant statements. For instance, the specific activities generated to enhance fish habitat are limited to few acres on the Forest. However, the efforts to maintain or improve fish habitat are inherant in several other activities (timber harvest, road building, livestock grazing, etc.). 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. To assist the reader in locating all discussion associated with a particular resource, use or activity, the following index was developed specific to this chapter:

PROGRAM OR ACTIVITY	PAGE(S)
Access	57
Boundary Location	24
Buildings and Grounds	26
Cabin Creek	11
Cultural Resource	14
Diversity	40
Fire	26
Prescribed	28
Slash	49
Suppression	26
Fish Habitat	19,32
Coldwater	19,33
Insects and Disease	36
Land Ownership	25
Minerals	20
Oil and Gas	20
Hardrock	20
Range	29
Cattle and Sheep	29,33
Recreation, Developed	6
Campgrounds	7
Recreation, Dispersed	8
Motorized	8,9
Nonmotorized	8,9
Research Natural Areas	
Riparian	32,33,59
Roadless Areas	5,58
Roads	24,57
Construction	24,57
Maintenance	24
Closure	58
Effects on Wilderness, Roadless	58
Trails	8
Special Uses	23
Timber	37
Effects on Wilderness, Roadless	45
Harvest Systems	40
Logging Systems	46
Old-Growth	40,43
Planting	53
Site Preparation	52
Slash Control	49
Stand Improvement	55
Long Term-Sustained Yield	38
Utility Corridors	34
Established	34
Potential	34

PROGRAM OR ACTIVITY	PAGE(S)
Watershed and Soils----------	35
Overland Flow----------	35
Soil Movement----------	10,33,35,59
Streambanks----------	32
Wilderness----------	3
Established----------	3
Study----------	3,5
Potential----------	5
Wildlife Habitat----------	17,19
Birds----------	17,18
Small Animals----------	17
Moose----------	17,32
Deer----------	17,32
Elk----------	17,32
T & E Species----------	15,32

B. Wilderness

Summary of Changes Made Since the Draft EIS

The Lionhead wilderness proposal for the Preferred Alternative (Alternative 7) has been reduced by 1350 acres. This reduction was to accommodate snowmobile use in the upper portion of Watkins Creek drainage.

The amount of wilderness (established and proposed) in each alternative is dependent on the goals and objectives for that particular alternative. Wilderness designation has pronounced effects on other resources and uses. Activities do occur in wilderness. Specific examples include: trail construction and maintenance to facilitate and disperse recreation use, outfitting and guiding, and livestock grazing. Most of these activities are associated with primitive recreation and are discussed on pages 8 to 9 of this chapter. Acres of wilderness (established and proposed) for each alternative are shown in Table IV-1.

Table IV-1: Area of Wilderness, Established and Proposed, By Alternative (Thousands of Acres)

Alternative/Benchmark											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
741	716	780	763	968	716	738	1096	1204	739	716	716

It is apparent from the table that the goals of Alternatives 5, 8, and 9 provide for substantial increases in amount of wilderness. In fact, a goal of Alternative 9 is to propose all available roadless area as wilderness. Alternatives 2, 6, Maximum PNV, and Minimum Level Management propose that no wilderness be added to the current amount already established. Alternatives 1, 3, 4, 7, and 10 propose differing amounts of additional wilderness but each propose additions of less than 100,000 acres.

Classification of additional wilderness will have an effect on the economic base of the area. Those businesses and individuals dependent on the wood products industry will be affected by removal of timber producing areas from the timber base. Although some of this volume may be restored by more intensive management of the remaining areas, this intensive management will be more expensive due to the efforts to protect other resources. On the other hand, those businesses and individuals dependent on primitive recreation could benefit from the classification of wilderness since this increases these recreation opportunities. Social conflicts would arise from additional wilderness classification because the action would attract an influx of those people interested in primitive recreation and naturalness. Those businesses and individuals interested in maximum use of the available renewable resources of the Forest would become less prominent and influencial.

Short-term Use Vs. Maintenance and Enhancement of Long-term Productivity - The establishment of wilderness has some effect on long-term productivity. Although native productivity of resources is maintained and biological gene pools are protected at maximum levels under wilderness, opportunities to increase productivity through management of timber and wildlife habitat resources are forgone. The 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.

Irreversible and Irretrievable Commitment of Resources - Establishment of classified wilderness areas effectively commits those areas to wilderness management. Although it is possible for Congress to revoke wilderness classification, this is unlikely to occur in the foreseeable future. The classification results in an irretrievable loss of the timber being grown. It also hampers, if not prohibits, the exploration for and removal of mineral resources.

Adverse Effects Which Cannot be Avoided - Wilderness classification prevents the introduction and use of modern conveyances and conveniences; automobiles, snowmobiles, off-road vehicles, chainsaws, houses, campgrounds, etc.. Removal of both timber and mineral resources is prohibited or highly restricted. 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.

Conflicts With Other Land Management Plans - Wilderness classification satisfies the desires of some of the public but is objectionable to others. Classification of roadless areas which contain large amounts of private land inholdings would create significant problems to the owners if they plan to access and develop their lands.

Energy Requirements - Energy is not expended in wilderness classification. Energy requirements for managing the recreational resource in wilderness are shown in Table IV-7.

C. Roadless Resource

Changes Since the Draft EIS

In the Preferred Alternative (Alternative 7) the suitable timber base was reduced 9,000 acres. This reduction occurred almost entirely within roadless lands. The result is that in this alternative an additional 7,600 acres are now assigned to non-roaded management.

The amount of roadless area outside of wilderness in each alternative is dependent on the goals and objectives for that particular alternative. Activities associated with roadlessness include those identified for wilderness plus: off-road vehicle and snowmobile use, wildlife habitat improvement projects, possible mineral development, and livestock range improvements. These activities will be appropriately discussed under these headings. The acres to be retained in roadless condition under each alternative are shown in Table IV-2.

Table IV-2: Area Assigned to Roadless Management Outside of Wilderness (Thousands of Acres)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
466.8	488.2	569.6	468.8	331.8	615.3	512.0	229.1	135.5	500.7	638	637.7

It is apparent from the table that the goals of Alternatives 3 and 6 are to retain the most roadless area of any of the alternatives or benchmarks other than Minimum Level. The lower acreage of roadless proposed in Alternatives 5, 8, and 9 reflects the amount of acreage proposed for wilderness while the acreage of roadless assigned in Alternatives 1, 2, 4, 7, and 10 reflect an increase in the area to be roaded.

The effect of increased roadless management instead of wilderness classification would be to maintain the opportunities for: wildlife habitat improvement, possible minerals development (primarily oil and gas), continued use of off-road recreation vehicles (snowmobiles and trail bikes), and increases in livestock grazing.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The assignment of acreage to a roadless situation has some effect on long-term productivity. The native productivity of resources is maintained but the opportunity to make the area more productive through intensive management is forgone. Roadlessness maintains the opportunity for semi-primitive recreation and is important in the maintenence 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 build-up of natural fuels.

Irreversible and Irretrievable Commitment of Resources - The assignment of acreage to roadlessness is not irreversible but, once it is made, change of the roadless prescription must be subjected to an intensive analysis and review in order to change it. Such analyses may occur at any time, but normally when the plan is revised if significant modification is required. Roadless assignment results in an irretrievable loss of renewable resources (especially timber) that are produced but not harvested.

Adverse Effects Which Cannot be Avoided - Roadless prescription means that timber harvest cannot occur-- at least, in traditional ways. It also limits the possibility of mineral exploration and development because of the difficulty of access. Some wildlife and fish habitat improvements may be impossible or expensive to accomplish. Habitat improvement may be accomplished through the use of fire. Fish habitat improvement and fish stocking programs can also be carried out, although at higher cost. Control of insects, disease, wildfire, and noxious weeds will require special and sometimes expensive techniques.

Conflicts with Other Land Management Plans - No conflicts with other land management plans are likely to result from roadless lands. One possible exception is that Burlington Northern Railroad Company would have to apply for road permits to cross these lands in order to access their private land.

Energy Requirements - Some energy may be used to maintain recreation facilities (primarily trails) but this use is associated with recreation. Energy expended by the public in dispersed recreation is shown in Table IV-7.

D. Developed Recreation

Sixty developed recreation sites (campgrounds, boat launches, VIS centers, and downhill ski areas) are located on the Forest. These sites occupy a relatively small amount of land 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 roading or clearing of slopes, vegetation is destroyed or significantly changed and water infiltration is slowed while overland flow is increased.

The lower the emphasis on developed recreation, the greater the risk of pollution from sewage facilities, garbage problems, and vandalism. Developed recreation is emphasized in Alternatives 4, 5, 7, 8, 9, and 10, and to a lesser extent, in Alternatives 1, 2, 3, and 6. No additional major sites other than completion of Ski Yellowstone and expansion of Bridger Bowl are proposed. Developed recreation is a low emphasis item in all alternatives. It is anticipated that private enterprise will provide most of the needed facilities to meet the demand for developed recreation.

The Forest capacity of over 884,400 recreation visitor days (RVD's) per year will be exceeded before 1990. The projected use for developed recreation by alternative is shown in Table IV-3:

Table IV-3: Anticipated Use at Developed Sites
(Thousands of RVD's)

	ALTERNATIVE/BENCHMARK											
DECADE ***	1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
1	803	803	803	803	803	803	803	803	803	803	803	803
3	922	922	922	1245	1132	922	1132	1168	1132	1132	1132	0
5	922	922	922	1245	1244	922	1244	1168	1244	1244	1244	0

Developed recreation sites are high cost per acre facilities due to construction, maintenance, cleanup, monitoring and policing. User fees are currently charged at 20 campgrounds and a decision could be made to charge user fees at other sites. Hence, some income is generated. However, this extra income has little effect on the PNV of the Forest as a whole and even fails to offset the cost of Forest-wide developed recreation activities.

Although the total area used by developed recreation is small, the existing use or expansion of the three major downhill skiing areas on the Forest provides a significant effect on the area's economy. Those businesses which cater to recreationists may benefit slightly by the existence of campgrounds in the area. Campgrounds developed by the Forest in some cases provide direct competition with privately developed campgrounds in the area. The retention or limited increase of developed recreation facilities would have little effect on lifestyles in the area.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The construction and management of these developed sites will have an adverse effect on the long-term productivity. The vegetation of much of the site will be replaced by graveled or paved roads, camp spots, and cleared slopes. The vegetation on much of the remainder will be suppressed by the concentrated trampling of the users. These effects would remain evident for a long period of time even though the sites were abandoned. Efforts to restore the sites to previous productivity would be costly and of questionable success.

Irreversible and Irretrievable Commitment of Resources - Once established, these sites are likely to be maintained and become an irreversible, long-time commitment of a resource. Wood fiber and forage which would have been produced on the sites is irretrievably lost.

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 due to the numerous and costly facilities concentrated in one place. Some wildlife habitat in the area will be destroyed or vacated.

Conflicts with Other Land Management Plans - Construction and management of campground sites might be construed as competition with privately owned facilities. However, these sites are frequently used by the local population and also provide rest and camping sites for tourists. Such sites represent a historical use on the Forest and efforts to eliminate or drastically change this use would be opposed by the local population.

Energy Requirements - Energy will be used in the cleanup and maintenence of these sites. Most campgrounds will require garbage removal on a regular basis and yearly maintenence of the facilities will be energy intensive. Energy used by recreationists to reach and use developed recreation sites will be 100 billion BTU's during the first ten years (first decade) and will increase proportionate to the increase in recreation visitor days during the following decades.

E. Dispersed Recreation

Summary of Changes Made Since the Draft EIS

The Forest has, in the past, displayed its travel restrictions on the Forest Travel Plan Map which was updated annually or semi-annually. Now the Travel Map is made a part of the preferred alternative and this map will be updated whenever more site-specific analysis of an area on the Forest indicates there should be new or different travel restrictions on the roads and trails of the area.

Travel restrictions in the Cabin Creek area have changed between the Draft and Final EIS. The Draft Forest Plan (Proposed Alternative) allowed motor bike use on designated trails from September 1 to December 1. The Final Forest Plan (Preferred Alternative) allows motor bike use on designated trails from July 15 to October 30. A comparison of the effects of six different options is presented at the end of the dispersed recreation section.

Dispersed recreation occurs on land and water which is not developed for intensive or concentrated recreation. Specific activities associated with dispersed recreation include maintenance or construction of facilities such as trails, trailheads, toilets, hitch racks, stock ramps, parking areas, and information signs to enhance the recreation experience of the Forest visitor and to protect other resources. The effects of these improvements on soils, water, and vegetation are similar to the effects discussed for developed recreation sites (see above) although costs per acre for maintaining these sites may not be as high. The number of facilities is proportional to the goals and objectives associated with an alternative. However, despite objectives, the facilities occupy only a small acreage of the Forest under any alternative.

Dispersed recreation falls into two categories; that associated with roads (roaded) and that associated with unroaded areas (primitive and semi-primitive). Roaded natural recreation depends on roads which are primarily a result of timber harvest. Primitive and semiprimitive recreation requires a roadless setting. The amount of each which can be enjoyed is dependent on the goals of the alternative and is correlated with the amount of timber harvest and roading allowed under each alternative. It is possible that the category of dispersed recreation can change between alternatives according to the way other resources are managed. The projected acreage available for each category of recreation is shown in Table IV-4.

Table IV-4: Acreage Available for Dispersed Recreation
(Nearest Thousand Acres)

	ALTERNATIVE/BENCHMARK											
TYPE OF AREA	1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
Roadless	467	488	570	469	332	615	512	229	136	501	638	638
Roaded	527	531	385	503	435	404	480	410	395	495	381	381
Wilderness	741	716	780	763	968	716	738	1096	1204	739	716	716

Roadless areas provide opportunities for people to have 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 roadless conditions with the exception of the physical existence of roads. The projected use for all dispersed recreation is shown in Table IV-5.

Dispersed recreation use can have adverse impacts on the grizzly bear which is an endangered species. Heavy use of specific areas within occupied habitat can displace the bear. Heavy use of occupied habitat for recreation also increases the chance of encounters with bears and a greater possibility of habituating bears to the presence of humans. Encounters of grizzly with humans often result in harm to the human and removal or mortality of the bear.

All alternatives except the minimum level alternative provide for significant increases in primitive, nonmotorized, and motorized types of dispersed recreation use. The Forest is presently about 41 percent wilderness, 35 percent nonroaded outside of classified wilderness, and 24 percent roaded. Each alternative changes these percentages and a broad range of differences is analyzed. The demand for all forms of dispersed recreation, except big game hunting, is met in the first decade for all alternatives. In later decades, none of the alternatives meet the projected demand for motorized or monmotorized dispersed recreation. The future demand for primitive recreation is met in all alternatives.

As projected use approaches capacity, recreation can either be limited by a permit system or the type of recreation experience will change. Excessive use in either the semiprimitive or wilderness setting 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 and campsites.

The effect of dispersed recreation on the PNV of the Forest is, in effect, the result of the amount and type of use which will occur. The availability of dispersed recreation opportunities can have a major effect on the local economy. The more recreation available, the more tourists and others are attracted to the area. Local businesses which cater to recreationists will benefit most by those alternatives which emphasize recreation. On the other hand, businesses which depend on harvest of renewable resources will benefit least by those same alternatives.

The effect of emphasis on recreation on the lifestyles in the area are identical to those discussed under Wilderness and Roadless.

Table IV-5: Projected Use for Dispersed Recreation
(Thousand Recreation Visitor Days)

	ALTERNATIVE/BENCHMARK											
	1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
Nonmotorized												
Decade 1	364	378	473	393	331	409	392	290	261	392	405	370
Decade 3	450	519	644	557	493	601	555	432	387	555	605	444
Decade 5	448	517	662	562	501	614	560	439	393	560	611	451
Decade 10	416	459	613	499	494	556	499	385	345	500	544	438
Decade 15	447	504	601	527	455	563	526	392	353	526	546	430
Motorized												
Decade 1	705	706	587	673	575	620	600	552	541	600	634	690
Decade 3	886	914	822	900	801	845	810	773	761	810	880	881
Decade 5	1059	1115	1036	1108	1007	1057	1004	973	960	1004	1085	1057
Decade 10	1459	1570	1497	1554	1438	1503	1421	1386	1377	1423	1530	1439
Decade 15	1874	2087	1897	2037	1869	1940	1875	1792	1778	1875	1965	1739
Primitive												
Decade 1	189	272	288	274	352	285	308	373	391	308	310	186
Decade 3	248	356	377	359	457	374	399	484	508	399	402	244
Decade 5	318	456	483	460	591	479	516	626	657	516	520	313
Decade 10	462	663	702	668	647	696	539	698	743	529	544	455
Decade 15	462	663	702	668	647	696	539	698	743	539	544	455

The management of some areas of the Forest for nonroaded recreation is quite controversial. The decisions of whether to allow for or limit certain types of use has differing effects on different user groups. The perception that the capacity for some types of recreation is being reduced is apparent. Those areas where motorized use is restricted or prohibited have an effect on those groups such as motorbike or snowmobile users.

The effects of vehicle restrictions in Cabin Creek vary depending on the type and timing of these. The Proposed Alternative (7) and the Proposed Forest Plan restricted motorized trail bike use to a 3 month period, September 1 to December 1. Snowmobile use was allowed. The Preferred Alternative (7) and Final Forest Plan have been changed to be less restrictive. Motorized trail bike use is allowed from July 15 to October 30 on five designated trails. Consultion with the Fish and Wildlife Service has indicated that this use will not have a negative effect on the grizzly bear.

Table IV-6 compares the effects of each of the possible management options for public motorized vehicle use withi the Cabin Creek area.

Table IV-6: Effects of Public Motorized Vehicle Use in Cabin Creek By Management Option

Option	Recreation	Elk	Grizzly Bear	Soil
1 Entire area available yearlong for vehicle use (including jeep type)	Least restrictive to motorized vehicles	Greatest displacement of elk within area	Could cause the most disturbance to Grizzly Bears (particularly during period for weight recovery)	Greatest risk for soil movement (particularly during wet periods)
2 All trails available yearlong to vehicles 40 inches wide and less	Eliminates vehicles larger than 40 inches wide. Restricts use to trails.	Displaces elk near trails	Similar to option 1	High risk for soil erosion on trails (particularly during wet periods)
3 Trail vehicles 40 inches wide and less allowed	Allows trail vehicles during fall months on designated	Displaces elk near designated trails during fall	Low impacts on bears during weight recovery	Moderate soil movement on trails

from 9/1 - 12/1 on designated trails	trails	months	period	
4 Trail vehicles 40 inches wide and less allowed from 7/1 - 10/30 on designated trails	Allows trail vehicles during summer and fall months on some designated trails	Displaces elk near designated trails during summer and fall months	Impacts bear during 7/1 - 7/15 weight recovery period	Minor soil movement on trails
5 Trail vehicles 40 inches wide and less allowed from 7/15 - 10/30 on designated trails	Similar to option 4	Similar to option 4	No impact to bear during weight recovery period	Similar to option 4
6 Area closed to public motorized vehicle use	No public motorized use in area	Low elk displacement	Low impact to bear	Minimum risk for soil movement in area

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The short-term use (construction and maintenence) of trailhead facilities, toilets, hitchracks, stock ramps, and loading areas will have similar long-term effects on productivity as developed recreation sites (see above). Although trails can be abandoned and may eventually return to near original condition, this is not likely to happen as long as the demand for dispersed recreation remains high.

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 constitute an irretrievable loss of resources.

Adverse Effects which Cannot be Avoided - The loss of vegetation displaced by the construction and maintenence of the facilities and trails cannot be avoided. These facilities and trails will tend to concentrate use in certain areas and along certain routes. Despite care and maintenence, soil erosion will occur and water flow may be diverted along new channels.

Conflicts with Other Land Management Plans - No conflicts with other land management plans are likely to occur as a result of dispersed recreation activities.

Energy Requirements - Energy is required for the maintenence of dispersed recreation facilities but at less volume than for maintenence of developed recreation facilities. Some energy is required to clear and maintain trails but this is small compared to total energy use on the Forest. The major use of energy associated with dispersed recreation (roaded, semiprimitive, and wilderness) is that used by the public in travel to and recreating in the Forest. This energy use is shown in Table IV-7.

Table IV-7: Energy Used in Dispersed Recreation During the First Decade (Nearest Billion BTU's)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
156	157	162	167	219	164	162	152	149	162	169	156

Energy use in succeeding decades is proportional to the recreation visitor days projected for those decades (Table IV-5).

F. Research Natural Areas

The Forest currently has no Research Natural Areas, but has a number of areas being considered for inclusion into the system. Following formal designation, these areas are protected from management activities to preserve the natural conditions to the extent possible. This protection precludes domestic livestock grazing, timber harvest and road construction for other than access purposes. The areas are generally proposed for mineral withdrawal.

To avoid conflicts, these areas are generally located in wilderness or areas not scheduled for resource development; however, some conflicts may occur. The proposed Research Natural Areas comprising 3,300 acres contain suitable ivestock rangeland. The areas may need to be fenced to exclude livestock and the usable forage will be unutilized. The proposed areas contain no timber suitable for regulated timber harvest.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Designation of Research Natural Areas precludes intensive management activities which could improve long term productivity of the site for other forest resources; however, the existing productivity of the site will be retained.

Irreversible and Irretrievable Commitment of Resources - Designation of Research Natural Areas generally commits the area to that use into the future. The

forage left unutilized by livestock in Research Natural Areas is irretrievable. When suitable timber exists, the volume of possible timber harvest is lost.

Adverse Effects Which Cannot be Avoided - Timber harvest and livestock grazing are not scheduled in Research Natural Areas. The possibility of mineral exploration and development is limited or made more costly because of imposed restrictions. Many types of wildlife and fish habitat improvements may be impossible or expensive to accomplish. Control of insects, disease, wildfire, and noxious weeds will require special and sometimes inefficient techniques.

Conflicts With Other Agencies Land Management Plans - Major conflicts associated with Research Natural Areas involve livestock grazing and mineral exploration and development. Control of grazing may require fencing which may affect livestock movement in adjacent areas. Restrictions on mineral exploration and development may conflict with existing plans.

Energy Requirements - Some energy will be required if Research Natural Areas are fenced to exclude domestic livestock and some used to maintain existing fences.

G. Cultural Resources

"Cultural Resources" refers to the Forest's archaeological and historic properties which are nonrenewable resources, making it necessary to maintain their scientific, historic, and social integrity. The Forest Service policy is to identify, protect, interpret, and manage cultural resources as directed by Executive Order 11593 (May 13,1971). The major purpose of the Forest's cultural resource management program is to catalog or preserve cultural resources and comply with the various Federal laws, regulations and policies. In all alternatives, an inventory of sites where ground-disturbing activities are planned will be required. If a historical site is found before or during ground disturbing activity, it will be documented and evaluated for possible preservation. Indian tribes which historically used the area will be consulted if a site appears to have religious or historical significance. Cultural resources in each alternative will be managed to ensure protection of the resource.

Over 70 prehistoric archaeological sites have been identified on the Gallatin National Forest. Prehistoric peoples traveling seasonally into the northern part of what is today Yellowstone National Park crossed and re-crossed parts of the Forest. Some of the artifacts they have left include projectile points, scrapers, and similar artifacts dating from the Late Middle Period (3,500 B.P. to 1,700 B.P.). Further examples of prehistoric artifacts include two pictograph caves with designs painted by these early hunters. Historical sites on the Forest include log buildings erected by some of the earliest settlers. These include original Forest Service administrative buildings.
Many other evidences of early settlement and industry exist on the Forest, such as coffer dams, logging flumes, or evidences of gold- or silver-rush mining activities.

Protection of the cultural resource will have little effect on the PNV of the Forest since so few acres are involved. Some timber may not be harvested on or near identified cultural sites but this volume will be small and can likely be harvested from other areas. The identification of the cultural resource can be of economic benefit to the surrounding area by inducing tourists and others to

visit the sites. Protection of the cultural resources has no effect on the lifestyles in the area.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The protection given to cultural sites will have some effect on the long-term productivity. The vegetation on and near the sites will not be harvested or will be harvested at less than maximum intensity. Consequently, although the native productivity may be maintained in these areas, opportunities to increase production through intensive management will be forgone. 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 this happen, the ground disturbing 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.

Irreversible and Irretrievable Commitment of Resources - The cultural resources which are given protection will have an effect on the vegetative resources within the area. Since the committment to protect these cultural resources is irreversible in the foreseeable future, the harvestible vegetation grown on these sites represents an irretrievable loss of that resource.

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. When this happens, some cultural resources will be lost and the activity will be halted until an adequate survey and analysis is made. Thus, the activity will at least be delayed and, in certain instances, may be diverted to a more costly route or area.

Conflicts with Other Land Management Plans - The management of the cultural resource should have little effect on other planning efforts adjacent to the Forest. The recognition of the historic roads and trails is regional and even national in scope.

Energy Requirements - Managing the cultural resource will require little energy expenditure. Some travel will be necessary in the surveys and some energy may be used excavating or cataloging sites that are located. This energy will be only a minor portion of the total Forest expenditure.

H. Threatened and Endangered Species

Threatened and endangered species on the Forest include the grizzly bear and bald eagle. Some impacts to other resources will occur as a result of measures to protect the grizzly in occupied habitat (MS-1 and -2 areas). Dispersed recreation may need to be restricted in occupied areas where man/bear confrontations are likely. Livestock grazing in occupied areas would require mitigations to assure that activities do not jeopardize the continual existence of the species. These mitigations will add to the grazing costs. Increased costs for timber management are also probable.

Management practices for all alternatives are designed to recover the grizzly population to the point it can be removed from the threatened category. All alternatives provide for grizzly management emphasis within the area needed for the survival and recovery of the bear (MS-1 areas). Alternatives vary by the amount of grizzly management emphasis in the areas which the bears visit on occasion but which are not considered essential for their recovery (MS-2 areas). Alternatives 7 and 10 provide the greatest emphasis for grizzly recovery in MS-2 areas. Alternatives 3, 8, and 9 provide for a more moderate amount of grizzly emphasis and the remaining alternatives the least emphasis in MS-2 areas. The alternatives with the greatest emphasis for grizzly in the MS-2 areas should recover the population earlier.

The effect of grizzly bear management on the PNV of the Forest is the result of the amount and type of emphasis which will occur. The greater the emphasis, the higher the management cost becomes and the lesser the amount of other resource uses.

Management for the bald eagle does not change by alternative.

An attempt has been made to establish a population of peregrine falcons on the Forest. The peregrine is an "endangered" species. This will be a cooperative effort with the State of Montana Department of Fish, Wildlife, and Parks.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Protection and management of the threatened grizzly bear and endangered bald eagle will have some effect on the long term productivity of their habitats. Vegetation and space in occupied habitat will require careful management to protect or enhance habitat.

The timber resource will be harvested at less than maximum intensity. Native productivity of the timber resource in these areas will be maintained but some opportunities to increase production through intensive management will be forgone.

Livestock grazing in occupied grizzly habitat will require special mitigating measures to assure that activities do not jeopardize the continued existence of the species. Intensive range management practices which could significantly increase livestock production will be forgone in occupied grizzly habitat.

Dispersed recreation activity may need to be restricted in occupied areas where bear/man confrontations are likely.

Nesting sites for bald eagles will be protected by managing buffer zones around the sites. Activities are restricted within about 400 meters from the nest area. This represents a minor amount of land which would be unavailable for other purposes.

The peregrine prefers to nest in high rocky crags and hunt in large open areas which provide many birds for its food. The effort to introduce the species will have very little effect on other resource management practices.

Irreversible and Irretrievable Commitment of Resources - The threatened and endangered species habitats which are given protection will have an effect on the timber and range resources within the areas. Since the commitment to

protect these species is irreversible in the foreseeable future, the vegetation made unavailable for harvest represents an irretrievable loss.

Adverse Effects Which Cannot be Avoided - Any activity which causes a loss to a threatened or endangered species population, despite the mitigation measures taken to protect their habitat, is considered as an adverse effect to the continued existence of the species.

Conflicts with Other Land Management Plans - The management of the threatened or endangered species habitats should have little effect on other planning efforts adjacent to the Forest.

Energy Requirements - Management of the threatened or endangered species habitat will require little energy expenditure. Some travel will be necessary to monitor activities in the area but it will be a minor portion of the total Forest expenditure.

I. **Wildlife Habitat**

Activities specific to the improvement of wildlife habitat on the Forest include vegetative manipulation through the use of timber harvest and fire. Improved livestock grazing practices, particularly in elk winter ranges and riparian areas, also improve wildlife habitat. Most of the management for wildlife habitat is associated with restrictions in the management of other resources, the use of fire, and road closures. These restrictions are discussed in this chapter. The acreages scheduled for burning to improve wildlife habitat are shown in Table IV-8.

Table IV-8: Wildlife Habitat Scheduled for Burning
(Acres per Year)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
720	420	403	1500	932	935	600	935	403	1000	300	0

Alternatives 4, 7, and 10 and, to a lesser extent, 5 and 8, are those alternatives with greatest acreage of wildlife habitat improvement. The objective of this activity 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 only a slight risk of accelerated erosion. Air quality degradation is similar to that from slash control following timber harvest and managed fire.

A wide variety of nongame wildlife (e.g. birds, small rodents) occurs on the Forest. These species depend on a variety of habitats for survival. Activities

to directly benefit nongame habitat include installation of egg hatching stations to establish a peregrine falcon population and construction of bird boxes for songbirds. Other resource activities which alter nongame habitat will be evaluated and monitored for any changes.

The Montana Department of Fish, Wildlife, and Parks is responsible for management of wildlife. The Department has no direct responsibilities for wildlife habitat management on National Forest land. However, their responsibility is in the management of the animal populations. Their objectives are to provide increased populations for hunting and increased opportunities for wildlife related recreation.

Since wildlife populations are directly related to the quality and extent of their habitat, National Forest land managers will consider the needs of wildlife in the planning and implementation of activities. These considerations have no direct effect on the environment, but result in recommendations concerning several activities (especially timber harvest, burning, grazing, 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. The Forest is well known and important for hunting of big game. However, most of the effort to maintain and improve wildlife habitat is associated with timber harvest, grazing, burning, and road management. Effects of these efforts will be discussed in those sections.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The productivity of areas that are burned will be changed. If trees are normal occupants of these sites, some or all may be destroyed. This is especially true of tree seedlings which may occupy the area. The production of vegetation preferred by grazing wildlife will certainly be enhanced.

Irreversible and Irretrievable Commitment of Resources - The act of burning does not constitute an irreversible commitment of the areas to be used primarily for wildlife. Different areas will be scheduled for treatment each year. Areas burned in any one year may never be so treated again. Any plant or animal species removed or suppressed by any of the activities constitute an irretrievable loss of that resource.

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 (see "Timber Management").

Conflicts with Other Land Management Plans - Because of the intense interest in wildlife and the big contribution wildlife hunting adds to the recreation potential of the Forest, no major conflicts are anticipated between the wildlife habitat management efforts of the Forest and land management plans for the adjacent areas.

Energy Requirements - Energy will be used in the efforts to improve habitats. This energy use will amount to only a small percentage of the total energy used on the Forest.

J. Fish Habitat

Specific activities for the improvement of fish habitat on the Forest are the building of pool development structures and the installation of aeration devices to prevent fish winterkill.

Table IV-9: Fish Habitat Scheduled for Improvement
(Acres per Year)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
40	40	25	50	40	40	20	40	60	40	25	0

There are few activities specifically proposed to increase fish habitat. In all alternatives, a small budget is proposed to replace or retrofit the few bridges and culverts that were improperly designed for fish passage in the past. Additionally, some natural barriers to fish passage may be removed. Only one or two projects a year are anticipated so environmental effects will be inconsequential.

Fishing on the Gallatin National Forest is well publicized and is an important activity to the recreationist. The Forest is noted for "blue ribbon" trout streams and the abundance of high elevation lake fisheries. As with wildlife the same coordination with the Montana Department of Fish, Wildlife, and Parks is required for fish. Also, as with wildlife, the primary considerations given to protection of fisheries are associated with other activities (primarily timber harvest, grazing, minerals development, and road management) and will be discussed in relation to those activities. Since accelerated fish habitat management usually increases recreation activities, those businesses and individuals interested in fishing as recreation will benefit. There will be little or no effect on the lifestyles of the local population.

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 insure that fish are capable of occupying presently unavailable habitats. Thus, fish habitat will be maintained and enhanced above the present level in many areas.

Irreversible and Irretrievable Commitment of Resources - There are few irreversible or irretrievable commitments of resources associated with fish habitat improvement projects because they occupy minor amounts of land.

Adverse Effects Which Cannot be Avoided - Stream bottoms will be disturbed when fish barriers are removed. This may have minor short-term effects on the fish and insects which occupy these areas.

Conflicts with Other Land Management Plans - There are no conflicts with fish habitat improvement projects and land management plans of the adjacent area.

Energy Requirements - Some energy will be required in removal of barriers and construction and maintenence of fish habitat improvement facilities. This will be only a small portion of the total energy use of the Forest.

K. Minerals - Including Oil and Gas

Changes Since the Draft EIS

An oil and gas environmental assessment prepared by the Forest in 1980, documents the possible environmental consequences associated with leasing and provides the basis for the Forest's lease recommendations (except for the Hebgen Lake District). The environmental analysis to support the oil and gas leases was declared to be in violation of NEPA and the Endangered Species Act in a 1985 Federal Court decision. The Court ruled that all Gallatin National Forest oil and gas leases have been suspended pending the outcome of this lawsuit. New leases and subsequent lease reissuance will undergo additional analysis as required by NEPA. This analysis will be incorporated into this FEIS. Leases covered by the Hebgen Lake Oil and Gas Environemntal Analysis are still valid.

Forest Service responsibilities in minerals management are to make available energy and mineral resources from the Forest and to administer their exploration and development. The potential for extensive locatable mineral production appears to be high in the Stillwater Complex, and in the Jardine and Cooke City areas. Development activities would have a significant effect on the onsite environment, but disturbances would occupy a very small area on the Forest because underground mining techniques are anticipated. Each proposed activity will be subjected to intensive environmental analysis prior to approval.

The potential for oil and gas production exists. As of May 23,1984, applications to lease oil and gas rights on over 57,463 acres are on file. Leases have been issued on more than 255,716 acres. (These numbers change frequently as applications are granted, additional applications are made, or existing applications are withdrawn.) When the existing leases on the Forest expire, issuance of new leases will be based upon further environmental analysis. Extensive exploration activity has occurred but no development has been started. As with other minerals, each development proposal will be evaluated on a project by project basis.

The potential for minerals/oil and gas exploration and development does not change by alternative. However, those alternatives which emphasize roads will increase the likelihood for such exploration and development. Those alternatives emphasizing roadlessness and wilderness will decrease or foreclose the likelihood of exploration (see Tables IV-1 and IV-2).

Major discovery and development of mineral/oil and gas resources would have a significant effect on the environment: physical, biological, economic and social. Specific development sites (mines, well-head locations, and waste deposits) would be affected by ground disturbance, wildlife dislocation, etc. New roads would be constructed (see section on roads). Vegetation would be

destroyed and the sites would be difficult to rehabilitate. Water quality would suffer. Such development would cause an increase in the economic base by an increase of jobs in the area. The influx of people would cause a change in lifestyle and have an impact on local schools, police, and other community organizations and facilities.

There are no areas on the Forest that have been identified as having high potential for oil and gas. However, the Bridger, Bangtail, and periphery of the Crazy Mountain Ranges have moderate potential. Considerable exploration activity has occurred in the Bangtails in recent years. This area is generally roaded and in no alternative is it assigned to prescriptions which would require non-standard lease stipulations. The roadless portion of the Bridgers are proposed for wilderness in Alterantives 8 and 9. The Crazy Mountains would become wilderness in Alternatives 5, 8, and 9. These would, then, forego exploration and development. The roadless crest of the Bridgers and the core of the Crazies would not be developed or roaded in any alternative. These areas would continue to be difficult to explore for energy minerals or to develop in any alternative.

Oil, gas, or geothermal development could potentially affect some of the thermal features of Yellowstone National Park. Development in the Greater Yellowstone Area could eventually have cumulative effects on the recreation ahd wildlife resources which make the area unique. Because of its attraction to millions of visitors each year, any large scale development such as would accompany the discovery of a major field would affect the attractiveness of the area to the visitors.

This magnitude of development could have harmful effects on the grizzly bear if it occured in occupied habitat. The related activities of road construction, pipeline construction, and facility maintenance would greatly the risk of grizzly bear mortality. This activity could also displace bears from parts of their habitat.

Stipulations have been developed which will apply to leases in areas of high concern (e.g., key wildlife areas and areas with unstable soils or steep slopes). These stipulations can be found in Appendix D of the Forest Plan.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Earth moving, exploration, and development of mineral/oil and gas resources are likely to have a long-term effect on the productivity of the specific sites. Pits, drill-sites, waste deposits and roads are not easily rehabilitated. The disturbed sites are unlikely to be as productive, vegetatively, as before disturbance. Leasing, in itself, will not effect productivity.

Irreversible and Irretrievable Commitment of Resources - Leasing for oil and gas can be an irreversible commitment of the resource if the lease is exercised and oil and gas discovered. If development of the mineral or oil and gas occurs, the effects become irreversible with respect to the mineral resource unless economics dictate otherwise. Disturbed sites may be rehabilitated and, although the vegetation lost while the development was in place is not retrievable, the site preparation could actually improve future productivity.

Adverse Effects Which Cannot be Avoided - If development occurs, soil will be disturbed, erosion will occur, water quality will be lowered, and wildlife may

be relocated. Some visual resource will be lost. Oil and gas development, and especially minerals development, will have adverse effects on roadless land and wilderness values if they occur adjacent to these lands.

Conflicts with Other Land Management Plans - Land management plans for the adjacent areas give little consideration to the possibility for large mineral/oil and gas development.

Energy Requirements - Energy requirements will be slight unless mineral/oil and gas discoveries are made. Some energy will be used in monitoring the activities which now exist but this will be a small portion of the total Forest requirements. If a large mining development should go into production the energy requirements could be significant. A large mine could require construction of new transmission lines. Similarly a successful oil and gas well could produce a net yield of energy requiring pipelines and possibly additional electrical service.

L. Human and Community Development

A variety of programs provide employment for individuals in Forest activities. In summer, this number is supplemented by seasonal employees. There is also a program which involves the use of "volunteers". These individuals are usually retired persons or college students and volunteer for certain specific jobs. These programs have a 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 (Table IV-10).

Table IV-10: Forest Service Employment in Decade 1
(Person Years)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
227	303	190	250	240	240	255	225	221	255	219	104

The number of volunteers varies from year to year depending on availability of qualified individuals. The program contributes little to the economic base but is important from a social standpoint in that the individual volunteers obtain satisfaction in knowing they are contributing to the environmental well-being of the Forest.

The facilities occupied by the Forest personnel are covered under the section "Buildings and Other Facilities" (Page IV-22).

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The goal of all the personnel on the Forest is to maintain the long-term

productivity of the Forest. This desire is also what entices people, young and old, to volunteer for particular jobs on the Forest.

Irreversible and Irretrievable Commitment of Resources - None identified.

Adverse Effects Which Cannot be Avoided - None identified.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - The energy used by permanent, seasonal and volunteer workers on the Forest is related to specific activities and is discussed in the appropriate sections of this chapter. Energy use not related to specific activities is a rather small portion of the total Forest use.

M. Special Uses

The Forest administers about 762 special use permits which authorize use of about 27,282 acres and 275 miles of right-of-way. An additional 209 miles of road are managed in a cost-sharing agreement with Burlington Northern Railroad Company. Other permits include ski slopes, summer homes, powerlines, ditches, reservoirs, etc. The construction of these facilities has caused drastic change on the site where they are specifically located. The vegetation on the sites is often destroyed or drastically changed. For instance, establishment of ski slopes has resulted in clearing of forested slopes and replacement with grass/shrub cover. The special use roads have the same effect as other roads and will be discussed under the appropriate section. Each request for a new permit will be subjected to environmental analysis prior to consideration.

Special uses do contribute to PNV because fees are collected from permittees. These fees do not offset the administrative costs of the program. The dams and ditches contribute significantly to the economic base of the surrounding area. Irrigation of croplands is a significant use in the Gallatin and Yellowstone valleys. Most of the water used originates on the Forest and is diverted to the fields by these special use dams and ditches. Reservoirs on the Forest provide water to surrounding communities. The city of Bozeman is dependent on reservoirs on the Forest. The lifestyle of the water users would change drastically in absence of the water storage and distribution system.

The special use ski areas are of regional and national significance. The ski area users contribute significantly to the local economy.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The vegetation on some specific sites occupied by special uses such as summer homes is destroyed. On other sites such as ski areas trees are replaced by grass and shrubs. These effects will remain as long as the facilities remain on the ground.

Irreversible and Irretrievable Commitment of Resource - Most special uses will likely be maintained into the foreseeable future. The vegetation lost by their existence constitutes an irretreivable loss of resource.

Adverse Effects which Cannot be Avoided - The soil disturbed by construction of special use facilities will tend to stabilize over time. Facilities may not blend well into the natural landscape.

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.

N. Rights-of-Way and Cost Share

Road and trail rights-of-way are acquired by the Forest from private or other owners, usually in connection with the Forest's timber and general Forest access programs. Rights-of-way on which roads are constructed affect about 20 acres of private land each year.

Cost-share agreements are negotiated between the Forest and owners of private land inside the Forest boundary. Agreements cover the administration of roads and both parties share in the construction and maintenance costs.

Construction and maintenence of roads is the only environmental effect associated with rights-of-way and cost share agreements and this is discussed under "Transportation System".

Short-term Use Vs. Maintenance and Enhancement of Long-Term Productivity - Rights-of-way gives the Forest an opportunity to manage lands which might otherwise be unavailable. Productivity on the accessed lands can be maintained or improved. Cost share agreements allow private land owners access to lands to harvest timber or other resources and reduce costs of roading to both parties.

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 imply an irreversible use and the vegetation removed by the construction and maintenence constitute an irretrievable loss of a resource.

Adverse Effects Which Cannot be Avoided - Some rights-of-way are difficult to acquire and may be obtained by condemnation. Such actions are seldom pleasant for both parties. Adverse effects of the resulting roads are discussed under "Road System" (pages IV-56 to IV-60).

Conflicts With Other Land Management Plans - Access to the Forest boundary and to private lands within the Forest may conflict with other plans in the area.

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.

O. Property Boundary Location

The amount of Forest boundary surveyed annually is related to the amount of activity requiring the need to locate and mark ownership. About 43 miles are located each year. This 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 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 effect the economy of the area.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Location of boundary has no effect on productivity other than it establishes the sites on which management activities by the different owners might occur.

Irreversible and Irretrievable Commitment of Resources - There is no commitment of resources associated strictly with boundary location. The commitment occurs on one or both sides of the line when specific actions are initiated.

Adverse Effects Which Cannot be Avoided - Some vegetation may be removed or pruned along the lines but the effect should be short lived.

Conflicts with Other Land Management Plans - None identified.

Energy Requirements - Some energy is expended in travel when surveying but this use is small compared to total Forest use.

P. Land Ownership and Adjustment

Land exchange proposals are generally initiated by private owners. Exchange proposals for the future are unknown and there are no differences in how they will be handled between alternatives. Historically, about four proposals are received each year but less than two exchanges are acted on each year. About 25 percent of the land within the Forest boundary is privately owned and may, at some time, be subject to consideration for exchange. Each proposal will be subjected to appropriate analysis to help guide subsequent action.

Alternatives 8 and 9 envision large land ownership adjustment programs needed to establish wilderness in areas which presently contain significant amounts of privately owned lands. Some of the private landowners may be unwilling to sell these lands or to exchange their ownerships within the areas for land outside of the areas proposed for wilderness in these two alternatives.

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.

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 may or may not be committed to particular uses according to the land management plan in effect at the time.

Adverse Effects Which Cannot be Avoided - The Forest Service loses control of the management of lands which enter private ownership through exchange.

Conflicts With Other Land Management Plans - None identified.

Energy Requirement - Little or no energy is used in land exchange.

Q. Buildings and Other Facilities

The Forest owns, leases, or maintains 110 buildings. They include houses, barns, offices, VIS centers, work centers, garages, storage facilities, fire lookout towers, and others and are located throughout the Forest. These structures occupy about 620 acres, an insignificant portion of the total Forest acreage. Construction causes some soil disturbance on the sites. Water relationships for the specific sites have been changed because of the landscaping and maintenance. In some locations, the presence of buildings has changed the visual quality. New buildings or facilities, other than those discussed under "Developed Recreation" are not contemplated under any alternative. Maintenance will continue on all present facilities.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Vegetative productivity will not exist during the life of the facilities.

Irreversible and Irretrievable Commitment of Resources - Since no plans have been made to destroy or remove buildings or facilities, the commitment to this use is irreversible. The vegetation lost represents an irretrievable commitment.

Adverse Effects Which Cannot be Avoided - Although efforts have been made to landscape building sites, the presence of the facilities does affect natural appearance. Effects of soil disturbance will remain long after the facility is gone.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - The energy required to heat and light the various administrative buildings will not significantly change among alternatives.

R. Fire Suppression

The purpose of fire suppression is to minimize damage to valuable resources by controlling, containing, or confining fires. The extent of fire suppression activities depends on fire starts, weather, and amount of prescribed fire allowed to burn or amount of fires set to meet management objectives.

Successful long-term suppression has a favorable 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 even 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 Forest Service, 1978) because of the resulting surface water erosion.

Fire is one of nature's methods of controlling or reducing insect and disease infestations. In some cases, protection from fire causes conditions condusive to both insects and disease, resulting in the creation of fuels created by dead

and dying trees. (Extensive tree kill by insects creates fuel conditions condusive to fire which may last for many years.) These areas of insect- or disease-killed trees may be extensive and, unless trees are salvaged, will contain fuel for large, hot, hard-to-suppress fires.

Fireline construction with hand tools or heavy equipment can increase the potential for soil erosion. In order to stop fires, firelines are dug to expose mineral soil which is more susceptible to erosion than soil covered by litter or humus. Placement of the fireline, across slope or up and down slope, has an effect on amount of erosion. The potential for soil movement is increased by use of heavy equipment on steep slopes or on soils susceptible to erosion.

The average annual cost of fire suppression on the Forest from 1976 to 1980 was $234,000. Projecting this cost over the planning horizon results in a $5.8 million decrease in PNV because no measurable benefits offset the cost. Since fire suppression provides jobs for a number of seasonal employees and as some of the equipment and provisions used in fire supression is purchased or leased locally, the program contributes to the economic base of the area. The cost of the fire management program on the Forest is shown in Table IV-11 by alternatives:

Table IV-11: Fire Suppression Program--Annual Consequences by Alternative

TOTALS	ALTERNATIVE									DEP
	* * * 1	2	3	4	5	6	7	8	9	10
Acres Burned	353	295	306	268	298	299	298	298	298	298
Federal Firefighting Fund Costs ($M)	307	262	272	236	265	266	265	265	265	265
Resource Damage($M)	57	43	47	42	44	45	44	44	44	44

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Effective fire suppression will protect the current crop of trees. If practiced on any one site for too long, it will induce a change in vegetative composition and density which may or may not effect productivity. Fire protection may create situations where dry fuels are so abundant that fires are difficult to combat. Overall, fire suppression generally maintains productivity and enhances the possibility that trees can be harvested at the appropriate time.

Irreversible and Irretrievable Commitment of Resources - Since it is unlikely that fire suppression will be halted it is, in essence, an irreversible commitment of resources. Natural changes in vegetation, desirable or undesirable, due to fires constitute an irretrievable loss of that resource.

Adverse Effects Which Cannot be Avoided - Loss of soil due to construction of firelines will occur despite care in location and preventive measures. Buildup of fuels will continue in areas protected by fire suppression.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Energy required in the fire suppression program is dependent on the number and kind of fires. In bad fire years, this use can be a substantial portion of the total energy expended by the Forest.

S. **Managed Fire**

Managed fires consist of prescribed fire (unplanned ignition) which will be allowed to burn under observation or prescription in accordance to a predetermined set of conditions. Managed fire also consists of planned ignitions for specific purposes such as improving wildlife and livestock range. Controlled burning is also used to dispose of logging debris following timber harvest. Each of these types of managed fire will be discussed under the appropriate heading.

Managed or unplanned ignitions are currently included in the management direction for the Gallatin. This direction varies by alternatives and is displayed in Table IV-12:

Table IV-12: Annual Prescribed Fire Program by Alternative

UNITS	* * *	ALTERNATIVE 1	2	3	4	5	6	7	8	9	DEP 10
Acres Treated		4500	5200	2600	3500	3000	2700	6360	6360	6360	6360
Costs (M$)		245	383	171	246	227	215	299	299	299	299

Managed fires can stimulate seed germination and brush resprouting, thus increasing forage production for big game. Burning of trees, brush, and debris may temporarily alter the habitat of animals and birds. This improves habitat for those species preferring open areas and degrading habitat for those preferring dense vegetation. Because of this, managed fire tends to increase vegetative and animal diversity (Davis, 1982). At the same time, the burned area degrades the visual landscape for a short period of time until new plant growth screens the effects of fire. In the process of burning, accumulated fuels are consumed, which can reduce the severity of future fires.

Managed fires are seldom so hot that everything, overstory and understory, is consumed. Fires attaining this magnitude are usually suppressed. Even so, soils are exposed to runoff and this can result in lowered water quality for a short period of time.

Because a managed fire can burn for long periods of time, air quality can be adversely affected during these periods. The effect is likely to be less intense, at any one time, than with large intense wildfires. Reduced air quality should be similar to that produced by fires ignited for specific purposes-- wildlife range, livestock range, and slash control.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The act of 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 species composition usually changes. A new cycle of vegetative succession is begun and allowed to continue unless interrupted by fire. Animals will be displaced until their habitat is re-established. The native productivity is not destroyed and, in fact, may be temporarily enhanced by the availability of the minerals in the ash. Exceptions are cases of hot, intense fires where soil productivity is lessened.

Irreversible and Irretrievible Commitment of Resources - A proposal to allow a fire to burn is not irreversible. Analyses are made for ignitions to decide whether a particular fire should or should not be suppressed. If the fire is allowed to burn, the consumed material is irretrievable.

Adverse Effects Which Cannot be Avoided - The burned area will remain visible for a short time. Soil is bared and a small amount of soil erosion may occur which will lower water quality. Smoke will be generated into the atmosphere. Habitat for some animals and birds will be temporarily destroyed.

Conflicts with Other Land Management Plans - None identified.

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

Range management includes all activities involved with management, use, and protection of range resources to provide for efficient livestock grazing. Currently, 43,400 AUM's of livestock grazing takes place on the Forest annually, with an additional 15,900 AUM's grazed on intermingled private lands where management of the grazing resource is waived to the Gallatin National Forest. The projected demand for additional livestock grazing is impossible to precisely predict but is known to be greater than provided by any alternative. This is evidenced by the number of inquiries as to the availability of grazing permits, number of applications received when there is forage available for assignment, and applications by existing permittees to increase permitted numbers.

1. Livestock Forage Outputs

Grazing increases will be attained by stocking more animals on existing allotments through improved range management practices and by instituting grazing on areas not presently stocked. Actual livestock potential is shown in Table IV-13.

Table IV-13: Annual Potential Livestock Forage (Thousands of AUM's)

DECADE	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
1	43.4	44.9	31.8	44.9	44.9	44.9	44.9	44.9	40.0	44.9	59.0	0
3	43.7	65.1	29.9	57.2	45.6	49.3	45.0	45.0	40.0	50.0	57.0	0
5	45.7	66.8	28.8	59.7	45.6	49.8	45.0	45.0	40.0	50.0	57.0	0
10	47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	56.0	0
15	47.0	67.8	28.0	60.0	45.6	50.0	45.0	45.0	40.0	50.0	59.0	0

Source: FORPLAN Reports

Alternative 3 would reduce livestock AUM's from current levels. All other alternatives either maintain or increase livestock AUM production. The difference in grazing potential is a result of the amount of suitable range proposed for livestock grazing and the amount of money invested in range improvements such as sagebrush burning, noxious weed control, fences, and water developments. Table IV-14 identifies the acreage of range prescribed to grazing and the amount of improvements proposed by alternative.

Transitory range is created by timber harvest and will be available to livestock in all alternatives. The amount of transitory range assigned to grazing is shown in Table IV-14. There appears to be no adverse effect of livestock grazing on timber production in any of the alternatives except 2, 4, and 5, which provide for intensive grazing on transitory range and will adversely affect reforestation success. The alternatives include timber harvest on dry sites with a high potential for transitory range. Livestock use of these areas will result in delayed tree regeneration and poor stocking levels because of trampling.

Table IV-14: Summary of Range Programs and Effects (Avg. Annual)

ITEM	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
	---------- Thousands of Acres----------											
Range Acreages												
Suitable Range	331.8	331.8	331.8	331.8	331.8	331.8	331.8	331.8	381.8	331.8	381.8	0
Suitable Open-to-Grazing	282.2	282.2	282.2	282.2	282.2	282.2	282.2	282.2	282.2	282.2	282.2	0
Suitable Grazed	171.9	256.3	110.5	229.1	232.1	191.1	191.1	191.1	74.9	191.1	131.9	0
Transitory Range Utilized												
--Decade 1	16.2	16.1	16.5	16.2	16.5	16.3	15.7	15.7	16.5	15.7	--	331.8
--Decade 2	15.9	16.5	13.4	10.9	15.2	11.8	15.4	15.4	13.4	15.4	--	282.2
--Decade 3	18.3	23.3	9.1	10.2	14.4	11.3	14.9	14.9	9.1	14.9	--	0
--Decade 4	25.8	33.6	7.5	17.3	16.5	14.6	19.8	19.8	7.5	19.8	--	0
--Decade 5	22.5	29.9	5.1	19.7	13.2	13.5	19.1	19.1	5.1	19.1	--	0
	----------Acres----------											
Nonstructured Improvements												
Sagebrush Burning	242	390	75	351	390	240	200	321	75	321	--	0
Larkspur Spraying	400	628	124	554	629	367	280	497	124	497	--	0
Noxious Weed Spraying	569	905	176	809	907	524	388	730	176	730	--	0
	----------Miles----------											
Structural Improvements												
Fence Construction (Mi./fence @ $1000/mi.)	3.6	5.6	1.2	5.0	5.6	3.2	4.4	4.4	1.2	4.4	--	0
Water Improvements (Mi./water @ $3500/mi.)	3	5	1	4	5	3	4	4	1	4	--	0

Based on the FORPLAN model assignments, adjusted after a forage analysis by the ID team. See --"Developing Livestock and Wildlife Productivity Figures for the Gallatin Forest Plan," Accomplishment Report, Planning Records (July 29, 1981).

2. Interaction between Livestock Grazing and Wildlife/Fish

Elk winter ranges are in many cases important spring and fall livestock ranges. When elk and domestic livestock both use elk winter range--even a different times of the year--there is a potential for adverse impacts on both species. This comes through diminished levels of forage on the range when the elk need it and from reducing plant vigor for good forage production in subsequent growing seasons.

The different alternatives distribute winter range forage differently between elk and domestic stock. Alternatives 2 and 5 call for greater use of winter range forage by livestock than do the other alternatives. The forage left on the winter range for elk use is correspondingly lower with these alternatives. This reduction would cause the elk to move onto adjacent private winter range.

Alternative 7 (Preferred Alternative) increases grazing on winter range only where it can be accomplished through greater investment to increase forage

production, not by assigning a greater proportion of the presently available forage to livestock.

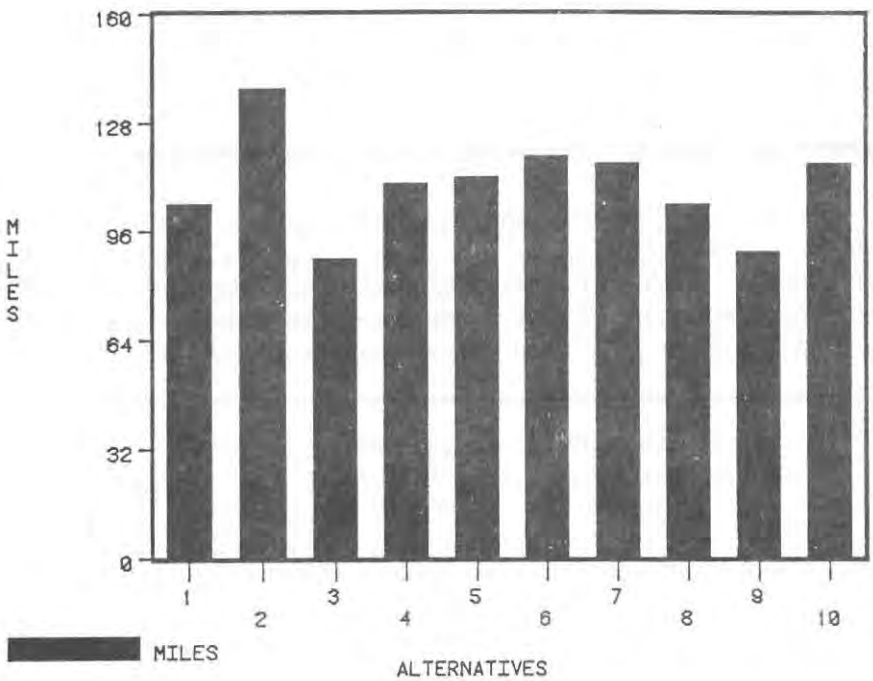
Big game animals' use of summer range provides for their winter survival. Alternatives 2, 4, and 5 with high livestock AUM outputs would increase livestock densities on summer range. The increased stocking would increase competition for forage and would also cause elk and other big game to leave some areas because of an intolerance to the presence of domestic stock. This would not reduce the elk population because there is approximately 3 times as much elk summer range available as there is the more critical winter range.

Increased grazing in occupied grizzly habitat would increase the potential for man/bear confrontations. All alternatives provide secure habitat for the grizzly in the areas determined to be needed for recovery of the species.

Riparian habitats would be subject to increased grazing pressures in Alternatives 2 and 5. Moose, elk, white-tailed deer, and many noname species would be adversely affected. These impacts will be mitigated in Alternatives 7 and 10 by using rotation-type management systems, or by installing fence and water developments to better distribute the stock away from the riparian areas. See the Forest Plan for utilization standards in riparian areas.

Miles of sensitive fishery streams impacted by grazing are shown by alternative in Figure IV-1, based on the Forest's fisheries analysis (Planning Records, 1981). Most of the decreases in fish population due to cattle grazing would be a result of a loss of riparian grasses and forbs adjacent to sensitive fishery streams (Bjornn, 1977; Bossu, 1954; Platts, 1979; Murphy and Hall, 1980).

Figure IV-1: Miles of Sensitive Fishery Streams Impacted By Grazing



An increase of 30,000 catchable trout could be gained over current levels by reducing grazing use in the riparian zone to 40 percent utilization along the 104 miles of sensitive streams presently grazed. In Alternatives 7 and 10 this level of riparian forage utilization would be implemented.

Soils in riparian areas will be eroded and compacted by livestock to some extent in all alternatives. These effects will intensify with the increase in livestock grazing under certain alternatives, particularly 2 and 5. Investment levels to mitigate livestock impacts to riparian are adequate except for Alternatives 2 and 5. Site-specific impacts on riparian areas will occur under all alternatives.

Livestock impacts on riparian areas can be mitigated by redistributing the stock away from streams through use of fencing and water developments (EPA and BLM, 1979). However, these developments can also adversely affect soils by trampling because livestock tend to trail along fence lines concentrating in fenced corners and near water developments. Alternatives 2 and 5 have the most miles of fence and the most water developments. Alternatives 2, 4, and 5 will affect soils the most. Other alternatives, including the Alternative 7 (Preferred Alternative), have fewer fences and water developments.

3. Other Considerations

Cattle or sheep grazing may annoy some recreationists because of smells, flies, visibility, noise, and manure on trails and around campsites. Most of these conflicts will be in meadows and grasslands near level terrain and slow-moving streams. Management of these areas is designed to maintain adequate vegetative ground cover. This in itself limits cattle use in most areas to acceptable levels.

Grazing fees add to the PNV of the Forest. However, total contribution to PNV is less than 3 percent under any alternative. Though grazing is an historic use on the Gallatin, livestock numbers have declined significantly over the years. This is primarily due to sheep allotment closures in the 1950's and 1960's for resource protection. There are 164 livestock permittees grazing livestock on 148 active allotments. Many of these ranchers are dependent on the Forest forage for a significant portion of their ranching operation.

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.

Irreversible and Irretrievable Commitment of Resources - There is a long tradition of ranchers utilizing grazing allotments 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.

Adverse Effects Which Cannot be Avoided - Conflicts will continue to exist between livestock and big game. Facilities (fences and water developments) on rangelands 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. All these adverse effects are minor and local in nature.

Conflicts with Other Land Management Plans - None identified.

Energy Required - Energy required by the Forest in livestock management is not great. Some may be required in monitoring the resource and in maintenence of some facilities. This will not be a significant portion of the total used on the Forest. Permittees will also use energy in managing livestock while on the Forest and in moving livestock to and from Forest rangelands.

U. Utility Transportation Corridors

For this discussion, utility corridors are linear strips of land which contain existing power transmission lines or have been identified as having advantages for future locations for utilities. Electronic sites are occupied by radio, television, or microwave telephone transmission facilities.

The Forest presently has five utility corridors with electric transmission lines for 69 to 230 kilovolts (kV). Four of these corridors (Flathead Pass, Gallatin Canyon, Reas Pass, and Emigrant to Gardiner) are presently occupied by transmission lines. The 161 kV line from Clyde Park to Emigrant is presently under construction. Application has been received and centerline selection is presently underway for an additional 69 kV line in the Emigrant to Gardiner corridor.

An analysis has been made to define the kinds of land which should be avoided in permitting or construction of linear right-of-way utility lines, oil and gas pipelines, and communication lines (Bonneville Power Administration, 1977). This analysis inventoried existing facilities and potential corridor locations. Guidance for the analysis is contained in a Region 1 letter to the Forests on Corridor Planning Guidance, 1990 Special plans and Studies, dated October 7, 1982. Avoidance areas are defined as areas where establishment and use conflict with land use/land management objectives. Exclusion areas are defined as areas where such facilities are not allowed.

The analysis cited above identified a possible corridor from the Emigrant area through the Tom Miner Basin and across the Gallatin Divide to the Gallatin River in the area of Buffalo Horn Creek. This corridor could tie with a corridor through Big Sky and Jack Creek to Ennis. This is the only identified corridor which crosses a roadless area being considered for wilderness in Alternatives 8 and 9. These alternatives would exclude future considereation of the Tom Miner to Buffalo Horn segment for an energy transmission corridor. The potential for use as an energy corridor would not be affected by the other alternatives. The likelihood of this corridor being seriously pursued for a energy corridor may have been lessened due to the construction of a transmission line from Bozeman to Ennis through the Norris area. The study also identified a corridor from the Gallatin River south of Big Sky through the Taylor Fork area, across the Madison Range, and down Indian Creek on the Beaverhead National Forest. This route has been effectively closed by the Lee Metcalf Wilderness.

Another corridor identified in the study passed along the northern boundary of Yellowstone Park from Gardiner to Cooke City. This route was eliminated by the Absaroka-Beartooth Wilderness.

Corridors, in themselves, have no impact on the area. Only when these corridors are occupied does the impact occur. Prior to construction of a utility line or oil and gas pipeline, an appropriate analysis would be required to establish the final location of the facility and, likely, its supporting road. At this time, the effects of the facilities would be displayed. The existing electronic sites on the Gallatin occupy minor amounts of land and have little effect on the environment other than their effect on visual quality.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The existence of an unoccupied corridor has no effect on long-term productivity. The existing, occupied corridors have little effect on long-term productivity.

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 corridor does not cross identified exclusion areas, the possibility of occupation by a utility does exist. The timber cleared for the right-of-way maintenance of existing powerlines is an irretrievable commitment of that resource.

Adverse Effects Which Cannot be Avoided - The right-of-way clearing, power poles, and conductors detract from natural appearance of the landscape.

Conflicts with Other Land Management Plans - None identified.

Energy Requirements - A minor amount of energy is used for administration of facilities.

V. Watershed Improvement and Maintenence

Specific watershed projects are mostly designed to improve or maintain water quality. They are similar to projects to improve fish habitat and affect small acreage on the Forest. The main emphasis of watershed protection is inherent in road building, timber harvest, grazing, and minerals development. Specific projects include channel stabilization, debris removal, cleanup, and restoration of overused sites. Each project is quite important to the few acres or short stretchs of stream involved. Effects range from lessening soil erosion along streambanks, preventing overflow or stream channels by removing debris, stopping pollution by cleanup of old waste dumps, and similar actions. Effects will include improvement of fish habitat in and below the projects and improvement of the water quality downstream from the projects. Each project will be subjected to analysis before being initiated, and the effects will be identified. The number of projects does not vary between alternatives.

Water quantity is an important issue on the Gallatin because of the requirements for downstream irrigation, protection of high value trout fisheries, and maintenance of quality water for municipal uses. Alternatives that increase the amount of timber harvest will result in increased water yield although the amount is not significant. Increased water yield can damage stream channels and increase channel sediment levels which would adversely affect fisheries and water quality (Megahan, 1980; Troendale and Leaf, 1980; Leaf and Anderson, 1975). Alternatives which concentrate timber harvest on a smaller suitable timber base have the greatest risk for increasing water yield and sediment to particular drainages. Watershed analysis will be a part of all analyses for

road construction, grazing, minerals development, and timber harvest to assure that stream channel stability and sediment levels in streams are within acceptible levels (WATBAL System - Wilson, Patten, Megahan, 1982).

The amount of roadless land affected by timber harvest activities varies by alternative. Of the existing 638,000 acres of existing roadless acreage outside of designated wilderness, the amount of area to be impacted ranges from 149,500 acres for Alternative 2 to 3,900 acres for Alternative 3. This would occur over the next 150-year period. The Preferred Alternative, Alternative 7, identifies 92,800 acres of the existing roadless land for timber harvest over the 150-year planning period. The timber harvest activity would eliminate the areas from future wilderness consideration.

Most of the existing roadless lands of the Forest will not be affected by timber harvest in any of the alternatives. A more detailed breakdown of tentatively suitable timber acreage in existing roadless areas is described in Appendix C.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The few acres of specific watershed projects each year will have an effect on the specific sites. Streambank stabilization and debris removal will protect water quality not only on the site but also downstream from the site. This will effect the long-term population of fish. Areas that are cleaned to prevent pollution will eventually return to original vegetative condition and productivity.

Irreversible and Irretrievable Commitment of Resources - Commitment only exists if the projects are not completed. Watershed projects return areas to productivity.

Adverse Effects Which Cannot be Avoided - When working in streams to stabilize channels and remove debris, the stream bottom will be disturbed and water quality will deteriorate for a short period of time.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Energy will be required to complete the projects and to monitor watershed conditions on the Forest but this will be a small portion of the total Forest Use.

W. Insects and Disease

The most effective means to conduct a meaningful integrated pest management program on the Forest is through vegetative manipulation by timber harvest. This may involve a harvest system (clearcutting) and effects of this are discussed in this chapter. The program may also involve emphasis on certain tree species.

Approved pesticides may also be used as necessary in conjunction with silvicultural systems to provide needed protection of the timber resource. Environmental effects are associated with chemical control, although these effects may vary by the type and amount of chemical used and the method of application. In most cases, the major impact would be on non-target insects which would have a secondary effect on the food resource of birds and animals in the area. Streams, though avoided to the extent possible, would be affected by

pesticide drift and affect the food supply for fish. Despite greatest care, there is always the danger of spills and misapplication.

Proposals for use of pesticides or herbicides would be subjected to strenuous analysis prior to initiation.

Insect and disease control has the potential for affecting the local economy. If large infestations occur and controls are not applied, timber available to the local markets can be much reduced over the long term. Efforts to combat infestations do not contribute much to the local economy since these efforts are a part of the regular workload (timber harvest) or, in case of pesticide use, are short term. Calculation of PNV is little affected by insects and disease since it is assumed that major uses of chemicals will not occur.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The application of appropriate silvicultural methods to control of insects and disease increases the long-term productivity of the Forest from the standpoint of recoverable resources. The native productivity is not affected by either control or lack of control.

Irreversible and Irretrievable Commitment of Resources - The only control measure proposed by the Forest involves silvicultural means. Harvesting in a certain way implies that the new generation of trees will also be harvested. Though this is not irreversible, it is a long time commitment. Trees killed by insects because of lack of control represent an irretrievable loss of that resource.

Adverse Effects Which Cannot be Avoided - Silvicultural attempts to control insects may result in harvest of trees in areas that severely affect visual quality and may also result in larger than preferred cutting units.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Energy required to combat insects and disease by silvicultural means is equal to that of the regular work load. Should a proposal be made to use pesticides, considerable energy would be required but this would be disclosed by the appropriate analysis.

X. Timber Harvest

Timber management consists of a series of activities which are prescribed to regulate growing, tending, harvesting, and regenerating wood crops on suitable timber sites. Timber harvest is one step in the process of overall timber management. Explained under this heading are effects of differing amounts of suitable acreages by alternative. Also discussed are the effects of silvicultural harvest systems. Subsequent sections will discuss other aspects of timber management including logging methods, slash disposal, plantings, etc.

The Forest harvests timber from areas identified as having suitable timber. The amount of suitable timber acreage and the volume of timber harvested per acre of suitable timber varies by alternative due to differing emphasis of management for other resources.

The long-term sustained timber yield under each of the alternatives is shown in Table IV-15. The amount of land identified as suitable timber acreage is shown in Table IV-16.

Table IV-15: Long-Term Sustained Timber Yield
(Million Board Feet/Million Cubic Feet)

	ALTERNATIVE/BENCHMARK											
UNIT	*** 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
MMBF	30	43	10	35	30	25	27	25	23	33	8	0
MMCF	7.4	10.8	2.6	9.0	7.0	6.4	6.9	6.3	5.8	8.4	2.6	0

Table IV-16: Acreage of Suitable Timber
(Thousands of Acres)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
247	368	85	310	239	229	305	216	199	314	65	0

It is apparent from the two preceding tables that the difference in the amount of suitable timber acreage by alternative affects the volume of timber harvest. The most efficient silvicultural treatment to accelerate tree growth in natural regenerated stands on the Gallatin is to precommercial thin at approximately age 20. This practice is provided for in all alternatives. Alternative 2 emphasizes timber harvest while Alternative 3 provides for the least amount. The other alternatives represent a mid range of timber harvest.

The 1980 RPA revised statement of policy found in Forest Service Manual 1920, 10/82 R-1 Supplement 5 requires a comparison of the long term sustained yield (LTSY) for timber with the projected growth rate at year 2035 for the Preferred Alternative. The LTSY for Alternative 7 (Preferred Alternative) is 6.9 MMCF per year. The predicted growth rate at year 2035 is 67.5 MMCF, indicating the Forest would achieve 73.5 percent of potential growth by the fifth decade if managed under Alternative 7. The reason for this is a combination of two factors:

1. Reductions in standing volume after the first decade, due to the effects of the mountain pine beetle. Yield tables for lodgepole pine depleted by mountain pine beetle were used to model all alternatives.

These tables show that there is a reduction in the harvest after the first decade if beetle-infested stands are not harvested in the first decade. No massive harvest of the beetle-infested stands is possible in Alternatives 7 and 10 in the first decade because the objective of these alternatives is to distribute harvest across the Forest. Therefore, harvest volume for beetle-infested stands drops between the first and second decades, and the drop influences the growth at 2035.

2. Carrying low growth stands in the inventory past the fifth decade. The relatively large timber base and modest harvest level of early decades causes many acres with low growth to be carried in the inventory well past the fifth decade. This reduces growth below potential.

To reach 90 percent of LTSY, the Gallatin would need to ignore early harvest on the west side of the Forest and concentrate almost exclusively on the Absaroka and Crazy Mountain ranges. This would leave vast areas already depleted by the mountain pine beetle in a reduced state of growth.

Alternatives with largest acreages of suitable timber have the potential to provide the most beneficial effect on the timber resource. These benefits include:

1. Improved age class and size class distribution,
2. Maintenance of healthy, vigorous stands,
3. Reduced threat of insects, disease, and wildfire,
4. Better utilization of growth potential of timber growing sites,
5. Production of higher levels of timber.

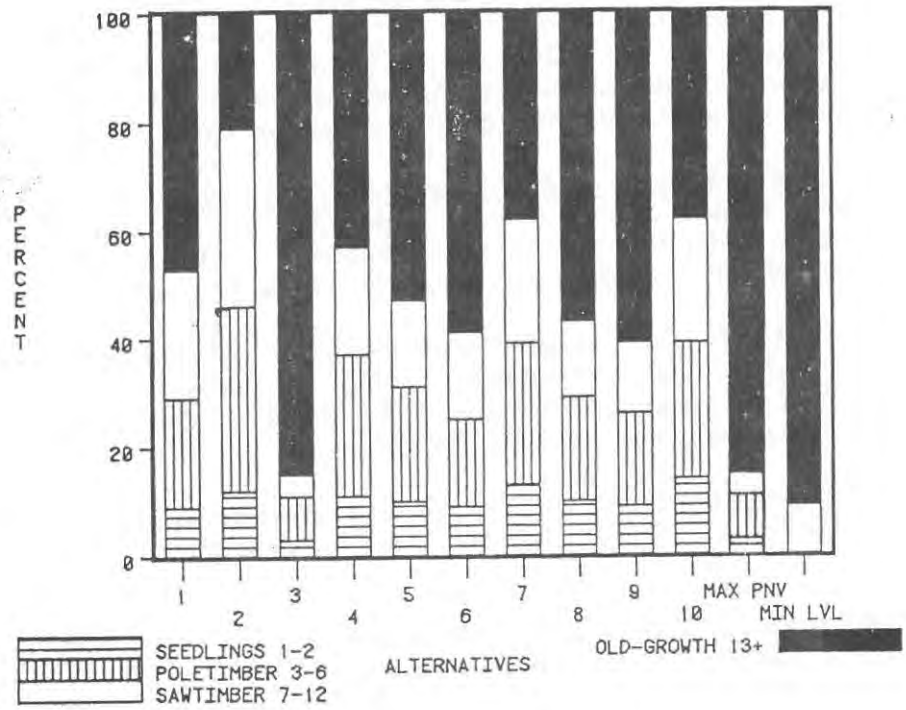
The large suitable acreage assignments afford better flexibility in achieving a given base harvest schedule and provide better geographic or spatial distribution of the harvest.

The combination of volume production and suitable land base varies by each alternative according to the management objectives of the alternative. Alternatives 2, 4, 7, and 10 provide the best distribution of age classes forestwide because of their harvest schedule and suitable timber base size. Figure IV-2 shows the distribution of timber age classes in commercial forest land in the tenth decade of each alternative:

Mountain pine beetle, western spruce budworm, and dwarf mistletoe are the common insect and disease pests on the Gallatin (McGregor and Others, 1980). A major infestation of mountain pine beetle is decimating lodgepole pine currently and must be considered the most serious threat to the timber resource. How effectively each alternative deals with this problem forestwide is reflected in the acreage of the capable and available timberland proposed for timber management and how well the alternative redistributes the acreages of different age classes.

Alternatives 2, 4, 7, and 10 which provide the best age class distribution would also reduce the long-term losses of lodgepole pine to mountain pine beetle (Cole, 1980). They would also reduce the probability of wildfire in a larger area of the Forest.

Figure IV-2: Age Class Distribution (Tenth Decade)



As described earlier in the wildlife section, these same alternatives would result in more diverse forest habitat spread out over the Forest. The alternatives with smaller suitable timber land bases would limit the ability to improve age class distribution and habitat diversity through timber management.

1. Timber Cutting Systems

There are three basic timber cutting systems utilized on the Gallatin for regeneration harvest. Clearcutting and shelterwood cutting systems, which produce even-aged timber stands, are the main harvest systems used on the Gallatin. These systems account for over 90 percent of the volume harvested. The other uneven-aged harvest systems will be practiced on a limited basis in special areas because it is very difficult to successfully employ this system in our timber types. Also, there are two intermediate harvest systems needed: commercial thinning and sanitation-salvage harvest (Smith, 1962).

a. Even-Aged System of Timber Harvest

Three methods of even-aged timber harvest are used to varying extent in each alternative. These are clearcut, seed tree, and shelterwood. In clearcutting, all trees are removed from the area in a single cut. In seed tree and shelterwood cutting, a few trees are left in the area 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 period of time, openings are thus created and more soil is exposed to erosion (Bethlahmy, 1967; Megahan and Kidd, 1972). The alternatives with the higher amounts of suitable timber have the most even-aged harvest systems.

Even-aged management has effects on the visual resource which may vary by alternative and depend on visual quality objectives of the alternative. The greatest visual degradation would occur in the high timber harvest alternatives in which large areas are assigned to modification or maximum modification visual quality objectives (Table IV-17). Maximum modification is generally associated with clearcutting. That portion of the Forest outside wilderness which is unsuitable for timber harvest or is to be managed in the retention or partial retention visual objectives contains few or no areas to be harvested by an even-aged harvest system.

Table IV-17: Area in Modification and Maximum Modification Visual Quality Objectives (Thousands of Acres)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
338	527	111	462	328	309	403	361	272	421	197	0

As trees are removed, evapo-transpiration is reduced and more water is infiltrated into the groundwater system. This is emphasized when even-aged harvest systems are used because the entire mature forest canopy is removed. In extreme cases, this can lead to mass failure and the slipping of large areas of soil and rock on steep slopes and clay soils (Dryness, 1967; Fredrickson, 1970; Megahan, 1971). Mass failure hazards exist on the Forest and potential problems will be dealt with on a case-by-case basis.

The increase in infiltration and the tendency for openings to accumulate snow results in increased water yield which generally occurs at the time of peak flow. The water regime for an area harvested by an even-aged management system will generally recover to preharvest conditions about 20 years after harvest (Garn and Malmgren, 1973). This increased flow can be of benefit to farmers who irrigate downstream if storage capacity (dams) exist to capture the increased flow. Increasing the flow at peak times also can affect the stability of the stream banks resulting in some erosion.

Even-aged management of riparian areas affects stream environments if trees are removed from the streambanks (Weaver, 1983). Bank stability is reduced and debris which could provide fish habitat is removed (Bryant, 1983; Frear, 1982). The debris, which presently forms dams, will eventually rot and wash downstream and the large trees which would form future dams will be removed. A satisfactory pool-riffle ratio cannot be maintained. Current debris dams would disappear within the next 40 years and the fish population would decrease.

Removal of all trees from streambanks would also affect the temperature of the stream which would have an effect on the ability of the cold-water-demanding trout populations.

The effect on total fish population of the Forest depends partly on how much of the riparian timberland area will be managed with even-aged systems (Franklin and others, 1981). The riparian areas will be managed to provide preferential treatment for the maintenance or enhancement of the fisheries resource.

Even-aged harvest systems provide the best opportunity for reduction of fire hazard. In clearcuts, there are no living trees to be protected from fuel elimination methods. Slash and other fuel reduction in seed tree and shelterwood harvests is more difficult and costly because the standing trees must be protected from the fuel elimination method.

More forage is produced by clearcutting and seed tree harvest systems than all other systems (Planning Records). Less forage is produced in the shelterwood system and the forage increase lasts for a shorter period because trees occupy more of the site for more 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. Wildlife species which prefer openings or sparse canopies will find more suitable habitat and those species prefering 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.

Big game habitat is impacted by the distribution and scheduling of timber management activities. Increased roaded access and timber harvest activities can reduce security. If wildlife objectives are of high priority, the security of animals on winter ranges is protected. On potential winter ranges, however, where timber management objectives take precedence over wildlife, the security of big game utilizing those winter ranges is relatively low. Alternative 3 provides the most security to animals on winter ranges, because most of the winter ranges are managed to meet big game objectives. Alternative 2 provides the lease security, because timber management objectives take precedence on much of the winter ranges.

Timber management activities adversely affect big game if there is not enough forage or if forage cannot be used because cover is inadequate.

Intensive timber management on critical elk summer range would make those areas less effective habitat as security is disrupted and cover removed.

The primary concern in grizzly bear habitat is the reduction in security resulting from human activities such as timber harvest, road construction, and road management.

Alternatives with large suitable land bases and high objectives for commodity production,(such as Alternative 2) would have the most acres with potential adverse impacts on grizzly bear security and habitat components.

A restrictive road management program helps mitigate the adverse effects of timber management. All alternatives would be able to mitigate timber harvest impacts through motorized access restrictions. However, alternatives with less access would have a lower risk for grizzly bear mortality.

In all alternatives, at least 10 percent of the suitable timberland will be in old-growth forest at all times. The goal was exceeded in all alternatives because other constraints or prescriptions were even more limiting (Table IV-18). All forested lands not suitable for timber production and all forested wilderness has the potential to produce old-growth stands unless catastrophic fire, insects or diseases kill the trees.

Table IV-18: Old Growth on Suitable Timberland in the Year 2080
(Percent of Total)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
47	21	84	43	53	59	48	57	61	38	42	91

Even-aged harvest systems provide the best opportunity for control of insects and disease because all diseases or 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. In some cases where shade is necessary for seedling survival, a shelterwood cut is appropriate providing the remaining overstory following the first harvest is removed before the young trees can be infected.

Timber productivity in the future is enhanced by proper application of any silvicultural system. Old, slow growing trees are replaced by young, faster growing trees and that growth rate can be sustained by thinning, weeding, and other intermediate cutting.

Clearcutting is the least costly method of harvesting trees because high volumes are removed in small areas. Seed tree and shelterwood cutting is slightly 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. These lesser costs reflect that even-aged management cutting units are easier to lay out and mark than other harvest units so slightly less manpower and time is required per unit of timber sold.

Even-aged management can adversely affect the recreation experience in areas by disrupting trail systems or creating undesirable openings. The experience may be enhanced to some extent by careful placement of openings to create open vistas. On the other hand, semiprimitive recreation can have a distinct effect on timber harvest due to the area prescribed as roadless for recreation purposes (see section on dispersed recreation).

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - From a timber production standpoint, even-aged harvest systems provide the best chance to improve the 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 a desired mix of tree species can be introduced. However, with these systems, it is more difficult to maintain a proper balance of visual quality and dispersed recreation experience. 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 preferring openings is increased.

Irreversible and Irretrievable Commitment of Resources - Although areas which have been harvested by even-aged systems may never be harvested again, the road system necessary for harvest has been constructed and considerable money has been expended in revegetation. For all practical purposes, most areas previously harvested are irreversibly committed to timber harvest in the future. The wildlife habitat changed by the harvest and the dispersed recreation opportunities lost or drastically changed are irretrievable.

Table IV-19: Energy Consumption Related to Timber Harvest (Million BTU's)

ACTIVITY TYPE	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
Fell and Buck	.4	.5	.1	.3	.2	.3	.3	.1	.1	.3	.1	0
Load, Yar Haul	26.4	32.7	6.3	16.9	11.6	17.9	22.4	8.4	8.4	22.4	6.3	0
Site Prep, Reforesta-tion	2.4	2.7	.5	1.0	.7	1.5	1.4	.3	.3	1.4	.3	0
Timber Stand Improvement	1.5	1.5	.1	1.5	.3	1.1	.8	1.1	1.1	.8	.5	0

Adverse Effects Which Cannot be Avoided - Visual quality is generally lowered by even-aged harvest. Some soil will be eroded and water quality will be lowered. Wildlife habitat will decrease for species preferring dense canopies. Fish habitat will be changed by harvest occurring in riparian areas or by increased sedimentation. Semi-primitive recreation opportunities will be lost and the wilderness character of nonroaded lands is always affected.

Conflicts with Other Land Management Plans - None identified.

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-119

b. Uneven-aged Systems of Harvesting Timber

Selection harvest, an uneven-aged management system, is usually prescribed only for riparian areas that have been assigned the riparian prescription. This system of timber harvest selects those trees which are mature or over-mature and leaves the remaining canopy undisturbed. The system has no effect on the visual resource--at least, when viewed from a distance. Since no openings are created, the harvest unit is not considered unrecovered. Water quality and quantity are not measurably affected by this harvest system because the canopy is not altered significantly, soils are not unduly disturbed, and the remaining trees are able to respire the extra water (Rice and Others, 1972).

Since trees are left in the riparian zone following harvest by selection, the system can be used to enhance fish habitat. However, those trees left purposely to fall into the stream and form pools and riffles will not be harvested and the timber volume will be reduced.

Fire and slash disposal are difficult to manage in selection harvest systems. There is little opportunity to reduce high, natural 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 (untrimmed) be yarded and the slash be disposed of in the yard area.

Little forage is produced by selection harvest except in some group selection units. Group selection involves harvest of appropriate groups of mature trees when circumstances permit. This option creates small openings, usually only a few feet in diameter, and can 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 expand. Selection harvest generally 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 nestors 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 infection 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. 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.

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. Because of the system, there is little opportunity to enhance production by introduction of 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.

Irreversible and Irretrievable Commitment of Resources - The choosing of selection harvest for an area does not commit that area to timber harvest in the future although it is likely these areas will continue to be harvested by this system in the foreseeable future. The timber that could have been grown by applying a more productive timber harvesting system is irretrievable.

Adverse Effects Which Cannot be Avoided - There are few adverse effects associated with selection harvest. If applied drastically, 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.

Conflicts With Other Land Management Plans - None identified.

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-19.

2. Logging Methods

Logging system options on the Gallatin include tractor and cable yarding. The choice of a logging method depends largely on land slope and sensitivity of the soils. On slopes under 40 percent, tractor yarding is generally appropriate. On slopes greater than 40 percent, cable systems will be often used. Helicopter or other aerial methods are not likely to be used on the Gallatin within the next decade due to high costs for the relatively low volume of timber per acre.

a. 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 removal of the

timber from the site. Logging with tractors causes soil disturbance on about 28 percent of the area. 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 causes reduced infiltration capacity, air permeability, and productivity (Froelich, 1979; Froelich and others, 1980). Soil compaction can cause overland flow, accelerated erosion, and stream sedimentation which causes reduced 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 avoided 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 on the Forest are thin. Displacement or mixing of this topsoil can drastically change the fertility of bared areas. On especially sensitive soils, the number of skid trails can be limited or another logging system can be required. Generally speaking, tractor logging requires more miles of logging road construction than any other logging method. The effects of roads are discussed elsewhere.

Removal of the organic layers or low-growing vegetation exposes the soil to raindrop splash erosion and overland flow during intense rainstorms (Bethlahmy, 1967; Megahan, 1980). The removal of the protection plus the inevitable compaction causes a decrease in infiltration rate and the resulting overland flow can cause rills or gullies. In these situations, the Forest is directed to apply proper and timely erosion control measures.

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). Tractors operating in streams can have a severe impact on the stream channel and cause excessive sedimentation for miles downstream (Bjornn, 1974). Tractors are not allowed to operate 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 on cover is the removal of trees (Lyons, 1979). Forage growth may be stimulated by the scarification caused by tractors but this is usually minimal. 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 a significant portion of the area. However, if topsoil is removed by the tractor operation, the productivity of the site is decreased (Froelich, 1979).

Tractor logging is the least expensive method available for moving logs from the stump to the yarding area. This can mean a greater profit to the purchaser or, in some cases, a greater return to the U. S. Treasury and payments to the county.

Recreational disruption and noise of logging operations cause local, short-term degradation to the recreation experience. 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. In alternatives with high timber harvest levels (such as Alternative 2), there will be numerous sales and the recreation value of large segments of the Forest will be lowered.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Tractor yarding is the least expensive method to yard logs. In most cases, tractor logging, in itself, has little effect on long-term productivity. However, it is inevitable that some tractor logging will occur on wet soils or on isolated pockets of clay soils. In these cases, soil compaction will occur and effect productivity. In all cases, some soil will be lost which may effect the long term productivity and this soil will lower the water quality and fish habitat of the streams. These water quality effects, however, should be short-lived.

Irreversible and Irretrievable Commitment of Resources - Just because the current stand of trees is tractor logged does not irreversibly commit the area to tractor logging in the next generation. However, if the road system is designed to accomodate tractor logging, there is a strong possiblity that tractors will be used in the future. The soil lost or unduly disturbed by the tractors constitutes an irretrievable loss to the site.

Adverse Effects Which Cannot be Avoided - Tractor logging leaves skid trails which are unsightly to Forest visitors. These trails will eventually be revegetated or screened from view. During the logging operation, considerable noise and dust is generated by the tractors and soils are disturbed. Soil disturbance is followed by a loss in water quality and,
perhaps, some loss in productivity. Some fish habitat is likely to be disturbed or destroyed.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - The energy requirements for yarding are shown in Table IV-19. Most of the energy use projected for "Mixed" will be used to tractor log.

b. Cable Logging

Cable logging involves dragging the logs along the ground and is rarely used on areas more than 800 feet from the initial landing area. About 25 percent of the harvest will be cable logged. Cable logging is generally used on slopes steeper than 40 percent. Cable logging, because the logs are dragged along the ground, has similar effects to tractor logging but the effect is not as severe because the weight and tread of the tractor is absent. However, skid trails are obvious and about 23 percent of the soils are disturbed.

Because the heavy tractor is not used, cable logging does not cause severe soil compaction. However, because the logs are dragged uphill and the slopes are generally steep, soil erosion and overland flow similar to tractor logging can occur but erosion control is required for these trails.

In essence, except for intensity, the effects of cable logging are the same as those discussed for tractor logging. The major difference between cable and tractor logging, other than being less severe on the specific site, is that cable logging generally requires less miles of road than tractor logging. The effect of roads are discussed elsewhere.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Cable logging effects long-term productivity less than tractor logging because the effects of compaction is not as severe. There is less soil disturbance and less loss of productivity. As with tractor logging, cable logging in itself does nothing to enhance productivity.

Irreversible and Irretrievable Commitment of Resources - The fact that an area is cable logged does not commit the area to be logged in the future. However, because the road system is in place and considerable money will be spent in generating a new stand of trees, it is likely that the area will be logged and that a cable system will be used. The soil lost by the use of the system is irretrievable.

Adverse Effects Which Cannot be Avoided - Considerable noise and dust are created by cable logging although it may be less than with tractor 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.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Energy requirements for cable logging are shown in Table IV-19. Some of the energy used in "Mixed" yarding is also as a result of cable yarding.

Y. Slash Control

Slash (unusable limbs, tops, and cull logs) usually must be removed from a timber harvest unit before regeneration can occur. The most common method of disposal is to burn the slash onsite, 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, 1979; Smith, 1962).

Slash may be tractor piled and burned on gentle slopes; it may be handpiled and burned or broadcast burned regardless of slope. In light fuel concentrations, limbs and tops can also be lopped and scattered. Where slash is not evenly distributed and a mature overstory has been left, underburning or jackpot burning of slash concentrations is the only effective method of slash 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 first growing season because forbs, grasses, and shrubs resprout or seed and grow

rapidly after fire. Burned dozer piles leave scars that are readily visible onsite and, in some cases, from several miles away. Burned handpiles are virtually invisible to the casual observer after a short period of 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.

Air quality will be degraded by burning. Slash burning is generally carried out when fuels are dry but weather conditions permit control of fire. 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 can be rapidly dispersed. The higher the timber harvest level (see "Timber Harvest"), 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 individual piles or in windrows. This activity has a high potential for degrading the soil resource (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 piles or windrows and they will not burn as well because the soil smothers the fire. If windrows or individual piles and the soil beneath them are too dry when burned, the topsoil may be baked, become sterile and impervious to wetting (Dryness, 1976). The soil structure may be severely altered. Little or no vegetation will grow to protect the soil from erosion during the several years necessary for recovery.

Handpiling and burning 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 (1962) describes 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, 1982; USDA Forest Service, 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 fire will not creep over the line. The soil surface is then exposed to raindrop splash erosion and overland flow is likely. Ditching to divert water from the fireline into adjacent undisturbed areas will prevent erosion.

Water quantity is affected more by removal of trees than by slash disposal. 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 has an effect on fisheries or streams if water quality or quantity is affected. The removal of large woody material from streams or streambanks may affect the formation of pools by destroying potential debris necessary for addition to the stream as instream debris decays. 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 during slash disposal. Forage may be temporarily reduced by slash disposal activities, but the reduced competition from trees and nutrients rapidly released by fire result in an increase of shrub, grass, and forb growth in the subsequent growing season .

A totally clean forest floor lacks cover for a wide variety of small animals, many of which depend on insects for food. 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. Slash disposal procedures should leave 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 increases their susceptibility to disease or insect attack.

Costs of slash disposal vary by disposal 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. The higher the timber output, the higher the total slash disposal costs. Slash disposal is a necessary cost to the production of timber and, as such, has an effect on the calculation of PNV. How much slash disposal is required depends on the acres of timber harvested each year. Some slash control will be required on practically every acre. Within the next 50-year period, the average annual area burned for slash disposal and timber site preparation purposes is shown in Table IV-20.

Table IV-20: Average Annual Area Burned for Slash Disposal and Timber Site Preparation (Acres)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
2945	4133	640	2240	2320	1470	3267	2140	1766	3267	2210	0

Slash disposal activities affect recreation by creating smoke which may degrade air quality enough to cause local short-term problems. Units harvested but 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.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Slash control, if properly done, maintains or increases long-term productivity. Productivity is adversely effected if slash is not treated or if slash is treated in a poor manner. There is always a chance in machine piling and windrowing for excess soil to be displaced and erosion to occur. Soil compaction may also result. Fertility is then lost and the next generation of trees suffers. Burning at the wrong time and allowing the fire to be too hot generally has the same effect. Most other effects of slash control are short-term and have little effect on productivity.

Irreversible and Irretrievable Commitment of Resources - Control of slash on a harvest site does not irreversibly commit this area to slash control in the future. However, the whole idea of slash control is to enable another generation of trees to be established. Considering the time and effort expended in slash control, it is likely this future generation of trees will be harvested and the slash created by that harvest will need to be treated. The soil inevitably lost in slash control efforts is irretrievable.

Adverse Effects Which Cannot Be Avoided - The most obvious adverse effect is the generation of smoke into the atmosphere by slash control. Though this effect is short lived, the more volume of slash control, the more smoke. Other adverse effects include the scorched and blackened vistas which turn green in a year or two and the inevitable displacement and possible erosion of soils.

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.

Energy Requirements - Some energy is required in slash control. If machinery is used, the energy required for a particular site can be significant. A small amount of energy is used in torches to light fires. Handpiling of slash requires little energy outside the muscular activity of those persons doing the piling.

Z. Site Preparation

The objective of site preparation is to create micro-sites where tree seedlings have a good chance for survival. Site preparation requires the removal of competing vegetation and exposure of mineral soils. Seeds and seedlings planted in organic matter and duff dry out and fail to survive.

Site preparation is usually a spin-off from logging and slash disposal activities. Dozers used to skid logs and pile slash displace litter and other organic matter and the result is enough mineral soil exposed to provide planting sites. Cable logging displaces some topsoil, and broadcast burning or burning of handpiles creates 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 must be killed just before planting. Scarification can be done by dozers or other machines on gentle slopes, but must be done by hand on steeper slopes. If competing vegetation is too dense, chemical control can be proposed for eliminating this competition. Each site must be analyzed to determine the appropriate method.

Site preparation has the same effect on the visual resource, soils, water quality and quantity, and fish as the soil-disturbing aspect of slash disposal.

Handscalping of the individual tree planting sites is generally the least costly method of site preparation; 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 the soil and water resource.

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.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Timber productivity of sites depends in part on how quickly trees are established after harvest. Adequate site preparation is necessary to ensure seedling survival and to give them a good start for competition 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 maintenence of productivity.

Irreversible and Irretrievable Commitment of Resources - Since considerable money and effort is expended in preparing the site for a new generation of trees, it is inconceivable that the next generation of trees on the site will not be harvested. Soil inevitably lost or displaced by site preparation activities is irretrievable.

Adverse Effects Which Cannot be Avoided - The temporary unsightly appearance of piled slash and disturbed soil on sites that have been prepared for regeneration is unavoidable and will remain until vegetation grows and screens the effect from view. Soils are inevitably eroded or displaced. If burning is used, smoke is generated. The noise and scars of site preparation can affect recreation use--at least, for a short time.

Conflicts With Other Land Management Plans - If burning is used in site preparation, there is a possibility of conflict with the Clean Air Act.

Energy Requirements - Energy requirements for site preparation are very similar to those for slash control and in many cases are shared (see above).

AA. Reforestation

Tree planting occurs after harvest, slash disposal, and site preparation if natural regeneration does not take place. The proportion of harvest areas to be planted varies by harvest method, land type, and prescription. Natural regeneration generally takes place on the Gallatin regardless of harvest system undertaken. Clearcuts may need to be planted, but shelterwood and selection harvest units generally 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 mistletoed. 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 for planting because of the high cost of site preparation and, in many cases, because planting these sites is a poor investment. Average annual tree reforestation is shown in Table IV-21:

Table IV-21: Average Annual Planting by Decade (Acres)

DEC-ADE	* * * * 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
	ALTERNATIVE/BENCHMARK											
1	312	362	69	137	94	200	186	42	46	184	43	0
3	319	427	73	308	93	224	224	51	53	228	72	0
5	263	352	94	359	246	209	237	219	200	236	95	0
10	250	314	660	313	232	198	261	216	197	209	98	0
15	231	330	95	283	173	226	226	167	141	221	92	0

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 preharvest levels of water yield, water quality, and time of peak flow; and protection of the soils from erosion. Rapid regeneration causes cattle and wildlife forage to decrease because of shading and competition of the growing trees, but speeds the recovery process 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 and costs are high. It is more expensive to plant on slopes of over 40 percent; on thin, rocky soil; 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. Because of the expense, planting has a definite effect on the calculation of PNV.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Planting can have a definite effect on productivity of the next generation of trees. The stand is quickly established and begins to grow instead of waiting for natural regeneration. This shortens the time for next harvest. Other species or a mix of species can be introduced on the site, if compatible, and

lessen the loss to insects and diseases in addition to producing more wood fiber. These activities should not affect the native productivity of the site and will give quicker protection to the soils by producing a rapid overstory. Though this rapid growth of timber will reduce the forage available to livestock or big game, it will also provide the hiding cover and protection from cold needed by the big game.

Irreversible and Irretrievable Commitment of Resources - Because of the expense of planting, it is reasonable to assume that the next generation of trees will be harvested. For all practical purposes, this is an irreversible commitment. The only irretrievable loss associated with planting would be in cases where trees are not planted or when the planting fails. The fiber lost during this period of time could not be recovered.

Adverse Effects Which Cannot be Avoided - A percentage of the plantings on the Forest will fail. This expense is difficult to recover. Due to the introduction of other species, the composition of the forest overstory will change.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Some energy will be required in transportion of tree planting crews to the field and the use of powered equipment for planting. 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 20 years old (too small for commercial products). Commercial thinning generally occurs when the stand is about 60 years old (some commercial products). The objective of thinning is to reduce competition among crop trees so maximum growth per tree is realized. The resulting fewer but larger trees are theoretically more valuable at time of harvest.

Thinning can have a minor adverse effect on viewing from the foreground until the slash decays or is otherwise disposed of. The more open aspect of the thinned stands is not likely to be noticed by the casual observer.

The slash created by thinning is a fire hazard that is difficult to manage. Broadcast or underburning is not possible without damage to the remaining trees and burning handpiles can also cause considerable damage. Fortunately, 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. Hiding cover for big game may be reduced by thinning but recovers rapidly as the remaining trees occupy the available space. A more or less diverse stand can result from thinning depending upon the objectives for the species designated to remain as crop trees. If a mix of species is desired, thinning to emphasize one species would be a detriment to diversity and 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 more healthy, vigorous stand.

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. Also, the $75 to $150 per acre investment must be discounted over the rotation length.

Aproximately 20 percent of the regenerated stands are scheduled for commercial thinning in all alternatives. Commercial thinning has the same environmental effects as selection harvest, discussed on page IV-43. Average annual acreage of timber stand improvement is shown in Table IV-22.

Table IV-22: Average Annual Timber Stand Improvement by Decade (Acres)

DEC-ADE * * * *	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
1	411	411	11	411	299	298	215	299	299	215	125	0
3	306	224	32	108	71	73	134	35	35	132	43	0
5	312	385	56	267	89	118	224	51	52	227	71	0
10	162	204	77	235	173	229	301	170	149	252	150	0
15	148	202	73	269	180	109	160	140	133	307	158	0

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Thinning can increase the productivity of wood fiber. The possibility exists that the final product following thinning may be more useful (Cole, 1975).

Irreversible and Irretrievable Commitment of Resources - Thinning a stand almost makes an irreversible commitment to harvest the remaining trees in the stand. In only unique situations would final harvest not occur. Some of the funds expended in this costly process may not be completely retrievable.

Adverse Effects Which Cannot be Avoided - The slash created by thinning will likely not be treated. This will present a fire hazard for a few years after thinning. Temporary losses of hiding cover and protection from cold will affect big game use of the areas. The visual resource will be adversely affected for a short period of time.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Most of the energy used in precommercial thinning will be used in transportation of crews to the sites and use of powered equipment for thinning. 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-19).

CC. Road System

Road construction and maintenance have 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 decreased visual resource.

There are about 800 miles of road on the Forest at the present time. An additional 407 miles of collector and local roads are needed to complete the transportation system for Alternative 3 which prescribes the least amount of road. Two hundred miles of these 407 total miles would be the major collector-type roads. These new roads would be constructed within the next 30 year period. There would be 160 miles of these collector roads located outside of the Forest boundary to provide access from the State or county road systems to the Forest. The remaining 207 miles would be the feeder type local roads that would be constructed over the next 70 years. Approximately 70 percent of these local roads would be closed and rehabilitated. Within the next 70-year period there would be an additional 40 miles of collector roads and 62 miles of local roads open for public use on the National Forest land.

In comparison and at the other end of the spectrum, an additional 2,234 miles of collector and local roads are needed to complete the transportation system for alternative 2 which prescribes the most amount of road. Of this total, 355 miles would be the major, collector-type roads. These would be constructed within the next 30-year period. About 182 miles of these roads would be located outside of the Forest boundary to provide access to the Forest. The remaining 1879 miles would be the feeder-type local roads constructed over the next 70 year period. Approximately 70 percent of these local roads would be closed and rehabilitated. Within the next 70 year period there would be an additional 173 miles of collector roads and 564 miles of local roads open for public use within the Forest.

In Alternative 7 (Preferred Alternative) there would be an additional 149 miles of collector roads and 359 miles of local roads open for public use within 70 years.

Due to the checkerboard ownership pattern, there would be an additional amount of local roads on privately owned lands within the Forest boundary for all alternatives.

Table IV-23 identifies the miles of road to be constructed and reconstructed by alternative for the next 150 years. Mileages include roads outside the Forest boundary which provide access to the Forest. Approximately 70 percent of the local roads will be closed and rehabilitated. The mileage of open and maintained road at any one time will be much less than indicated.

Table IV-23: Road Construction By Decade (Miles)

DEC-ADE	ALTERNATIVE/BENCHMARK 1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
Decade 1	215	287	87	163	132	136	215	103	102	192	47	0
Decade 3	307	402	88	257	153	153	238	106	107	270	58	0
Decade 5	236	290	40	227	117	75	257	92	78	153	63	0
Decade 10	107	169	43	196	114	95	161	101	91	128	57	0
Decade 15	117	166	33	172	114	73	181	89	84	177	55	0
Total Needed For Mgmt* (Dec. 1-7)	2416	3041	1214	2259	1794	1711	2310	1601	1535	2247	1811	807

*Total includes 800 miles of existing road.

Roads provide access for increased motorized recreation, but eliminate primitive recreation and severely modify semiprimitive recreation. Wilderness attributes of roadless areas are forgone. People will either shift their recreation use to another roadless area or continue to use the same area and experience a change in the type of recreation available. People who prefer roaded recreation will find greater opportunities for this type of recreation.

Most of the existing roadless lands of the Forest which are being considered for wilderness additions in this document will remain roadless in all alternatives. The amount of area to be accessed for timber harvest activities has been identified earlier in this chapter. It is possible there will be roads constructed beyond the areas accessed for timber management purposes if discoveries of oil or gas are made.

Road management can mitigate potential conflicts in use. Seasonal or year-around road closures can be used to 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 highly visible for many miles. Cuts and fills are often visible even through a screen of vegetation. Where the visual resource is important, the visual 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 any alternative would result in an adverse, though not unacceptable visual effect according to visual quality standards (USDA Forest Service, 1977).

Road construction can result in adverse effects to cultural resources but roads built for timber hauling can also facilitate exploration and development of locatable and leasable minerals.

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 animals to acceptable levels even though the road provides a travelway for horseback riders and hikers.

Road construction on big game winter range causes few problems to the animals because construction activity normally occurs when few or no animals are present. 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, 1979). 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.

Grizzly bears generally avoid open roads and an area parallell to them. The activity on the road creates a non-effective habitat for the bear although not generally an impediment to passing through. Roads in occupied habitat have greater effect on grizzly bears in that they allow easy access to these lands for recreation. This increased potential for human-bear encounters poses a greater risk for the grizzly bear.

Roads in riparian areas can cause significant sediment delivery to streams. This 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 1975 and 1976). Riparian area roads will be built to conform to Forest-wide standards and guidelines in order to minimize adverse effects on riparian environments (Planning Records: 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 by standards and guidelines to all road construction activities to reduce the sediment delivered to streams (Planning Record: Management Practices). Sediment production from all causes, including natural, is approximately 118,000 tons per year on the Forest.

Increasing sediment in streams has an adverse effect on trout populations. The most sediment is produced by road construction and reconstruction activities in

Alternatives 2 and 5. Predicted populations of catchable trout are shown in Table IV-24. Note that the lower populations of trout are similar in all alternatives because of the limited increase in sediment above the existing situation.

Table IV-24: Fish Population Potential in the Fifth Decade
(Thousands of Catchable Trout)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
1532	1525	1516	1535	1553	1554	1551	1553	1564	1551	1523	1584

Every mile of road construction disturbs the soil on four to eight acres between the top of the cut and the bottom of the fill slope. This area can be considered a clearcut with special reforestation problems. No trees will grow on the road surface, but 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 man-caused fires. However, this same access makes fire suppression easier by quick delivery of fire fighters and providing fuel breaks for fire.

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, creating a significant benefit to the local economy.

Road construction is directly tied to timber harvest which tends to offset the cost of road building. All the alternatives 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.

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 road bed and cut/fill slopes will not maintain the preconstruction production potential. If the roads remain active, this acreage is removed from the vegetative production capacity of the area. Roads remove the habitat of small animals and birds even though the edge of roads may create habitat for others. Roads facilitate timber harvest which can have a positive effect on future productivity of the area. Roads change the type of recreation experience which can be enjoyed in the area. Actively traveled roads can have an adverse effect on the movement of big

game animals. Roads can have severe and long-lasting impact on the visual resource.

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 a resource occurs. If roads are built, irretrievable losses occur in wilderness potential, primitive and semiprimitive recreation, and roadless wildlife habitat.

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 forgone. Road construction and maintenance cause the greatest amount of soil disturbance and erosion. Water quality of streams is lowered by road building and fish habitat is destroyed or lowered.

Conflicts With Other Land Management Plans - None identified.

Energy Requirements - Road construction and maintenance requires the largest amount of energy use of any activity on the Forest. This is displayed in Table IV-25.

Table IV-25: Energy Required for Road Construction and Maintenance During The First Decade (Billions of BTU's)

ALTERNATIVE/BENCHMARK											
1	2	3	4	5	6	7	8	9	DEP 10	MAX PNV	MIN LVL
7	9	3	5	3	5	6	2	3	6	2	0

CHAPTER V. PEOPLE PRIMARILY INVOLVED IN THE PREPARATION OF THE PLAN

Robert E. Breazeale -- Forest Supervisor; B.S. Forest Hydrology, M.S. Fisheries Biology.

Twenty years experience with the Forest Service as a Hydrologist, Fire Mangement Officer, Forest Planner, and District Ranger. Most recently he was in the Washington, DC office as a Resource Information Specialist.

Responsible Official with overall responsibility for the preparation and implementation of the Forest Plan.

John T.Drake -- Forest Supervisor; B.S. Forest Management, M.S. Natural Resource Administration.

Twenty-one years experience with the Forest Service in three regions and Washington Office. Nine years' experience in various adminstrative positions (District Ranger, Deputy Forest Supervisor, Forest Supervisor). Program management responsibilities in a variety of resource areas. Three years experience as legislative assistant in Washington Office.

John D. Sandmeyer -- Planning Staff Officer; B.S. Forest Management.

Thirty-five years with the Forest Service; fourteen years with responsiblities in timber, recreation, land use, and fire management; seventeen years in land use planning.

Forest Planner, responsible for environmental analysis and Forest planning. Wrote tiered Hyalite-Porcupine-Buffalo Horn EIS for Plan package.

James Devitt -- Team Leader (6/82 and after); Social Scientist, M.A. Anthropology.

Responsible for social impact assessment of coal development in eastern Montana and Wyoming (1973-75); helped prepare the land management plan for the Umpqua National Forest (1975-78); helped write several unit plans and environmental documents on the Gallatin National Forest, (1978-present).

Served as interdisciplinary team member before 6/82, and team leader thereafter; leader in public involvement activities for the Forest plan; responsible for social assessment and economic analysis for the planning effort. Coordinated and contributed to the writing of the Forest Plan and the accompanying EIS.

Philip C. Cowan -- Energy Coordinator; B.S. Forestry/Forest Management.

Twelve years of experience as an assistant district ranger; district ranger from 1958 to 1967. Environmental coordinator for the Libby Dam and BPA powerline projects form 1970 to 1976 on the Kootenai; energy coordinator on the Gallatin National Forest from 1977 to 1983; two years experience as a District Resource Assistant.

Member of the interdisciplinary team from June 1979 to March 1980, and again from August 1980 to the present; as leader of the energy taskforce, helped develop concerns, opportunities, and prescriptions for energy. Wrote portions of the Forest Plan and EIS.

Randall W. Gay -- Zone Timber Planner; B.S. Forestry.

Eight years of experience in timber sales preparation on the Lolo National Forest. Served as environmental coordinator for construction of Interstate 90 and BPA powerline across National Forest lands from 1971 to 1972. Zone timber management planner from 1975 to the present on the Gallatin and Custer National Forests.

Member of the interdisciplinary team; member of the timber taskforce, provided information and expertise for development of management concerns and opportunities, prescriptions, and FORPLAN input-output data for timber. Wrote parts of the Forest Plan and EIS.

Steve Glasser -- Hydrologist; M.S. Hydrology.

Extensive experience since 1971 on interdisciplinary planning teams on three different National Forests. Seventeen years experience as a Forest Service Hydrologist.

Member of the interdisciplinary team. As leader of the water/soils taskforce, helped develop issues and concerns, management opportunities, prescriptions and FORPLAN input-output data for timber management. Submitted water and riparian data for Forest Plan data base. Wrote parts of the Forest Plan and EIS.

Michael Shaw -- Operations Research Analyst; B.S. Forest Management.

Three years graduate studies in Forest Economics including applied research in data management and analytical systems used in NFMA planning. Six years in planning-related Forest Service work.

Responsible for operations research and economic analysis needed to implement NFMA regulations. Additionally responsible for coordinating and processing biophysical data. Wrote parts of the Forest Plan and EIS.

Candace Bogart -- Cartographer; M.A. in Geography and Natural Resource Management.

Three years' experience in Supervisor's Office of Gallatin National Forest in cartography and photogrammetry. Formerly, cartographer with Bureau of Land Management. Experience with private archeology firm as cartographer and interdisciplinary team member.

Responsible for preparation of maps and graphics materials for Forest Planning documentation.

Patrick Callahan -- Writer/Editor; Ph.D. English.

Nine years of experience as a Forest Service communications specialist. Five years' experience in the Gallatin National Forest planning office as writer/editor.

Documentor and editor of Forest Plan materials, including the Forest Plan and EIS. Wrote parts of the planning documents. Assisted with the public involvement effort.

Carl Davis -- Soil Scientist; B.S. Forest Management (Certified Professional Soil Scientist).

Eleven years' experience as a soil scientist, specializing in soil mapping and interpretative uses of soils in mountainous environments.

Member of soil/water taskforce. Helped ID team develop capability area maps. Helped develop management concerns and management prescriptions.

Robert Dennee -- Forester; R-1 Certified Silviculturist (C.E.F.E.S.).

Three years of graduate studies and research work in forest economics and planning (U. of Minn.). Five years of Forest Service district level resource work with responsibilities in timber management and silviculture on National Forests.

Member of timber taskforce. Helped to develop issues and concerns, management opportunities, prescriptions, and FORPLAN input for timber management. Currently Public Information Officer for the Gallatin.

John Dolan -- District Ranger; M.S. Range Management.

Eleven years' experience as a Forest Service professional in range management and resources; five years of experience as a District Ranger.

As a member of the lands taskforce, helped to develop concerns, opportunities, prescriptions, and costs/outputs information for lands. Member of the management team, providing review and management input to the planning process and draft plan.

Kenneth A. Gallik -- Deputy Forest Supervisor; B.S. Civil Engineering.

Twenty-three years professional experience in private industry and Forest Service in the following areas: Civil engineering, engineering management, resource management. Registered professional civil engineer and land surveyer in State of Montana.

Member of the management team. Team leader for developing grizzly recovery policy.

Keith Giezentanner -- Wildlife Biologist; M.S. in Wildlife Biology.

Four years of professional wildlife management experience with the New Mexico Department of Game and Fish, including big game and waterfowl habitat management. More than three years' experience with the Forest Service in game, threatened and endangered species, and nongame habitat management.

Member of the wildlife/fish taskforce, providing expertise for development of management concerns and opportunities, prescriptions, and FORPLAN input for wildlife and fish. Also supplied wildlife habitat and population information for the Forest Plan data base.

Alfred S. Gilbert -- Forest Silviculturist; R-1 Certified Silviculturalist (C.E.F.E.S.).

Seventeen years of Forest Service timber work with responsibilities in timber sale preparation, timber sale administration, and silviculture; certified as R-1 silviculturist.

Leader of the timber taskforce; helped develop concerns, opportunities, prescriptions, and FORPLAN input for timber. Helped prepare prescriptions for submission to the taskforces.

Joseph J. Gutkoski -- Landscape Architect; B.S. in Landscape Architecture.

Twenty-four years experience in landscape architecture with the Forest Service--8 years in the Regional Office and 16 years in the Supervisor's Office. Licensed as an L.A. in both Montana and Idaho. Retired 8/82.

Leader of the recreation taskforce; assisted in development of issues and concerns, management opportunities, prescriptions, and FORPLAN input for recreation. Provided information for the Forest Plan data base in the following areas: recreation, visuals, and cultural resources.

Charles Harris -- Forester; B.S. Forestry.

Six years of Forest Service resource staff work on the district level with responsibilities in silviculture, recreation, wilderness, special uses, and lands.

Member of the taskforces for range and recreation; provided concerns, opportunities, and prescriptions for range and recreation.

Dennis Havig -- Range Conservationist; B.S. Wildlife Biology and Range Management.

Seven years of Forest Service resource staff work at the ranger district level with primary responsibilities in range, wildlife, dispersed recreation, wilderness, and special uses. Additionally, over five years of experience in the livestock industry prior to Forest Service employment.

Member of the range taskforce; helped supply concerns, opportunities, prescriptions, and FORPLAN input for range.

Neil Howarth -- Range Conservationist; B.S. Forest Management with Range Option. Twenty-eight years as a professional forester/range conservationist with the Forest Service including experience on ranger districts, in the Regional Office, and--for the last seven years--in the Gallatin Supervisor's Office. Retired April 1984.

As leader of range taskforce, helped develop management concerns and opportunities, prescriptions, and FORPLAN input-output data for range. Also provided range resource information for Forest Plan data base.

Sara Johnson -- Wildlife Biologist; Ph.D. Wildlife Biology.

Over six years' experience as an S.O. wildlife biologist working with land use planning, timber-wildlife and range-wildlife coordination, and wildlife habitat improvement projects.

Member of the wildlife/fish taskforce that developed concerns, prescriptions, and cost-output information for wildlife/fish.

Larry D. Keown -- Forester; B.S. Forestry

Five years' experience as Fire Management Officer on the Gallatin National Forest. Several previous positions in fire management with the Forest Service.

Served as leader for taskforces covering fire, fuels, and dead/downed wood. Cooperated in building prescriptions; supplying fire management information, cost analysis, and management concerns; and developing policy on fire suppression, fuels management, and dead snags.

Larry N. Lewis -- District Ranger; B.S. Wildlife Management.

Twenty years of Forest Service ranger district resource work, with responsibilities in timber, recreation, wildlife, minerals, special uses, and range. Six years' experience as a district ranger.

As a member of the management team, participated in decision-making aspects of the planning process. Member of the range resource taskforce; helped develop management concerns, opportunities, prescriptions, and FORPLAN data for range.

Jerome T. Light -- Forest Wildlife Biologist; B.S. Forestry (Wildlife).

Sixteen years experience as a professional wildlife biologist; three years as a range conservationist, and three years as a forester, all with the U.S. Forest Service. Retired in 1986.

Taskforce leader for fish and wildlife; led in developing management concerns and opportunities, prescriptions, and FORPLAN input-output data for fish and wildlife. Supplied information to the Forest Plan data base for wildlife, fisheries (with Lloyd), and range (with Howarth).

James Lloyd -- Zone Fisheries Biologist; M.S. Fish Biology.

District fisheries biologist for 2 years with the Bureau of Land Management. Also worked 4 years as Zone Fisheries Biologist in developing the fisheries section of the land use plans for six National Forests.

As member of the fish and wildlife taskforce, helped develop concerns, prescriptions, and cost/yield FORPLAN data. Developed fisheries data inputs for Forest Planning and supervised the implementation of the fisheries program as it pertains to Forest Planning.

Ross MacPherson -- Forester; B.S. Forest Management.

Twenty years of Forest Service work with responsibilities in recreation, timber, and public information. Seven years as District Ranger. Served as Public Information Officer and Recreation Director until retirement in 1986.

Member of management team; member of wilderness taskforce. Provided recreation and wilderness information. Responsible together with Devitt for public participation aspects of Forest planning.

John McCulloch -- District Ranger; B.S. Forest Management.

Twenty-one years of Forest Service resource staff work with responsibilities in timber, recreation, range management, special land uses, lands, wilderness management, wildlife, water, land management planning, and minerals. Presently serving as District Ranger.

Member of management team; provided decisionmaking, review, and management input to planning process and draft plan. Member of minerals taskforce; helped develop management concerns, opportunities, and prescriptions for minerals.

Ralph Meyer -- Forester; B.S. Forest Management.

Twelve years of Forest Service resource staff work with responsibilities in timber, range, recreation, wildlife, special uses, lands, and fire; ten years of district land management planning and administration. Presently serving as District Ranger at Hebgen Lake.

As a member of management team, provided input to planning process and draft plan. Provided district level information for the data base. Cooperated in setting visuals and grizzly bear policy.

Richard A. Miller -- Transportation Planner; B.S. Civil Engineering.

Six years of professional experience with the Forest Service in timber sale location, survey, design, and other phases of engineering.

Joined the Gallatin staff in October of 1980. Member of the timber taskforce. Provided information on the forest transportation system and its development, and on roading costs for timber.

Thomas Puchlerz -- Wildlife Biologist; B.S. Wildlife Management.

Nine years of Forest Service experience with responsibilities in wildlife, timber, range, watershed, special uses, and minerals. Six years of intensive wildlife management work with emphasis on timber-wildlife relationships and cold water fisheries. Serving as Wildlife Biologist at the Gardiner District.

Member of the fish and wildlife taskforce; helped develop concerns, opportunities, prescriptions and FORPLAN data for fish and wildlife. Helped supply data for the Forest Plan data base. Helped develop policy to assist grizzly bear recovery.

Sherm Sollid -- Geologist; B.S., M.S. Geology.

Two years as minerals specialist with Bureau of Land Management. Three years as Engineering Geologist with Soil Conservation Service. Five years as geologist with Forest Service.

Served on the minerals taskforce; also, provided geologic and minerals information for the Forest Planning data base.

James M. Williams -- Lands Forester; B.S. Forest Management.

Total of ten years experience as professional forester with Forest Service. Eight years in lands-related positions with responsibilities in valuation, exchanges, fee and partial interest acquisitions, land adjustment plannning, special uses, and status and claims. Currently Lands and Recreation Officer for the Gallatin.

Provided status and land adjustment information for Forest Planning data base. Provided ID team with specific lands-related management practices for area prescriptions.

Howard A. Zeman -- District Ranger; B.S. Forest Management.

Thirteen years of resource staff work at the ranger district level with primary responsibilities in range, wildlife, and watershed. Was involved in land use planning on the Little Missouri National Grasslands in Region 1 and two ranger districts in Region 2. Currently the District Ranger at Livingston.

Member of the wilderness taskforce; contributed to framing concerns, opportunities, prescriptions, and costs/outputs for wilderness. Member of management team. Also provided data relating to ranger district inventories.

CHAPTER 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 Forest Plan and Draft EIS.

The Forest Service has conducted an active public involvement program throughout the Forest planning process. Federal, State, and local agencies have been informed and consulted. Individual Forest users and interest groups, as well as other interested persons, have also had an opportunity to participate.

The Section B of this chapter summarizes the public involvement efforts undertaken through the planning effort, and summarizes the number, type, and general tone of the responses received during the comment period on the Proposed Forest Plan and Draft EIS.

Section C reproduces the comments received from other agencies, local governments, and elected officials along with the Forest Service response to each comment. The Forest did not receive comments from any Indian Tribe. All other comments, along with the Forest Service responses to each, are an unbound appendix to this document. The appendix is available for review in the planning records at the Forest Supervisor's Office in Bozeman, Montana.

Section D lists all those to whom copies of this statement have been sent.

B. Consultation With Others Between the Draft and Final Environmental Impact Statements

1. Summary of Public Participation Activities

The notice of intent to prepare a Forest Plan and Environmental Statement was published in the Federal Register August, 1980. The Gallatin National Forest released a Draft Environmental Impact Statement (DEIS) and Forest Plan March 28, 1985. Between July and September of that year when the commend period ended, Forest officials participated in numerous meetings and several field trips with interested citizens and groups.

The Forest had already developed the Draft Plan and EIS when, in September 1983, the NFMA regulations were amended to require each Forest to prepare, using specific criteria, an inventory of roadless lands and to evaluate each of these areas for wilderness in its land and resource planning process. The Forest's planning process had, until that time, assumed that RARE II process would resolve wilderness designation of the inventoried roadless lands and that the Montana Wilderness Study Act and the Lee Metcalf Wilderness Act would resolve the wilderness questions in the Hyalite-Porcupine-Buffalo Horn and Taylor-Hilgard areas, respectively. In order to comply with the revised NFMA

regulations, the Forest incorporated a re-evaluation of the inventoried roadless lands in the planning process. This necessitate issuance of a Draft EIS that included analysis of the wilderness issue as well as the other issues identified for the Forest.

In 1983 the public was asked to help clarify the wilderness issue, assist in compiling information regarding the inventoried roadless lands on the Forest, and help to identify management options for these inventoried roadless lands.

The Draft EIS and Proposed Forest Plan were filed with the Environmental Protection Agency and were made available to the public on March 28, 1985. News releases were prepared for the media in Bozeman and surrounding areas announcing the release of the Draft. A summary of the Proposed Plan was sent to all people on the planning mailing list, approximately 900 individuals and organizations. The Proposed Plan and DEIS were sent to State and Federal agencies and others who requested it. These numbered about 1000. The public comment period was initially to be until July 15, 1985 but was extended for an extra 30 days because of several requests for extra time. The closing of the comment period was August 15, 1985. Public open houses on the Forest Plan were held in Bozeman, Billings, and each Ranger District town during the public comment period. During this same time, presentations on the Proposed Plan were given to various groups and organizations that requested them.

2. Public Comments Received

The Forest received 2,095 responses to the Proposed Plan. These included 2,029 individual letters, 62 form letters, and 4 petitions with 389 signatures. Types of respondents were 2,029 individuals, 55 organizations, and 11 government agencies. The following tables show where the letters came from and the number of responses in each comment category.

Table VI-1: Response by Geographic Area

Origin of Response	Number of Responses
Big Timber/McLeod	20
Livingston	192
Clyde Park/Wilsall	8
Emigrant	29
Corwin Springs	159
Gardiner	15
Belgrade/Manhattan	16
Bozeman	628
Gateway/Big Sky	79
West Yellowstone	63
Billings	42
Other Montana	213
Other States	587
Unknown	44

Table VI-2: Number of Responses by Comment Category

Comment Category	Total Input Letters*	Form Letters*	Petition Signatures*
Specific Areas	2778	244	804
Timber	1762	46	
Fish and Wildlife	1532	50	572
Recreation	1144	61	1598
Management Philosophy	939	21	
Wilderness/Roadless	923	61	354
Roads and Trails	694		572
Access	692		354
Landownership	675		
Water/Watershed	428	41	
Grazing	373		
Alternatives	102		
Minerals	91		
Fire	53		
Management Areas	40		

*These are not numbers of people commenting, but number of times mentioned

3. How Public Comments Were Used

Within the broad framework of Forest planning, public input is one of five considerations in the decisionmaking process. Forest Service decisions are based on five factors: 1) the law, 2) technical information, 3) resource capability, 4)professional judgement, and 5) public input. Public input enters into the decisionmaking process when there is room for interpretation in any of the first four factors, expecially with regard to which uses will be emphasized. Public input, for example, would not be a factor in citing a violator of Federal regulations, but it does influence decisions about whether Forest management sould emphasize one use versus another.

In accordance with 40 CFR 1503.4, the comments about the Draft EIS and Proposed Forest Plan were treated in the following ways:

1. Comments offering technical corrections or pointing out inconsistencies have been used to revise the final documents.

2. Comments requesting clarification or comments resulting from misunderstanding of what was meant in the documents indicated areas where the proposed Plan or EIS needed clarification. Corrections were made or the reason a correctio was not made is explained in the response to the comment.

3. 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.

4. A majority of comments suggested changes in the proposed Forest Plan direction, ouputs, and land use assignments. These comments expressing a differing preference for Forest Service management required careful consideration both from an individual standpoint as well as a collective one. Where feasible and appropriate, Management Area direction in specific areas wa changed in response to comments. However, some comments requesting changes in the proposed Plan did not result in any change. Response to individual comments are contained in this chapter and in Appendix D, an unbound appendix to this document.

The Forest Service use of public comments is documented throughout the Final EIS and Plan. A summary of this documentation is as follows:

1. The Forest Service responses to individual public comments are displayed in this chapter and Appendix D. This chapter reproduces the agencies and elected officials comments and the Forest Service response to each. Appendix D, an unbound appendix to this document, is available for review in the planning files at the Forest Supervisor's Office in Bozeman, Montana. This appendix contains each comment letter along with the Forest Service response.

2. A summary of substantial changes between the Draft and Final Statements is given in Chapter I. Throughout Chapters II and IV, changes are summarized and noted where they occur.

3. The consideration of comments collectively is addressed in this chapter and, more briefly, in Chapter I. In this chapter, a summary of public comments is discussed by the major resource activitiy.

4. **Summary of Public Comments**

The summary below presents the major issues raised by commentors on the Proposed Plan and Draft EIS. The major categories of responses each have several parts. The summary gives a synopsis of what people had to say, sometimes quoting people or paraphrasing their comments.

a. **Recreation**

TOURISM AND ECONOMIC EFFECTS. The Gallatin is considered to be foremost a recreational forest. The quote "80% of the income is derived from recreation" is used frequently, and most feel that the budget does not reflect the importance of recreation through tourism to the local economy (20% of budget to recreation, 80% to timber). Tourism and its economic benefits would suffer if the quality of fishing, hunting, and wildlands were negatively affected by logging, roading, mining, development, etc. Most people said, "The plan should

recognize the recreational values of the forest land and plan for greater recreational activities and support facilities. It's time the Gallatin realized it is not a timber forest. It is recreation that keeps our economy going."

KEEP FOREST OPEN TO MOTORIZED USE - DO NOT RESTRICT. The number of areas for use by trailbikes and snowmobiles is being reduced. "When proposals call for restrictions, motorized vehicles are first in line for the cut." Mechanized recreation is important to the elderly, the handicapped, and those individuals who don't have time for extended visits. A reduction of areas available for motorized recreation would severely affect local tourist revenues, especially in the winter, and in certain areas like West Yellowstone and Cooke City. "Those of us trying to make payments or run a business find it very difficult...we need the motorized-use area we have left to be successful in business." People signed petitions asking to keep areas open.

TRAILS AND PARKING FOR MOTORIZED USE. Provide more parking areas for snowmobilers and bikers at access points. Some felt there was a need for facilities (toilets, trash cans, etc.) "We would like to see the marking of additional trails, more trail maintenance, more winter parking areas (or the size of present ones increased), and plowing done for winter users in these areas."

EFFECTS OF MOTORIZED USE. Effects include: damage to trails, riparian areas, alpine meadows, and hillsides; soil erosion due to destruction of vegetation; disturbance of solitude, wildlife and stock; exhaust fumes; increase in littering; overuse due to increased accessability. Majority of comments reflected a feeling that the outdoor experience and the recreational areas are negatively affected by motorized use. "One of the unique qualities of our forests is the solitude. That solitude is shattered far and wide by a screaming motorcycle. Motorcyclists have failed to demonstrate care and concern for our forests and other forest users."

DUDE RANCHING. Dude ranching provides important tourist income and jobs. Most encouraged protection from development of lands adjacent to dude ranches to ensure a quality outdoor experience. "We should not increase backcountry use at the expense of dude ranching, which has existed for years and provides employment and income to the local community." Others object to the undue influence of private interests concerning land use policies on public lands adjacent to dude ranch facilities. "By closing or locking up longtime access points, the commercial user not only controls his private land, but also controls the public land behind his property."

OUTFITTING. Outfitters provide important tourist income and jobs. The maintenance of our wildlands and clean waterways is important to ensure a quality hunting and fishing experience. "I can tell you with absolute certainty that the success of my business depends on having quality, unspoiled land and lots of it!" Road closures adversely affect hunting access. Others commented on the negative impacts of these large groups of people, their stock, and the length of their stay in the area. "Limit the numbers of outfitters who use a certain area, and make sure they are responsible for maintaining it (cleanup, etc.)."

KEEP MOTORIZED OUT. Motorized use should be restricted to areas now open, or kept out of the forest completely. "Demanding access with motorized vehicles to the more pristine and wild areas of the forest, is like demanding to drive your car over the golf course because you CHOOSE not to walk. I am appalled at the selfishness of those who scream 'discrimination' because they are not allowed to inflict their chosen form of recreation on terrain where it is inappropriate." There were many comments concerning specific areas, such as Cabin Creek, Hyalite, and Cowboy Heaven. Motorized vehicles should be banned at certain times of the year to protect the trails, and ensure quiet in calving and fawning areas.

PROTECT VISUAL QUALITY. This was generally associated with "managing the forest for recreation, wildlife and scenery". Concerns were expressed that damaging the visual quality of the forest by logging, roading, etc., would detract from the recreational value. "I don't travel all the way to the Gallatin to camp overlooking a clearcut." Scenery was regarded as a valuable natural resource in this area.

EXTENDED STAY - 15-DAY LIMIT. Associated with outfitter permits. Some wanted longer stays, while others objected to the length of stay in certain areas, due to the impacts.

SEPARATE AREAS FOR DIFFERENT USES - REDUCE CONFLICTING USES. Set aside areas for EXCLUSIVE use by motorbikes, and exclusive use by hikers and horses. "Motor vehicles, while not to be excluded totally from the forest, should be restricted to designated areas where they can spend a whole day and never come near a roadless area." Provide trails for cross-country skiers where snowmobiles are not permitted. "The grooming on snowmobile trails is about 8 feet wide, making it impossible for cross-country skiers to use. The surface is simply not compatible." It was widely felt that the Forest is for everyone's enjoyment, and that conflicts could be reduced by establishing separate use areas. Generally, this category reflects the conflict between motorized and non-motorized users.

CAMPGROUNDS - FACILITIES. Some felt a need for more developed campgrounds and facilities. "...very little emphasis is given to maintaining, improving and expanding picnic areas, campgrounds, trails and trailhead areas." Also, a need for facilities (toilets, trash cans, etc.) at access points and parking areas. Maintain the existing facilities better. Comments on a campground at Taylor's Fork expressed concern over the negative impacts on the outdoor experience of the nearby dude ranch visitors, and on streams in the area. Some expressed a need for more picnic areas.

PUBLIC INFORMATION - TRAVEL PLAN. The Forest Service should supply current maps and more information to the public. Travel plan is outdated, and trails and roads are listed that may not be there. "Often the travel plan shows a trail and within 4 or 5 miles, it just disappears. It should be updated."

b. Wilderness / Roadless Lands

ENOUGH WILDERNESS - WANT NO MORE. Wilderness does not serve the majority of the population, it is difficult to administer, does not allow for recreational needs, and is against the Forest Service Credo for multiple use and sustained yield. "There is more than enough wilderness for all. We need timber for progress. Wilderness and no jobs is a very sad outlook." It also restricts use by the elderly, handicapped, and persons with limited time, and reduces the timber base and opportunities for mineral exploration. "The forests are for everyone. Don't lock up any more of our lands, so that only an outspoken minority can use them."

WANT MORE WILDERNESS. The Gallatin National Forest is a vital part of the largest intact ecosystem in the temperate zone, and this needs to be preserved. "Undisturbed wilderness is the most precious thing we can pass on to our children. It is not a renewable resource." This area contains Threatened and Endangered Species, rare flowers and plants, important watersheds and cultural resources. Wilderness conserves resources for the future, and is important to the local economy (quality outdoor experience). The economic value of this area is in wilderness, not timber. "Our unspoiled lands are the key to the outdoor and tourist industries in our state. The long term value of wilderness in this area will increase as other places lose their natural areas."

PROTECT THE WILDLANDS. Keep undeveloped land undeveloped (no roading, timber harvesting, mineral exploration, resorts). "Once you build roads into our scenic, undisturbed lands, you have sealed their fate, and can never return them to their wild beauty." Wildlands are important for their scenic value, cultural resources, undisturbed wildlife habitat, and preservation for future generations. "The wild character of our area must be maintained. It needs more protection and less exploitation. The quality of life here depends on it."

WHY SO MUCH ROADLESS LANDS - NOT NECESSARY. We need roads for fire protections, hunting and recreation access, and mineral and utility access. Roadless areas limit the use of motorized vehicles for recreation. They also limit access to the handicapped, elderly, and people with limited time. "Our public lands should be accessible to everyone, not just backpackers."

c. Fish and Wildlife

PROTECT FISHERIES/WATER QUALITY/RIPERIAN MANAGEMENT. The plan does not adequately address the problem of fisheries/water quality/riperian management. This should be a priority. "Absolutely no further degradation of our fisheries can be permitted!" Superior quality of fisheries must be maintained; the waters in this area are the headwaters of some of the most important blue ribbon trout streams in the country. The streams and their riparian areas must be protected from adverse impacts from forest practices (roads, logging, grazing). Loss of tourist income due to degradation of the fisheries would have a widespread economic impact over the entire Forest (flyshops, outfitters/guides, motels, restaurants, gas stations, etc.). "Many businesses in our area depend upon quality fisheries to keep them economically viable." There is a concern about the decrease in numbers of catchable trout as proposed in Alternative #7 (proposed plan).

NO STOCKING - KEEP POPULATION WILD. Keep wild population. Wild trout are a vital part of quality fisheries.

ELK AND DEER POPULATION (NUMBERS). Destruction of habitat would adversely affect deer and elk populations. Grazing reduces habitat. Some felt that their livestock grazing should be given priority over wildlife, while others felt that the forest lands belonged to the wildlife first. Some commented that there were too many deer and elk, and one suggestion for curbing the population was the reintroduction of the gray wolf. Deer and elk numbers are important to quality hunting.

HABITAT/SECURITY NEEDS OF ELK AND BIG GAME (WINTER RANGE COVER). Grazing, timber harvest, and roading infringe on habitat, calving and fawning grounds and winter range of big game. "Take the timbering and grazing off big game winter range. You are risking the death and continual decline of wild animals when you take away their food for the cattle and timber industries." Big game is important to bring in hunters and recreationalists, therefore important to the local economy. "The plan should emphasize the protection of aesthetic values, and wildlife habitat as its primary goals."

BIG GAME HUNTING/HUNTING QUALITY. Hunting is important to the recreational income of the area. Large elk are an indicator of prime habitat, which should be preserved. Roads, grazing, and timbering affect hunting quality. Outfitters feel that a decline in hunting quality would affect their livelihood.

ELK LOGGING STUDY. The elk logging study should be implemented intact. It should not be used in managing deer habitat, as the needs for deer and elk are different.

GRIZZLY HABITAT NEEDS - SECURITY/MORTALITY. (REDUCE HUMAN CONFLICT). Timbering, roading, grazing, access, and recreational development would adversely affect grizzly bear habitat, leading to increased number of bear/human conflicts. "If you want to do the most you can for the grizzly, manage to retain as much of the wild characteristics of the area as possible." Grazing would only result in grizzly mortality. Allotments should not be given in grizzly habitat. Some felt that the grizzly has enough room and needs less attention. There were many comments about specific grizzly bear habitat infringements: Ski Yellowstone, West Gardiner area. "The grizzly bear will only survive in the Yellowstone Ecosystem if it is given top priority in undisturbed habitat."

MANAGEMENT OF THE GRIZZLY (INTERAGENCY TEAM). Specific comments about the management of the bear: drugging, relocating, etc. "We need less human handling of the grizzly...we're managing it right out of existence." The two larger petitions (345 signitures) wanted all grizzly bear studies to stop.

RECOVERY OF THE SPECIES (GRIZZLY BEAR). Most people wanted to increase grizzly bear numbers. "There is only one way to begin the recovery: when there is room for error, the err must be in favor of the grizzly." A few said they wanted them to become extinct and therefore, eliminate the problem.

OTHER THREATENED AND ENDANGERED SPECIES (WOLF, BALD EAGLE, FALCON). Comments for and against reintroduction of the gray wolf. Suggestions for nesting sites for peregine falcon. Comments about managing bald eagle areas. "The forest should be managed with threatened and endangered species' total ecosystem needs left intact."

OLD GROWTH. (TIMBER COMPONENT FOR WILDLIFE HABITAT). Old growth is needed as a valuable component to wildlife habitat. Some felt that too much old growth damaged habitat for wildlife (downfall too high).

MOOSE AND SHEEP HABITAT. Usually mentioned as part of a "wildlife list" when expressing concerns about preserving habitat. Specific areas mentioned: Windy Pass, Boulder River, Porcupine, Cabin Creek.

TRUMPETER SWAN. Commenters want more management interest in the Trumpeter Swan. They want it to be classified as a "sensitive species". Specific area commented on was upper Hebgen Lake.

d. Livestock Grazing

IMPACTS/EFFECTS OF GRAZING. Grazing damages riparian areas and fragile alpine meadows, reduces forage in wildlife habitats, pollutes streams, makes hiking unpleasant, and creates potential for conflicts with grizzly bears, etc. "When sheep are herded and ranged in the high country, the elk move out."

LIVESTOCK MANAGEMENT - GRAZING SYSTEMS, ETC. Specific comments on grazing management practices.

IMPROVEMENTS (FENCING, ETC.). Stockgrowers should be made responsible for protecting riparian areas through fencing.

SPECIFIC GRAZING AREAS. Comments concerning allowing sheep in Windy Pass, and Situation 1 and 2 grizzly bear habitat (potential conflicts). Wildlife should/should not have top priority in grazing areas. Specific comments about grazing damage in fragile alpine meadows and riparian areas. "New allotments on summer range would displace elk from their traditional areas."

AMOUNT OF GRAZING - FOR/AGAINST INCREASES. Some felt the amount of grazing should be increased, linked to the economy and traditional multiple use. The majority wanted reductions in grazing areas, due to impacts on habitat, watersheds, riperian areas, grizzly problems, etc. "Livestock grazing should be phazed out. There is no reason to subsidize an industry whose product is in oversupply. Range should be maintained for wildlife."

NOXIOUS WEEDS. Increased access would spread noxious weeds (knapweed, leafy spurge, thistle). Current weed control is not effective and the proposed plan does not adequately address this serious threat to forage. "More emphasis should be placed on noxious weed control. On both Forest and private land, it is becoming a very serious problem." Others felt weeds are not a problem, but pesticides are.

GRAZING FEES. Grazing fees should be raised. Grazing allotments must pay for themselves.

e. **Timber**

HARVEST NEEDED TO PROVIDE JOBS/ECONOMIC STABILITY OF AREA. The Forest Service is obligated to provide timber harvest to provide jobs. Reducing the harvest would affect economic stability due to loss of jobs in wood products related industries, especially in Livingston. "The survival of Brand S mill is dependent upon your decisions regarding timber production. You can't just take away our livelihood." Others felt that the wood products industry only supports a small percentage of the economy, while recreation supports the majority. "The value of this forest is in recreation and wildlife, not in timber sales that don't even pay for themselves."

HARVEST TIMBER FOR GOOD MANAGEMENT -REDUCE BUGS, FIRE. Harvesting bug-kill timber and harvesting to reduce fire danger is a necessity. It is better to utilize the forest now than to let it go to waste. "We should utilize the wood, not just let it go up in a forest fire." Harvest should enhance wildlife habitat, rather than destroy it.

IMPACTS/EFFECTS OF HARVEST (CLEARCUTTING). Most felt that timber harvest is detrimental to riparian areas, water quality, scenic value, wildlife habitat, fisheries, trail systems, watersheds, and fragile soils. "Please don't authorize any more timber cutting in our forests! The results are tragic, and you cannot justify them." It increases noise and air pollution due to truck traffic. The increased road mileage that accompanies logging is unacceptable, and there are many concerns about the amount of log truck traffic in the Gallatin Canyon. A few people commented that clearcutting is good for wildlife. "Timber harvest with the proper forest supervision will benefit wildlife."

WANT MORE HARVEST - DO NOT DECREASE, INCREASE BASE. We need a maximum harvest to support the local wood products industry. Trees are being wasted by being allowed to rot in the woods. Some areas now proposed for protection should be included in the timber base. "The Forest Service should propose the maximum harvest possible on the very small amount of land left for timber management on the Gallatin. The needs of wilderness and wildlife have been well provided for. Livingston, and Park County in general, depend a great deal upon forest products as part of its economic base."

HARVEST LEVEL IS TOO HIGH - REDUCE. The Gallatin is not a timber forest. "I protest the obvious overemphasis being placed on resource extraction, particularly timber cutting at a deficit and associated accelerated road-building." The product is substandard, and this is a fragile ecosystem with shallow soils, difficult terrain, a short growing season, and slow regeneration. The best use of the Forest is not logging but recreation. There are too many overpriced roads. Logging companies should be responsible for costs of roading and regeneration. The timber base is too broad. Too many areas are affected.

NO BELOW COST SALES - AGAINST SUBSIDY. Timber sales should pay for themselves, including the costs of roading and regeneration. "Don't use my tax money to destroy the forests".

FIREWOOD. More firewood areas are needed, especially in heavy concentrations of beetle-kill timber. "Firewood gatherers perform an important service by removing fuel from the forests, so the permit should be free." We need much better maintenance of access roads.

HARVEST PRACTICES OTHER THAN CLEARCUTTING (UNEVEN AGE MANAGEMENT). Develop and implement different techniques for harvest that benefit the Forest and the wildlife (multi-species stands, selective cuts, aerial logging, avalanche control, old growth, save whitebark pine for grizzly). More experimenting with new and different techniques that may be less damaging.

HARVEST LEVELS OK. Present levels okay (prior to draft plan).

f. Water / Watershed

WATER QUALITY MUST BE PROTECTED. Water quality (purity of supply, purity for wildlife and fish) should be a priority and must be adequately addressed in the plan. Degradation of water quality from timbering, grazing, roading, overuse by humans, etc., would adversely affect tourism and the economy. Water quality should be closely monitored, and damaging forest practices stopped immediately.

WATERSHED MANAGEMENT. Protection of the watershed should be a priority when determining logging areas (watersheds must be protected from the adverse effects of logging). Watersheds should be monitored closely, and if they begin to show adverse effects, logging (or other cause of degradation) should be stopped. Watersheds are a valuable resource and must be a priority.

RIPARIAN MANAGEMENT / STREAM CONDITION. We need a buffer zone implemented 100 feet on either side of streams, to protect them from the damage done by logging, roading, grazing, trails, etc. Undamaged riparian zones are vital to healthy fisheries and good water quality.

SOILS. Concerns were expressed about the effects of activities on the fragile soils (erosion, siltation, sedimentation, eutrophication).

g. Minerals, Oil, Gas

IMPACTS OF ACTIVITIES. Exploration and mining activities are detrimental to wildlife habitat, scenic values, water quality, and fragile soils. They also cause increased noise and air pollution, and more road construction.

MINERAL RIGHTS MUST BE PROTECTED/SUPPORT FOR MINERALS DEVELOPMENT. Wilderness areas "lock up" areas for minerals exploration. Hold to the "multiple use" concept. (Most responses were from mining companies).

LEASING. Some question whether or not leasing constitutes a commitment of resources.

STIPULATIONS (CONSTRAINTS, PROTECTION). The land should be protected from the impacts of mining through denial of leases. Monitor the effects, and stop mining activity if adverse effects are demonstrated. "Oil and gas exploration does not fit in with our beautiful lands, recreational areas, and wildlife homes. It should not be allowed. There is plenty of private land that private companies can ruin for their selfish goals."

GEOTHERMAL. Concern over the negative effects on the Yellowstone geothermal features, due to exploration and development. "No geothermal development should be allowed in this forest unless a thorough analysis has shown that there would be no adverse impacts to Yellowstone's thermal districts."

h. Access / Land Exchange

FOR MORE ACCESS. Much of "my public land" is unnecessarily locked up. Access is needed for hunting, recreation for elderly and handicapped, firewood gathering, and fishing. Private landowners adjacent to the forest are curtailing public use for private interests (dude ranches, hideaway homes, private ranchers, etc.) "We don't believe any ranch owner or group should control our access."

AGAINST MORE ACCESS. The present amount of access is sufficient, maybe even too much. Private property rights should not be infringed upon (their privacy is being invaded). "The number of proposed accesses is simply not necessary, and would be a burden on private land owners, especially in the Paradise Valley area." Additional access would adversely affect critical grizzly bear and big game habitat, especially in the West Gardiner area. Access also brings in noxious weeds. The great majority of these comments were in connection with the West Gardiner access proposal and also mentioned West Pine Creek.

IMPACTS/EFFECTS OF ACCESS. Access brings in noxious weeds, noise, dust, traffic, garbage, poaching, and overuse. It also creates more opportunity for bear/human confrontations, and increases disruptive motorized use.

CONDEMNATION. "Strong-arm tactics" should not be used to gain land. The majority were opposed to eminent domain. Others, however, felt that condemnation was justified if private land owners refuse access.

LAND EXCHANGE/CONSOLIDATION OF CHECKERBOARD FOR BETTER MANAGEMENT. Land exchanges are felt to be a good solution to checkerboard ownership and access problems. Most responses were in regard to the West Pine Creek Land Exchange for Access. Land exchanges should only be done with owners' consent.

ACQUIRE PRIVATE LANDS. The Forest Service should make attempts to acquire (buy) private lands in strategic areas, for access, critical wildlife habitat, and checkerboard colsolidation.

i. Fire

PRESCRIBED FIRE (BURNING). Arguments for and against the use of prescribed fire for habitat management, as an alternative to clearcutting, to reduce bug kill stands, reduce wildfire danger, and promote growth. "Fire worked well for millions of years. Controlled burns can be an effective tool."

FIRE PROTECTION. Comments relating to road building (more roads to assist in fire-fighting efforts), timber harvesting, and firewood collection to reduce potential fuels.

j. Road/Trail Maintenance/Construction

AMOUNT OF CONSTRUCTION. The majority felt the proposed amount of road construction is excessive and costs too much. "I absolutely oppose 220 miles of new roads. We need more trails instead." Others felt we need more roads to increase access.

EFFECTS OF CONSTRUCTION. Road building contributes to erosion and siltation of streams, damaging fisheries, water quality and riparian areas. It also destroys the aesthetic beauty of the forest, and allows too much motorized access, causing overuse, increasing the amount of trash, disturbing wildlife habitat and disrupting trail systems. "You are breaking up the forest, losing valuable security for animals and ruining the true nativeness and naturalness of our forests."

LEAVE ROADS OPEN FOR PUBLIC USE. Allow as much access as possible by leaving open and maintaining roads. Do not gate or put up barriers, especially during hunting season.

CLOSE ROADS TO PROTECT AREAS. Block off and replant roads after logging is completed. Gate roads to protect habitat, soils and forage areas. Closure would eliminate damage done by motorized use, and protect the roadway itself from damage (rutting, etc.).

HYALITE ROAD. Comments were on paving, improving, or leaving Hyalite Road as is.

MAINTAIN EXISTING ROADS AND TRAILS. Maintain existing roads and trails before constructing any new ones. Roads should be maintained to include safe use by regular (non 4X4) vehicles. Some comments on the unacceptable level of current maintenance (can't get in to cut firewood, etc., due to poor condition of roadways). Trail maintenance should be done as early as possible in the summer. Trails need to be patrolled more often to determine maintenance needs.

TRAIL CONSTRUCTION. Trails should avoid riparian areas and more trails should be added to help disperse use.

GALLATIN DIVIDE TRAIL. Comments concerning continuous wild trail from Bozeman to the Park. Some wanted continued access by snowmobiles.

C. **List of Agencies, Organizations, and Elected Officials to Whom Copies Were Sent**

Senator Max Baucus
Senator Office Building
U. S. Senate
Washington, D.C. 20510

Congressman Ron Marlenee
U. S. House of Representatives
Washington, D.C. 20510

Senator John Melcher
Senate Office Building
U. S. Senate
Washington, D.C. 20510

Congressman Pat Williams
U. S. House of Representatives
Washington, D. C. 20510

Honorable Ted Schwinden
Governor of Montana
State Capital
Helena, MT 59601

Leo Lane
Box 562
Three Forks, MT 59752

Paul F. Boylan
Montana State Senator
3747 South 19th Road
Bozeman, MT 59715

Dorothy Eck
Montana State Senator
10 West Garfield
Bozeman, MT 59715

Richard Corne
Montana State Representative
28 Border Lane
Bozeman, MT 59715

Orville S. Ellison
Montana State Representative
West Boulder Route
McLeod, MT 59052

Bob Raney
Montana State Representative
212 South 6th
Livingston, MT 59047

Harrison Fagg
Montana State Representative
1414 Mystic Drive
Billings, MT 59102

Jack Galt
Montana State Senator
Martinsdale, MT 59053

Frank W. Hazelbaker
Montana State Senator
P.O. Box 430
Dillon, MT 59723

Kerry R. Keyser
Montana State Representative
P.O. Box 126
Ennis, MT 59729

Francis Koehnke
Montana State Representative
Box 692
Townsend, MT 59644

Dorothy Bradley
Montana State Representative
919 W. Lamme
Bozeman, MT 59715

Walter Sales
Montana State Representative
R. R. 1, Box 25
Manhattan, MT 59741

John C. Vincent
Montana State Representative
209 East Lamme
Bozeman, MT 59715

Norm Wallin
Montana State Representative
2422 Spring Creek Drive
Bozeman, MT 59715

Peter Story
Montana State Senator
Box 355
Emigrant, MT 59027

American Wilderness Alliance
Dan Heinz, Field Representative
127 West Main
Bozeman, MT 59715

Beak Environmental Specialists
50 East Loucks, Suite 215
Sheridan, WY 82801

Big Sky Snowriders
Harry Roylance, President
216 M Street
Livingston, MT 59047

Big Timber Rod and Gun Club
Big Timber Lions Club
Big Timber, MT 59011

Billings Motorcycle Club
Mark Lenhardt
1023 North 23rd Stree
Billings, MT 59102

Billings Rough Riders
P.O. Box 884
Billings, MT 59103

Larry Binfet, Mayor
City of West Yellowstone
West Yellowstone, MT 83501

Backcountry Horseman of Gal. Valley
Ron Rassley, President
P. O. Box 3232
Bozeman, MT 59772-3232

Bozeman Chamber of Commerce
P.O. Box B
Bozeman, MT 59715

Bozeman, City of
City Hall
411 East Main
Bozeman, MT 59715

Bozeman City Library
220 East Lamme
Bozeman, MT 59715

Bozeman City & County Planning
Box 640
Bozeman, MT 59715

Bozeman Environmental Center
c/o Jan Strout, Programming Service
of on-Campus Living
Hedges Complex-MSU
Bozeman, MT 59717

Bozeman Mountaineers
80880 Gallatin Road
Bozeman, MT 59715

Brackett Creek Grazing Assoc.
c/o Phil Brug
8459 Huffine Lane
Bozeman, MT 59715

Brand S Lumber
Box 1033
Livingston, MT 59047

Bridger Bowl
P.O. Box 846
Bozeman, MT 59715

Bridger Canyon Property Owners
c/o Monte Eliason
6788 Jackson Creek Road
Bozeman, MT 59715

Burlington Northern Snowmobile Club
c/o Jim Gales
211 South I
Livingston, MT 59047

Plum Creek Timber Co. Inc.
Dick Wick, Superintendent
Box 149
Belgrade, MT 59714

Plum Creek Timber Co., Inc.
Don Nettleton
1st Interstate Center, Suite 2300
999 3rd Avenue
Seattle, WA 98104

Carnegie Library
Box 846
Big Timber, MT 59011

Chevron Oil Company
Box 599
Denver, CO 80201

City County Planning
(South Park County)
City-County Complex
Livingston, MT 59047

Dept. of Intergovernmental Agencies
Capitol Station
Helena, MT 59601

Dude Ranchers Association
Ron Hymas
107 Hemlock
Manhattan, MT 59741

Environmental Information Center
107 West Lawrence
Helena, MT 59601

Environmental Protection Agency
Region 8
1860 Lincoln Street
Denver, CO 80203

Environmental Protection Agency
301 South Park
Federal Bldg. - Drawer 10096
Helena, MT 59601

Flying D Ranch
P.O. Box 158
Gallatin Gateway, MT 59730

Gallatin Beef Producers
Bob Brownell, President
9433 Dry Creek Road
Belgrade, MT 59714

Gallatin County Commissioners
Gallatin County Courthouse
Bozeman, MT 59715

Gallatin County Saddle Club
Al Lien, Secretary
Box 1264
Bozeman, MT 59715

Bob Garner
916 South Willson
Bozeman, MT 59715

Greater Yellowstone Coalition
Ed. Lewis, Executive Director
P. O. Box 1874
Bozeman, MT 59715

Gallatin Valley Snowmobile Assoc.
P.O. Box 755
Bozeman, MT 59715

Gallatin Wildlife Association
Joe Gutkoski, President
304 North 18th Avenue
Bozeman, MT 59715

Gardiner Chamber of Commerce
P.O. Box 81
Gardiner, MT 59030

Eastside Forest Practice Committee
Mike Atwood
Brand S Corporation
Box 1033
Livingston, MT 59047

Livingston Chamber of Commerce
P.O. Box 660
Livingston, MT 59047

Livingston City-County Planning Board
City-County Complex
Livingston, MT 59047

Madison County Commissioners
County Courthouse
Virginia City, MT 59755

Madison-Gallatin Alliance
Box 875
Bozeman, MT 59715

May Petroleum, Inc.
One Energy Square, Suite 1000
4925 Greenville Drive
Dallas, TX 75206

Meagher County Commissioners
County Courthouse
White Sulphur Springs, MT 59645

Montana Bureau of Mines - Geology
Montana College of Mineral Science
- Technology
ATTN: S. L. Groff
Butte, MT 59701

Montana Energy Office
Room 310, Power Block
7 West 6th
Helena, MT 59601

Montana Farm Bureau Federation
P.O. Box 1027
Bozeman, MT 59715

Montana 4x4 Assoc., RVP, R-6
c/o Art Keene
209 South 9th
Bozeman, MT 59715

Montana Outfitters's Council
Dept of Fish, Wildlife & Parks
ATTN: Ralph Holman
Helena, MT 59601

Montana Outfitters-Guides Assn.
Ray Keefer, Committee Chairman
Clyde Park, MT 59108

Montana Outfitters-Guides Assn.
c/o Duane Neal
Pray, MT 59065

Montana Petroleum Association
Mr. Don L. Allen
Executive Director
1801 11th Avenue
Helena, Mt 59601

Montana Power Company
40 E. Broadway
Butte, MT 59701

Montana Snowmobile Association
Nina Smith
410 North 18th Street
Bozeman, MT 59715

Montana Sportmen's Association
c/o J. L. Lawellin
P.O. Box 637
Livingston, MT 59047

Montana State Clearing House
Dept. of Intergovernmental
Relations
Planning - Economic
Development Division
Helena,MT 59601

Montana Trail Bike Riders Assn.
Linda Ellison, President
3301 West Babcock
Bozeman, MT 59715

Montana Dept. of Natural Resources
- Environmental Sciences
Cogswell Building
Helena, MT 59601

Montana Dept. of Natural Resources -
Conservation
ATTN: Director
32 South Ewing
Helena, MT 59601

Montana Dept. of Natural Resources
Conservation
Division of Forestry, State Forester
8001 North Montana Avenue
Helena, MT 59601

Montana Department of State Lands
1625 11th Avenue
Helena, MT 59601

Montana Division of Forestry
Bozeman Unit Forester
Box 1343
Bozeman, MT 59715

Montana Department of Fish, Wildlife
and Parks
1420 East 6th Avenue
Helena, MT 59601

Montana Department of Fish, Wildlife,
and Parks - Coordinator, Region 5
1125 Lake Elmo Drive
Billings, MT 59101

Montana Department of Fish, Wildlife
and Parks, Coordinator, Region 3
8695 Huffine Lane
Bozeman, MT 59715

Montana State University
ATTN: Dr. Robert Chadwick
Dept. of Earth Sciences
Bozeman, MT 59717

Montana State University
Documents Library
Bozeman, MT 59717

Montana Stockgrowers Association
Mons L. Tiegan
P.O. Box 1697
Helena, MT 59601

Montana Wilderness Association
Box 635
Helena, MT 59601

Montana Wildlife Federation
Emily Swanson, Executive Director
109 East Main
Bozeman, MT 59715

Montana Woolgrowers Association
Bob Gilbert, Secretary
P.O. Box 1693
Helena, MT 59601

National Audubon Society
c/o John Fisher
113 Sourdough Ridge Road
Bozeman, MT 59715

Nature Conservancy
P.O. Box 258
Helena, MT 59601

Nature Conservancy
214-215 Radio Central Bldg.
127 East Main
Missoula, MT 59801

Nine Quarter Circle Ranch
Gallatin Gateway, MT 59730

Northern Plains Resource Council
Margie McDonald
419 Stapleton Building
Bozeman, MT 59101

Park County Commissioners
County Courthouse
215 East Lewis
Livingston, MT 59047

Park County Rod & Gun Club
Jim Stub
Box 307
Livingston, MT 59047

Public Lands Access Assn., Inc.
Gene Hawkes, President
16 Clonginer Lane
Bozeman, MT 59715

Jim Riebhoff (Motorized Recreation)
211 South 20th Avenue
Bozeman, MT 59715

Rocky Mountain Oil - Gas Assoc.
P.O. Box 1398
Billings, MT 59103

Rural Areas Development Committee
Torlief S. Aasheim
517 West Koch
Bozeman, MT 59715

Rural Electrification Administration
ATTN: Director, Envinronmental -
Energy Requirements Division
Washington, D. C. 20250

Sierra Club
Headwater Group
Sherm Janke
415 North 17th
Bozeman, MT 59715

Northern Yellowstone Rim Alliance
c/o Bruce Malcolm
Route 1, Box 687
Emigrant, MT 59027

Sierra Club, Northern Rockies Chapter
Ralph Maughan, Chairman
P.O. Box 1173
Pocatello, ID 83201

Ski Yellowstone Incorporated
c/o Joe Sabol
225 East Mendenhall
Bozeman, MT 59715

Society of American Foresters
c/o Chairman, Eastern Chapter
6412 Greenmeadow Drive
Helena, MT 59601

Southeastern Sportsmen Assoc.
Paul Berg
P. O. Box 33
Billing, MT 59103

Stillwater PGM Resources
2110 Overland Ave., Suite 102 B
Billings, MT 59102

Sweetgrass County Commissioners
County Courthouse
Big Timber, MT 59011

Sweetgrass County Planning Board
Box 6
Big Timber, MT 59011

Sweetgrass County Recreation Assoc.
Big Timber, MT 59011

Dr. Richard Tenney
308 South Bozeman
Bozeman, MT 59715

Texas Oil - Gas Corp.
c/o James H. Sherrard
Environmental Administrator
Fidelity Union Tower
Dallas, TX 75201

320 Ranch
Gallatin Gateway, MT 59730

Trout Unlimited
c/o Robert Foukal, Apt. #1
2020 South Rouse
Bozeman, MT 59715

Trout Unlimited
Joel Shouse
Box 337
Bozeman, MT 59715

USDA Forest Service
Beaverhead National Forest
Box 1258
Dillon, MT 5972

USDA Forest Service
Bitterroot National Forest
316 North 3rd Street
Hamilton, MT 59840

USDA Forest Service
Clearwater National Forest
Highway 12 - 126 Street
Orofino, ID 83544

USDA Forest Service
Custer National Forest
Box 2556
Billings, MT 59103

USDA Forest Service
Deerlodge National Forest
Box 400
Butte, MT 59703

USDA Forest Service
Flathead National Forest
Box 147
Kalispell, MT 59901

USDA Forest Service
Helena National Forest
Drawer 10014
Helena, MT 59626

USDA Forest Service
Idaho Panhandle National Forest
1201 Ironwood Drive
Coeur d'Alene, ID 83814

USDA Forest Service
Kootenai National Forest
Box A5
Libby, MT 59923

USDA Forest Service
Lewis and Clark National Forest
Box 871
Great Falls, MT 59403

USDA Forest Service
Lolo National Forest
Building 24
Ft. Missoula
Missoula, MT 59801

USDA Forest Service
Nezperce National Forest
319 East Main
Grangeville, ID 83530

USDA Forest Service
Northern Region
R-1, PP - B
Box 7669
Missoula, MT 59807

USDA Forest Service
Targhee National Forest
420 North Bridge Street
St. Anthony, ID 83445

USDA Soil Conservation Service
P.O. Box 970
Bozeman, MT 59715

USDI Bureau of Land Management
Montana State Office
P.O. Box 30157
Billings, MT 59107

USDI Fish Cultural Development Center
4050 Bridger Canyon Road
Bozeman, MT 59715

USDI Fish and Wildlife Service
1125 Lake Elmo Drive
Billings, MT 59101

USDI Missouri Basin Region
Building 67
Denver Federal Center
Denver, CO 80225

USDI Yellowstone National Park
Superintendent's Office
Box 168
Mammoth Hot Springs, WY 82190

United States Ski Association
Northern Division
1732 Clark Avenue
Billings, MT 59102

University of Montana
Student Environmental Research Center
758 Eddy Street
Missoula, MT 59801

Upper Gallatin Planning Assoc.
c/o Vic Benson
Canyon Route, Box 224
Gallatin Gateway, MT 59730

Upper Yellowstone Rod - Gun Club
P.O. Box 427
Gardiner, MT 59030

Upper Yellowstone Snowmobile Club
c/o Hoosier's Motel
Cooke City, MT 59020

Valley Motorcycle Club
c/o Dick Milledge
1414 South 4th Street
Bozeman, MT 59715

Van Cleve Company
Big Timber, MT 59011

West Yellowstone Chamber of Commerce
123 Yellowstone
West Yellowstone, MT 59758

Western Environmental Trade Assn.
Mike Micone, Executive Director
2301 Colonial Drive
Helena, MT 59601

Wilderness Society
Northern Rockies Regional Office
Michael Scott
105 West Main, Suite E
Bozeman, MT 59715

Wilderness Studies Group
University of Montana
Missoula, MT 59801

Wildlife Management Institute
William B. Morse
Western Representative
1617 N. E. Brazee Street
Portland, OR 97212

Yellowstone Nordic Ski Assoc.
30 Madison Avenue
West Yellowstone, MT 59758

Yellowstone Pine Company
P.O. Box 325
Belgrade, MT 59714

D. Agency and Elected Official Comments and Forest Service Response

146.

City of Livingston
Montana

FROM THE OFFICE OF

MAYOR

414 East Callender
Livingston, Montana 59047

May 21, 1985

MAY 23 1985
USDA, Forest Service
Bozeman, MT 59715

Forest Supervisor
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

RE: Proposed Gallatin National Forest Plan

To Whom It May Concern:

The Livingston City Council meeting and voting in regular session Monday, May 20, 1985, has asked that I should express the City of Livingston's sentiment that the above referenced plan in its current format is found wanting in the area of timber harvest.

Brand S Corporation, a local lumber mill and large area employer, will not be able to meet its minimum lumber requirements under the reduced timber harvest proposal. This very well might result in further layoffs in an already depressed employment market in Park County. This prospect is something that the City of Livingston would find distressing, especially given that the resources for production are in fact available as we understand it without jeopardizing the wellbeing of the Gallatin National Forest. We would urge the Forest Service, therefore, to consider instead Option #2 under the proposed forest plan or some other avenue that would allow for a greater timber harvest than what is currently proposed. On behalf of the City of Livingston, I appreciate the Forest Service's time and consideration of our request.

I am yours truly,

Rick Loftice
Mayor of Livingston

ERS/jh

cc: City Council
Doug Crandall

VI-22

United States Department of Agriculture | Forest Service | Gallatin National Forest | P.O. Box 130 Bozeman, MT 59771

Reply to: 1920

Date

CITY OF LIVINGSTON
Bill Dennis, President of City Council
414 E. Callender Street
Livingston, MT 59047

Dear Mr. Dennis:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next ten to fifteen years.

I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan.

I feel we have developed a Forest Plan that is responsive to expressed public needs and which reflects the resource capabilities of the Gallatin Forest. Each individual desire or expectation will not be fully met - some individual compromise is necessary. The decisions made through this process are important and will affect the future of the Gallatin Forest. In the years ahead the Forest Service will closely monitor the implementation of the Forest Plan and utilize those results in our future planning efforts.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I am aware of the situation in Livingston with the railroad pullout and the challenges which face your community in the coming months. Uncertainties on the national, as well as local, scene place large challenges on us as American citizens. The following decribes how your concern was addressed in the Forest Plan.

The National Forests were established to improve and protect the forest within their boundaries, to secure favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. Since the passage of laws authorizing the creation of National Forests in 1897, a goal of the Forest Service has been to promote community stability through a timber harvest program. This is

FS-6200-1 (7-81)

particularly true in areas where land ownership is largely federal and a large proportion of the income is derived from federal lands.

Harvesting and processing of sawtimber provides an estimated 9.8 jobs (direct, indirect, and induced) per million board feet of timber. National Forest timber is an essential part of the local wood products industry (including State, corporate, and non-industrial private lands) and the harvest level in the Forest Plan accounts for about 200 jobs in the local communities.

Although it is certainly not the largest income producer, the wood products industry does provide the majority of the manufacturing earnings in the Bozeman trade area. Concerns have been raised about the impacts of timber harvest activities on recreation related employment or earnings.

The Gallatin National Forest is an area with a number of resource capabilities. Perhaps because of that, it is also an area of conflicting demand for those resources. We recognize the compatibility of many of these resources. However, at the same time, we recognize that there are real or perceived incompatibilities between various users and uses.

In an attempt to strike a balance between the various desires of our publics, the Forest Plan provides that timber harvest is an appropriate activity on 24% of all forested land.

We feel that the final Forest Plan harvest level of 21 MMBF is an appropriate amount for the following reasons:

1. This harvest level is very near our historic average (22 MMBF average annual harvest for the years between 1946 and 1985).

2. This level of harvest appears to provide the best balance of age classes within the suitable forest area over time, and is still compatible with other objectives of the Forest Plan.

I appreciate your interest in the management of the Gallatin National Forest and hope I have addressed your concerns.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

MONTANA HISTORICAL SOCIETY
HISTORIC PRESERVATION OFFICE
225 NORTH ROBERTS STREET • (406) 444-4584 • HELENA, MONTANA 59620

147.

May 21, 1985

MAY 23 1985
USDA Forest Service
Bozeman, MT 59715

Mr. Robert Breazeale
Forest Supervisor
Gallatin National Forest
P.O.Box 130
Bozeman, MT 59711

Dear Mr. Breazeale:

Thank you for the opportunity to review the Gallatin National Forest DEIS and Management Plan. We note that under management standards in the Plan, the Forest intends to conduct a systematic program of cultural resource inventory, evaluation, preservation and nomination to the National Register of Historic Places. We commend the Forest for its commitment to meet its compliance responsibilities, but remain uncertain as to how those commitments will be met. Neither the DEIS nor the Plan present cultural resource management standards within the context of goals, objectives, research needs, problem identification or projected outputs and activities by time period. In short, we see no attempt to manage cultural resources. Rather the Plan simply provides a standard statement of intent to comply with cultural resource laws.

We recommend that the Gallatin N.F. incorporate a cultural resource management plan or commit to devising a separate planning document which provides for consideration, early in the planning process, the effects of Forest undertakings to cultural resources. Such a plan should include an overview of the cultural resource data base, management and resource concerns, research needs, project outputs and activities by time periods; all within a coordinated framework with other Forest management concerns. Unless the current data base, goals, data needs, projected outputs and activities, required budget and personnel, and program review mechanisms are identified, the reader cannot determine whether the standards provided in the Plan are adequate or even realistic.

Sincerely,

Alan Stanfill

Alan L. Stanfill,
Archaeologist/Anthropologist

File: Comp/Gallatin N.F./Forest Plan

VI-24

United States Department of Agriculture
Forest Service
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

Reply to: 1920

Date:

Montana Historical Society
Alan L. Stanfill, Archaeologist/Anthropologist
Historic Preservation Office
225 North Roberts Street
Helena, MT 59620

Dear Mr. Stanfill:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next ten to fifteen years.

I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan.

I feel we have developed a Forest Plan that is responsive to expressed public needs and which reflects the resource capabilities of the Gallatin Forest. Each individual desire or expectation will not be fully met - some individual compromise is necessary. The decisions made through this process are important and will affect the future of the Gallatin Forest. In the years ahead the Forest Service will closely monitor the implementation of the Forest Plan and utilize those results in our future planning efforts.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I want to respond to the concerns and desires expressed in your letter. Following is an effort to describe how each of your concerns was resolved through the Forest Plan.

The Forest Plan summarizes broad management goals and commits the Gallatin National Forest to meeting all laws and regulations pertinent to the management of cultural resources. The more highly focused delineation of program objectives, research needs, problem identification, etc., are better met by separate documents of more limited scope which specify the actual management treatments of the various classes of cultural resources.

FS-6200-11b (7/81)

Within funding limitations, the Gallatin National Forest is committed to writing a Cultural Resource Overview which will address the known cultural resource data base, research needs, and the additional concerns expressed in this portion of the comments.

The standards provided for in the Forest Plan are mandated by such legislation as the National Environmental Policy Act, the National Forest Management Act, the Archeological and Historic Preservation Act, the National Historic Preservation Act, the Archeological Resources Protection Act, and relevant Codes of Federal Regulation (eg. 36CFR800). The cited standards and directions are very specific. The Gallatin National Forest's commitment to follow these laws and regulations likewise commits us to carry out our cultural resource management responsibilities.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

United States Department of Agriculture

Soil Conservation Service

Federal Building-Room 443
10 East Babcock
Bozeman, MT 59715

June 5, 1985 281.

Robert Breazeale
Forest Supervisor
Gallatin National Forest
P. O. Box 130
Bozeman, MT 59715

Dear Mr. Breazeale:

We have reviewed your draft Forest Plan and Hyalite, Porcupine, Buffalo Horn Wilderness Study Report.

I would like to compliment you for your recognition, identification and protection of the snow measuring stations on both of these documents.

It is the best documentation of snow survey stations in any forest plan we have reviewed.

We have no problems with your guidelines for Management Area 26 which covers our snow survey locations. We are concerned with loss of current access should adjancent parcels become wilderness or some other form of restrictive management. We do not see a problem with your preferred alternative but would like to be advised if other forms of land management are instituted enroute to or around our data sites so that we may discuss this with you prior to implementation.

We concur with your preferred alternative for the Hyalite, Porcupine, Buffalo Horn Wilderness Study.

The Shower Falls SNOTEL site in the Hyalite drainage is very critical to water supply forecasts in the Gallatin River and for the forecasting of inflows and for the operation of Middle Creek Reservoir. Other alternative site locations are either in the Spanish Peaks or are included in the HPBH study area. We would very much like to continue to access this site with oversnow machines in the winter and with 2-wheel bikes and/or helicopter in summer.

We appreciate the opportunity to comment. If you have any questions about our operations on the Gallatin National Forest, we would be happy to discuss them with you.

Sincerely

Glen H. Loomis
State Conservationist

The Soil Conservation Service is an agency of the Department of Agriculture

United States Department of Agriculture

Forest Service

Gallatin National Forest

P.O. Box 130
Bozeman, MT 59771

Reply to 1920

Date

USDA, Soil Conservation Service
Glen H. Loomis, State Conservationist
Federal Building, Room 443
10 East Babcock
Bozeman, MT 59715

Dear Mr. Loomis:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next ten to fifteen years.

Thank you for your comments on the proposed Forest Plan and the Hyalite-Porcupine-Buffalo Horn Wilderness Study Report. I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan. We appreciate your concerns about access to the Forest snow survey sites.

I feel we have developed a Forest Plan that is responsive to expressed public needs and which reflects the resource capabilities of the Gallatin Forest. Each individual desire or expectation will not be fully met - some individual compromise is necessary. The decisions made through this process are important and will affect the future of the Gallatin Forest. In the years ahead the Forest Service will closely monitor the implementation of the Forest Plan and utilize those results in our future planning efforts.

Following is an effort to describe how each of your concerns was resolved through the Forest Plan.

Management Area 25 includes all electronic sites and snow survey sites. Our management guidance is to provide for the use of these sites. No management activities are planned within sites and our overall policy is to maintain your access to them. All Districts are aware of the importance of these sites and we will solicit your input before any changes are instituted.

The Shower Falls SNOTEL site is currently accessible by motorized vehicles. There are no restrictions proposed for this site in the Forest Plan, and if restrictions are instituted, administrative access would most likely be allowed.

FS-6200-11b (7-81)

281

United States Department of Agriculture

Soil Conservation Service

Federal Building, Room 443
10 East Babcock Street
Bozeman, MT 59715

June 21, 1985

Forest Supervisor
USDA-Forest Service
Gallatin National Forest
P.O. Box 130
Bozeman, Montana 59715

Dear Sir:

Thank you for the opportunity to review and comment on the Gallatin National Forest Plan. SCS staff has no comments to offer.

Sincerely,

Glen H. Loomis
State Conservationist

JUN 27 1985
USDA, Forest Service
Bozeman, MT 59715

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and its Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

Sincerely,

ROBERT E. BREAZEALE
Forest Supervisor

Enclosure

LIVINGSTON SCHOOL DISTRICT NO. 4 & 1
132 SOUTH B STREET, LIVINGSTON, MONTANA 59047
PHONE (406) 222-0861

293.

GAYLORD C. LASHER
Superintendent

WILLIAM J. ADAMO
Business Manager

June 18, 1985

JUN 20 1985
USDA, Forest Service
Bozeman, MT 59771

Forest Supervisor
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

Dear Sir:

At its recent meeting the Livingston Board of Education passed a resolution calling for an expanded commercial use option of forest products in the Gallatin National forest. Livingston and Park County, in general, depend a great deal upon forest products as part of its economic base. Furthermore the school district directly receives monies that are allocated from timber harvests in the national forest.

The Livingston Board of Trustees strongly urge that at least 35 million board feet of timber be harvested in the Gallatin forest over the next ten years. While we believe in the recreational use of the national forest, the facts show that the timber industry's raw material requirements would not have an adverse affect on recreation and recreation related employment. Park County needs to preserve its jobs. Unemployment is already at high levels and the tax base would shrink to intolerable levels if the proposed program of 21 million board feet harvest is adopted.

The Livingston Board of Education respectfully requests that you give further consideration to continuing the timber harvest at traditional levels.

Sincerely,

Dennis Noteboom, M.D.
Chairperson
Board of Trustees
Livingston School District #4 & 1

VI-28

United States Department of Agriculture
Forest Service
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

Reply to: 1920

Date

Dennis Noteboom, M.D.
Chairperson, Board of Trustees
Livingston School District #4 & 1
132 South B Street
Livingston, MT 59047

Dear Dr. Noteboom:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next ten to fifteen years.

I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan.

I feel we have developed a Forest Plan that is responsive to expressed public needs and which reflects the resource capabilities of the Gallatin Forest. Each individual desire or expectation will not be fully met - some individual compromise is necessary. The decisions made through this process are important and will affect the future of the Gallatin Forest. In the years ahead the Forest Service will closely monitor the implementation of the Forest Plan and utilize those results in our future planning efforts.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I am aware of the situation in Livingston with the railroad pullout and the challenges which face your community in the coming months. Uncertainties on the National, as well as local scene, place large challenges on us as American citizens.

I want to respond to the concerns and desires expressed in your letter. Following is an effort to describe how each of your concerns was resolved through the Forest Plan.

The National Forests were established to improve and protect the forest within its boundaries, to secure favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. Since the passage of laws authorizing the

creation of National Forests in 1897, a goal of the Forest Service has been to promote community stability through a timber harvest program. This is particularly true in areas where land ownership is largely federal and a large proportion of the income is derived from federal lands.

Harvesting and processing of sawtimber provides an estimated 9.8 jobs (direct, indirect, and induced) per million board feet of timber. National Forest timber is an essential part of the local wood products industry (including State, corporate, and non-industrial private lands) and the harvest level in the Forest Plan accounts for about 200 jobs in the local communities.

Although it is certainly not the largest income producer, the wood products industry does provide the majority of the manufacturing earnings in the Bozeman trade area. Concerns have been raised about the impacts of timber harvest activities on recreation related employment or earnings.

The Gallatin National Forest is an area with a number of resource capabilities. Perhaps because of that, it is also an area of conflicting demand for those resources. We recognize the compatibility of many of these resources; however, at the same time, we recognize that there are real or perceived incompatibilities between various users and uses. In an attempt to strike a balance between the various desires of our publics, the Forest Plan provides that timber harvest is an appropriate activity on 24% of all forested land.

We feel that the final Forest Plan harvest level of 21 MMBF is an appropriate amount for the following reasons:

1. This harvest level is very near our historic average (22 MMBF average annual harvest for the years 1946 through 1985).

2. This level of harvest appears to provide the best balance of age classes within the suitable forest area over time, and is still compatible with the other objectives of the Forest Plan.

I appreciate your interest in the management of the Gallatin National Forest and hope I have addressed your concerns.

Sincerely,

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

PARK COUNTY COMMISSIONERS

414 E. Callender
Livingston, Montana 59047
406-222-6120

295.

June 26, 1985

Forest Supervisor
Gallatin National Forest
P.O. Box 130
Bozeman, Montana 59771

Dear Sir or Ms:

We would like to comment on a portion of your Gallatin National Forest plan, the timber harvest portion. We noticed that there was a substantial reduction in the amount of timber sales to be let in the next ten years. The projected 21 mmbf per year is considerably less than the high of 56 mmbf per year of the 60's and early 1970's.

The lumber industry is one of the prime employers in our area, we have saw mills, loggers, truckers, plus many other wood industry jobs at stake. Along with the jobs we have payments to our schools and county roads to lose by the reduction of timber sales.

Shifting timber sales over to private lands is only a short stop gap solution. The small amount of private timber sales will dry up within a few years. A well managed forest such as you have could be further exploited to provide additional timber sales to bolster our sagging local economy. An additional harvest of 8-10 mmbf per year (total 30 mmbf) could keep our mills running along with our economy.

We urge you to take another look at the total amount of timber to be harvested from forest land and increase that allotment to 30 mmbf annually to helppreserve our mills and local economy. Thus benefitting our entire community.

Respectfully yours,

PARK COUNTY COMMISSIONERS

Clifford Olson, Chairman

Kenneth Spalding, Member

Carlo Cieri, Member

CO/vc

United States Department of Agriculture
Forest Service
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

Reply to 1920

Date

Mr. Clifford Olson, Chairman
Park County Commissioners
414 E. Callender
Livingston, MT 59047

Dear Mr. Olson:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next 10 to 15 years.

I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan.

I feel we have developed a Forest Plan that is responsive to expressed public needs and which reflects the resource capabilities of the Gallatin Forest. Each individual desire or expectation will not be fully met--some individual compromise is necessary. The decisions made through this process are important and will affect the future of the Gallatin Forest. In the years ahead the Forest Service will closely monitor the implementation of the Forest Plan and utilize those results in our future planning efforts.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I want to respond to the concerns and desires expressed in your letter. Following is an effort to describe how each of your concerns was resolved through the Forest Plan.

The National Forests were established to improve and protect the forest within its boundaries, to secure favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. This direction has been expanded to include a variety of other resources through subsequent legislation.

The Gallatin National Forest is an area with a number of resource capabilities. Perhaps because of that, it is also an area of conflicting

demand for those resources. We recognize the compatibility of many of these resources; however, at the same time, we recognize that there are real or perceived incompatibilities between various users and uses.

In an attempt to strike a balance between the various desires of our publics, the Forest Plan provides that timber harvest is an appropriate activity on 24% of all forested land on the Gallatin National Forest.

We have decided to retain, for the final Forest Plan, the harvest level of 21 MMBF that was recommended in the proposed Forest Plan. One of the reasons for this decision was to help maintain the timber supply at a time when the private timber supply is declining.

I appreciate your interest in the management of the Gallatin National Forest, and I hope I have been able to explain the reasons for the timber harvest levels. We look forward to continued cooperation with Park County in the years ahead.

Sincerely,

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

United States Department of the Interior

NATIONAL PARK SERVICE
YELLOWSTONE NATIONAL PARK
WYOMING 82190

305.

Received 7/17/85

IN REPLY REFER TO:
N3215(YELL)

JUL 18 1985

Mr. Robert Breazeale
Gallatin National Forest
P.O. Box 130
Bozeman, Montana 59771

Dear Mr. Breazeale:

Enclosed are our comments on the "Proposed Forest Plan" for the Gallatin National Forest. We hope these comments will help in the development of a final plan.

Sincerely,

Robert D. Barbee
Superintendent

Enclosure
Comments

VI-32

United States Department of Agriculture | Forest Service | Gallatin National Forest | P.O. Box 130 Bozeman, MT 59771

Reply to 1920

Date

USDI, National Park Service
Robert D. Barbee, Superintendent
Yellowstone National Park
Wyoming 82190

Dear Mr. Barbee:

Thank you for your comments on the proposed Gallatin National Forest Management Plan. It is very helpful for us to understand your concerns and philosophy regarding management activities on the Gallatin National Forest which could affect Yellowstone National Park.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I would like to take this opportunity to reaffirm our objective to pursue our mandate for mulitple use management. Our activities will be conducted in a manner which will provide for such important goals as the recovery of the grizzly bear and protection of the unique thermal features in Yellowstone National Park. One of the major over-all objectives of the Forest Plan is to recognize and manage for high quality recreation and wildlife resources on National Forest lands. These resources are very important to the local area for both social and economic reasons because of the Gallatin National Forest's unique geologic and scenic qualities. Equal in importance is the Gallatin's proximity to Yellowstone National Park and its relationship to the Greater Yellowstone Area with its nationally important resources. Our objective is to coordinate use and management of these resources among the various land management agencies within this unique area.

The Gallatin National Forest has been conducting biological evaluations for all proposed projects within occupied grizzly bear habitat. We have consulted with the U.S. Fish and Wildlife Service; Montana Department of Fish, Wildlife, and Parks; and the Interagency Grizzly Bear Study Team on a continuing basis to assure that our actions will not jeopardize, and will assist in, recovery of the species. Evaluations that conclude with a "may affect" situation have gone to the U.S. Fish and Wildlife Service for formal consultation.

FS-6200-11b (7-81)

COMMENTS ON PROPOSED FOREST PLAN - GALLATIN NATIONAL FOREST

INTRODUCTION

The greatest challenge now facing land managers in the greater Yellowstone ecosystem is integrating a variety of agency mandates and public needs in a way that will maintain the integrity of the largest intact natural ecosystem in the temperate zone of the earth. In recent years, both managers and the public have become increasingly aware of this challenge and have responded to it with many boundary-crossing programs and concepts. For a host of ecological reasons, some of which we are only now beginning to understand, it is not possible for managers in any part of the greater Yellowstone to manage their units in isolation. The time when national parks could be perceived as autonomous islands or when national forests were guided by a uniform management direction wherever they were located, is past. The evolution of management thought has been conditioned by encroaching civilization and scientific knowledge. Today, both public and private lands in the greater Yellowstone ecosystem are inextricably entangled.

A welcome side effect of our growing realization that all parts of this ecosystem depend on all other parts has been a heightened recognition of the remarkable qualities of the lands that border Yellowstone Park. The park itself, so long seen as a "crown jewel" of wild nature, was for many years viewed with no reference to its nonpark setting. Now, because of extensive scientific research involving many elements of the natural setting, we have overcome the old stereotype of the park being surrounded by lands that were somehow less "important." From an ecological perspective, the entire ecosystem has scientific and cultural values that can be demeaned by management actions in any part.

Naturally the National Park Service's most pressing concern is to ensure the welfare of Yellowstone Park, and to be watchful that management actions taken outside the park boundaries do not impair our ability to meet our legal obligations in protecting the Yellowstone resource. It is well known, for example, that external actions, beyond the administrative control of the National Park Service, could impair our ability to protect the grizzly bear, maintain a healthy elk population, or perpetuate naturally-occurring levels of geothermal activity in the park. However, it seems to us that dealing with management issues in the greater Yellowstone ecosystem only in terms of their immediate effects on the park is taking a narrow, short-term view of the situation when a broader vision is infinitely preferable. The following comments are offered in that spirit.

Among its other recent distinguishments, Yellowstone Park was set aside as an International Biosphere Reserve in 1974, and was designated a World Heritage Site in 1978. These honors bring with ther responsibilities. The attention of the world is focused on the park, and the manner in which America cares for the park is the subject of intense international attention. Unfortunately, the responsibilities associated with these honors are not

As pointed out in Chapter II of the Forest Plan "All proposed and existing activities funded or authorized by the Forest will be reviewed to determine potential for adversely affecting threatened or endangered species. Activities having potential for jeopardizing the existence of threatened and endangered species will be modified or dropped".

We presently are devoting a significant amount of time and energy to grizzly bear habitat component mapping to be used in the cumulative effects analysis process (CEA). This process will provide us the capability to analyze and evaluate both current and proposed activities as they relate to grizzly bear habitat effectiveness and mortality risk. We do not make the assumption that current activities are totally compatible with recovery of the grizzly bear. Impacts on grizzly bears become part of the total evaluation to give a broader picture of the cumulative effects.

The Gallatin National Forest has accomplished timber harvest activities within grizzly bear habitat following biological evaluations and U.S. Fish and Wildlife Service reviews and formal consultation which resulted in non-jeopardy opinions.

The implementation of the Forest Plan provides for the grizzly bear habitat and security needs in several ways. We have identified 817,000 acres, or more than 40% of the Gallatin National Forest, that is occupied habitat. Activities in occupied habitat will be guided by the "Grizzly Bear Standards and Guidelines for the Gallatin National Forest", which are based on the Greater Yellowstone Guidelines.

Timber management activities will meet standards of timing and spacing to provide for grizzly security while logging is occurring. These standards have been added to Management Area 13 as a result of the biological opinion of the U.S. Fish and Wildlife Service of the proposed Forest Plan. Another change in the final Forest Plan is a reduction of timber harvest in occupied habitat. Roads necessary for this timber program will be closed permanently or during seasons of high potential for human-bear conflict. The road management standards in Management Areas 13, 14, and 15 will be implemented to provide for grizzly bear security.

No new livestock grazing will be permitted in Management Situation (MS) 1 habitat. As of the moving of sheep from Ash Mountain to Meatrack Carbonate, the Gallatin National Forest will have only one active sheep allotment remaining in MS 1 habitat and only three active sheep allotments remaining in MS 2. The final Forest Plan closes ten sheep allotments that have been vacant for many years. All livestock grazing in occupied habitat is regulated by the Gallatin National Forest's grizzly bear standards and guidelines and the management standards in Management Areas 13, 14, and 15.

simply fulfilled. Like the original act creating the park, and like the National Park Service legislation which guides our management of the park, the more recent honorary designations do not fully take into account the complexity of managing the park when its fate is so bound up with the fate of surrounding nonpark lands.

Given the considerable international attention that the Yellowstone area receives, and given our own long-felt conviction that the Yellowstone landscape is one of our most valuable natural treasures, it is clear that the United States has more at stake here than in most other situations where national parks, national forests, and other management units must cooperate and integrate their mandates.

Because of the literally unique character of the greater Yellowstone ecosystem, we believe that management directions that might be perfectly appropriate in most national forests may not always apply in forest lands here. The proposed Gallatin National Forest Plan is a model of careful accommodation to many uses and interests - it is admirably faithful to the principle of multiple use. We are not the first, however, to suggest that merely because multiple use is the guiding principle of the national forests does not mean it must be applied uniformly throughout the national forest system. Some forests may be best managed for timber harvest, or grazing, or recreation, even to the exclusion of some other types of use. That possibility, or option, seems perfectly applicable to forests in the greater Yellowstone ecosystem. Considering the area's extraordinary values, we believe that the entire Yellowstone area may be best managed, not by trying to do many things satisfactorily, but by concentrating on doing one thing especially well. That one thing is protecting the integrity of the natural systems which are the area's single most important resource. This does not mean that other uses should be totally excluded; only that one overriding purpose - the protection of the ecosystem - be given primacy in all management decisions.

We realize that any change in management direction by the national forests in the Yellowstone area has immediate and sometimes dire consequences for individuals, whether they be recreational businessmen, stockmen, loggers, recreationists, or any of many other groups. We are compelled by our concern for the long-term fate of this area, however, to ask the hard question: Are the immediate gains made by a relative few people near the park worth the loss the world will feel if America loses the grizzly in Yellowstone, or permits the park's geysers - 60 percent of the geysers in the world - to suffer some irreparable harm? There is little doubt which way future generations would answer that question, just as there is little doubt that a healthy Yellowstone ecosystem will in the long run benefit the regional economy the most. Our job is to cast a vote for posterity, just as we do all we can to recognize the more pressing demands of the moment.

For that reason we heartily recommend that the Gallatin National Forest Plan be modified to give greater emphasis to protecting the ecological values that have made this area so justly famous.

All existing and proposed projects and activities in grizzly bear occupied habitat during the life of the Gallatin National Forest Management Plan will be evaluated through a cumulative effects analysis process when developed and operational for each bear management unit or subunit on this Forest. This will be an on-going process until applied to all occupied habitat on the Gallatin National Forest. The direction for this process is found in the forest-wide standards of the final Forest Plan and also in the management standards of Management Areas 13, 14, and 15.

Our on-going effort to complete grizzly bear component mapping has provided improved information concerning areas of key grizzly use. Page D-13, item 5 of the Forest Plan provides some clarification to the term "key grizzly habitat" (i.e., biological activity centers exhibiting primary habitat constituent elements or areas exhibiting secondary constituent elements within key travel corridors).

The Forest Supervisor does have the authority through 36 CFR 261.53 to close an area for protection of threatened, endangered, rare, unique, or vanishing species of plants, animals, birds or fish.

The statement "Some recreation developments may be enhanced with carefully planned and executed timber management activities", is included for developed recreation sites to permit such activities as hazard tree removal, tree planting, transplanting within a campground, or tree removal to provide a scenic overlook, highway pull-off area.

The Forest Plan is programmatic. During implementation, when the various projects are designed, more site-specific analysis will be performed. This process will include biological evaluations as needed to meet our goal to recover the grizzly bear population.

We have removed the statement concerning potential new areas for re-establishment of the grizzly bear found on page G-2 of the proposed Forest Plan. We also agree with your recommended change in wording on page G-5.

We have updated population data and projections for grizzly bear with the latest information.

The area discussed in your letter concerning additional occupied grizzly bear habitat on the Gallatin National Forest presently is being evaluated with the U.S. Fish and Wildlife Service, Montana Department of Fish, Wildlife and Parks, and Burlington Northern. We have completed our component mapping in that area. Based upon that, we have extended our mapped occupied habitat to the head of Beaver Creek. Forest-wide, we have increased the mapped occupied habitat for grizzly bears by approximately 83,000 acres. This change is reflected in the updated Management Area Map for the Plan.

We believe the Forest Plan provides a much improved management direction for recovery of the grizzly bear population. In Chapter II,

The following comments, while addressing numerous specific issues and directions in the proposed Forest Plan, aim also to illuminate some ways in which we think the needs of the greater Yellowstone ecosystem could be more fully incorporated into the plan.

THE GRIZZLY BEAR

Grizzly Bear

We would like to reconsider the direction of the Forest Plan concerning grizzly bears, but first some specific comments are in order. These refer to the plan as it now stands.

In the Forest Plan management areas 7, 13, 14, and 15, all of which occur within bear management situation areas 1 or 2, there is of course considerable potential for conflict between human uses of many kinds (forest harvest, livestock grazing, mineral, oil, and geothermal exploration, recreational development) and grizzly bears. The present Forest Plan does not explain how, or at what pace, the guidelines for protecting the grizzly bear in these areas will be accomplished. For example, on page G-8 of the Forest Plan, under "Standards and Guidelines" for wildlife management as it will occur in the above-named areas, the Forest Service is required to do the following:

> Complete a biological review (see Glossary) for all projects in occupied habitat. Based on recommendations and findings in the biological review, design and implement project modifications which will provide compatibility (see Glossary) between grizzly bears and other resource management activities without jeopardizing the grizzly population. If a project cannot be made compatible, and it will jeopardize the grizzly populations, it will be necessary to eliminate the project if in MS-1 and/or modify the project if in MS-2, primarily to reduce the potential for bear/man conflict.

Does this mean that a biological review will also be conducted to judge the suitability of all activities (recreational, industrial, and management) currently underway in the forest, or only new ones? If those currently underway are to be evaluated, is there a timetable for completion of evaluations? If current activities are not to be evaluated, is it assumed they are not incompatible with the recovery of the grizzly bear population?

We do not think that present levels of human use are in all cases compatible with grizzly bear recovery. Though it is often difficult to measure human use effects, especially those resulting from specific projects, on grizzly bears, the accumulated effects of human use are well-known and predictable. Consider the Forest Plan's approach to logging and livestock grazing.

Wildlife Objectives, of the proposed Forest Plan we stated that "All the identified habitat on the Gallatin National Forest that the grizzly bear needs to recover its population will be managed for his needs." This expressed intent and management direction has been carried into the final Plan. The cumulative effects analysis process, when operational, will serve as a management tool to aid us as we make decisions concerning activities as they relate to human-bear conflicts, both existing and potential.

Should we receive applications to lease for geothermal development we naturally will follow the National Environmental Policy Act requirements by conducting environmental analysis as was done for the Island Park Geothermal Area EIS. This is pointed out on page II-29, item B.3. We will consult with the National Park Service, U.S. Geological Survey, and other involved agencies and groups to assist in the analysis. We have included such a statement in our final Forest Plan. I can assure you, we will proceed with caution. We have strong commitment not to adversely affect the thermal features in Yellowstone National Park.

We have recommended to the Bureau of Land Management that phosphate withdrawal in the Cabin Creek/Tepee Creek area be revoked. Phosphate is a leasable material and it is therefore discretionary for us to allow or deny leasing. A detailed environmental analysis will be done with other agency consultation before a decision is made to lease.

The Cabin Creek, and much of Tepee Creek, was withdrawn from all form of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and geothermal leasing, and all amendments thereto by passage of the Lee Metcalf Wilderness and Management Act of 1983. This applies to Management Area 4 in the Madison Range and Management Area 20.

The concerns you have expressed under the heading "Elk Winter Range" are valid. Again, the emphasis of the Forest Plan is not on site-specific decisions,but provides a more programmatic management direction for the Forest. Before implementing site-specific projects, more detailed environmental analysis work will be accomplished to achieve such goals as grizzly bear recovery or increasing winter range capacity for elk. Other than threatened/endangered species, elk and moose will be given the most preference.

The term "big game" is defined in the Glossary as "Those species of large mammals normally managed as a sport hunting resource".

We have mapped key winter range for elk and bighorn sheep. It was impossible to display all of the information we have available for the various resources on the Management Area maps which went out with the proposed Forest Plan. Specific resource maps are available for review in this office.

Three statements of assurance appear in the E.I.S. that require attention:

> Increases in grazing would occur gradually over the next two decades. The livestock industry can respond to the increase and winter range and grizzly bear habitat would be protected (II-28).
>
> In this alternative, all occupied habitat is given emphasis for the bear, including both MS-1 and MS-2 lands. Activities that take place in occupied habitat - such as livestock grazing, timber management or recreation use - are done in a way that the grizzly populations can be protected (II-30).
>
> Livestock grazing would not be incompatible with grizzly management (II-30).

These statements seem to us to express exceptional optimism about the bear's ability to stand human use pressure. Numerous studies, both in Yellowstone and in nearby environments, indicate that logging negatively affects grizzly bears. Similar evidence exists to show that sheep grazing is also harmful. Indeed, the entire historical record demonstrates that logging, sheep, and grizzly bears do not go together.

We cannot overemphasize that the scientific evidence is already in existence to suggest that grizzly bears, especially a population like Yellowstone's, which is already stressed and perhaps in decline, cannot afford the additional stress of grazing and timber harvest. We note that in the Proposed Forest Plan, Table IV-1, data sources for evaluating the condition of the grizzly population include the findings of the Interagency Grizzly Bear Study Team. One 1980 paper by that team (Knight and Judd 1980) reported, bluntly, that "Grizzly bears and sheep are not compatible," and made the following observation and recommendation:

> Although poaching by sheepherders on the Yellowstone population is not likely to reduce the population to extinction, it is a significant mortality factor and we feel that any sheep allotments within 20 km of the Yellowstone Park boundary are a potential drain on the grizzly bear population.

In the five years since that statement was written, population estimates by the Interagency Grizzly Bear Study Team have decreased from a fairly "optimistic" high of 350 to something less than 200. There is now general agreement that every grizzly bear lost to poaching or other unnatural causes is one too many. There is also substantial evidence that sheep grazing is contributing, both in known and in unknown deaths, to the apparent decline in the population.

Because of this greater precariousness of the population and its documented decline (Knight and Eberhardt 1984a; Knight and Eberhardt 1984b), we are also concerned that Table IV-1 does not adequately provide for reevaluation of management actions. Under the heading of "Variability (±) which would

The key big game winter range maps were prepared by our wildlife biologists in cooperation with the Montana Department of Fish, Wildlife, and Parks. Data provided by the Park Service helped us identify part of our elk winter range. Your information was collected from aerial observations.

Trumpeter swans were classified as a "sensitive species" in August, 1986 in Region One of the Forest Service. Bald eagles currently are on the threatened/endangered species list for the Gallatin National Forest and managed as such. Both the trumpter swan and the bald eagle receive project specific evaluations. Refer to Chapter II of the Forest Plan.

Your review of our Proposed Plan is appreciated. Members of my staff and I would be happy to meet with you and any of your people.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

initiate further evaluation," the grizzly bear column states "one or more preventable bear mortalities." The bear population being what it is, one bear mortality is too many. Habitat loss may occur, reducing the number of bears, with no known "avoidable" mortalities occurring. As Appendix C explains, all projects (timber harvest, livestock grazing, and so on) in occupied grizzly habitat must be preceded by a biological study to establish that they will not harm the habitat. Should the study be in error, there is no protection for the bear, even if it completely loses some portion of the habitat, until the habitat loss is either somehow noticed by researchers or a dead bear results. Researchers may have no reason to notice the habitat loss for years, and no dead bear may result, at least no dead bear that can be specifically blamed on the guilty project. The result may simply be fewer bears. It appears to us that it would be far simpler, and far more likely to result in a restored bear population, if the project were not approved in the first place.

In any case, monitoring of the health of the grizzly bear population is of utmost importance. The Forest Plan does not make clear, or even introduce, the recently-developed interagency "Cumulative Effects Analysis Process for the Yellowstone Ecosystem." A discussion of this process and its implementation should be added to the plan, as it predicts in advance the effect of any forest project.

Other specific points relating to grizzly bears

In the Forest Plan, III-46, III-49, and III-52, under "Minerals," we read that human use may be controlled as follows:

> Within areas of key grizzly use, limit surface occupancy to periods of noncritical use, or restrict occupancy to specific areas if needed to control human-grizzly conflicts.

Does "areas of key grizzly use" have a specific definition? It is not in either applicable appendix. It needs to be defined. We suggest it be defined as "anywhere in MS-1, and in designated areas of MS-2."

Also, does "restrict occupancy to specific areas if needed to control human-grizzly conflicts" mean that managers have the option to deny all occupancy to an area because of human-grizzly conflicts? If not, should not managers have that option?

In the Forest Plan, III-44, it is stated that in Management Area 13 "Some recreation developments may be enhanced with carefully planned and executed timber management activities." Are these developments anticipated specifically at this time? Should the plan specify their probable location and extent? How will the developments help meet the management goals for Management Area 13, those being primarily the reduction of the grizzly bear mortality?

In the Forest Plan, G-2, in the discussion of remaining grizzly bear habitat in the lower 48 states, this statement is made:

> While suitable habitat may occur outside these six areas, other current and established land uses have eliminated and preclude reestablishment of the grizzly bear.

This appears to be a judgement made that is outside the scope of the Forest Plan; considerable interest is expressed in several areas for colonization and/or reintroduction, and though it may eventually prove true that established land uses will preclude establishment, the outcome is by no means certain and perhaps should not be, pending grizzly habitat mapping results.

In the Forest Plan, G-5, the first sentence in the second complete paragraph should be revised so that the Craighead estimate of 222 bears for 1959 is not represented as having been made in 1959. The estimate was made in the cited 1974 publication. A better sentence would read as follows: Craighead et al (1974) estimated that the grizzly population in the Yellowstone ecosystem was 222 in 1959.

In the Forest Plan, G-5, the third complete paragraph could be usefully updated to include population data and projections presented in 1984 by the Interagency Grizzly Bear Study Team, specifically papers by Knight and Eberhardt.

In the "Gallatin Forest Plan Proposed Alternative" map, the boundary of occupied grizzly bear habitat northwest of the park follows the Gallatin River south from Porcupine Creek to the mouth of Taylor Creek, and then follows Taylor Creek upstream to the mouth of Lightning Creek. Basile (1982) and the Final Environmental Impact Statement, Grizzly Bear Management Program (N.P.S. 1982) both indicate that much of the area between Taylor Creek on the south, Beaver Creek on the north, the Gallatin River on the east, and the Madison/Gallatin County Line on the west, is also occupied grizzly bear habitat.

Grizzly Bear - General Remarks

The cumulative effects of human use on grizzly bear habitat are well known. Under the circumstance of an apparently declining bear population, it would seem unwise to maintain current levels of use - grazing, logging, resource exploration, recreation - in the Gallatin National Forest Management Areas 7, 13, 14, and 15. Therefore, in the interests of the bears, and in keeping with the spirit of our introductory comments on the greater Yellowstone ecosystem, we urge you to reduce all conflicting human uses well below present levels in these Management Areas. Once it is fully determined that the grizzly bear population has recovered and is stable or increasing, then it may be reasonable to investigate greater levels of human use in these areas. Until then, such use is too dangerous to the bear.

ENERGY AND MINERAL EXPLORATION

Geothermal Development

According to the E.I.S., II-32, the proposed alternative "would have very little land outside wilderness which would not be available for leasing and exploration." The Forest Plan, V-21, contains the following statement:

> Two areas of the Forest - one near West Yellowstone and one near Gardiner - have been rated as "known geothermal resource areas," or K.G.R.A.'s, meaning that they are likely to possess commercial geothermal steam reserves. However, there has been concern that geothermal developments could adversely affect the geothermal features of Yellowstone Park.

We share that concern. We notice that none of the Management Area Standards for the areas near Gardiner and West Yellowstone refer specifically to geothermal development, presumably including such potential development under the "Minerals" heading.

We suggest that the Forest Plan include a statement of policy regarding potential geothermal development, and that the policy involve consultation with National Park Service, U.S. Geological Survey, and other involved agencies and individuals prior to acceptance of any applications for geothermal exploration or development. This is a profoundly important matter, one which has great effects on the future of the park's unique resources.

We also suggest that the precise boundaries of these areas be given in the Forest Plan, both in writing and on a map.

Mineral and Oil Exploration and Development

The E.I.S., as quoted elsewhere in this letter (under Geothermal Development), explains that under the proposed Forest Plan, practically all of the forest that is not protected in wilderness is available for leasing and exploration. We have elsewhere dealt, briefly, with the potential impacts of such activities on grizzly bears, but there is another sort of potential impact, and it is one of the reasons we must counsel the Forest Service to proceed with great caution in such developments. Recent research by the U.S. Geological Survey indicates that the aquifer that supports Yellowstone's major geothermal areas may originate in the Gallatin range outside the park. At present, though the data has not been prepared for publication, the scientists at the U.S. Geological Survey in Menlo Park, California, are willing to state that from the point of view of the isotopic composition of the thermal waters in the park, with present interpretations and the data in hand, the only reasonable place for the major recharge area (for the geyser basins) is in the Gallatins. Isotopic studies done at various locations in the Gallatin range north of the park suggest that in this previously unimagined way, Yellowstone Park is linked with the surrounding forest lands.

It should be clear from this rather startling discovery that any disturbance of the aquifer north of the park may have effects within the park. Until additional research is done on the exact extent of the aquifer, and until much more is learned about the nature of the connection, it is wise to proceed with great caution in all resource management activities. We suggest that the Forest Plan in some way reflect this new information and the concerns it naturally causes.

Our current maps of potential mineral extraction in the Gallatin Forest show a sizeable phosphate mining withdrawal in the Cabin Creek - Teepee Creek area. We find no mention of such a withdrawal in the Forest Plan. Is this withdrawal still viable, and if so how does it apply to the relevant management areas in the Forest Plan?

ELK WINTER RANGE

The plan uses such terms as "big game" and "wildlife" vaguely, such as in III-49, under "Range," where this statement appears:

> Forage needs of big game on key winter range will be emphasized over livestock needs.

The plan should define "big game" more precisely; which species will be given preference? Some species require more attention than others. Upon what will management decisions regarding preference be based?

The above-quoted statement is similar to the following statement from III-52:

> Available forage will be allocated between livestock and big game. Big game needs will be emphasized on key winter range.

Key winter range, though defined in intent in the Glossary, is not defined in fact on the map. Its actual extent may vary as, for example, the northern Yellowstone elk herd colonizes range north of the park, or as bighorn sheep distribution changes. Can the geographical extent, or potential extent of key winter range be spelled out more clearly?

Is there a more quantitative way to describe the extent to which big game needs will be "emphasized" over livestock needs in these cases? Will some proportional formula be followed? How will the preference be monitored?

In the Forest Plan, III-52, is the following statement:

> Before investments are made to increase livestock A.U.M. production, an evaluation of the effect on grizzly bear security will be made.

Will a similar evaluation be made for possible effects on elk or other wildlife species? Will sensitive species such as the trumpeter swan and bald eagle receive evaluations?

United States Environmental Protection Agency
Region 8, Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, Montana 59626

343.

EPA

JUL 8 1985

JUL 9 1985
USDA Forest Service
Bozeman, MT 59715

Ref: 8MO

Mr. Robert E. Breazeale
Forest Supervisor
Gallatin National Forest
Box 130
Bozeman, MT 59771-0130

Dear Mr. Breazeale:

This letter transmits the results of the U.S. Environmental Protection Agency's (EPA) review of your Draft Report and Environmental Impact Statement for the Hyalite-Porcupine-Buffalo Horn Montana Wilderness Study Act Areas. Thank you for the opportunity to review this document. Our review addresses potential adverse environmental impacts associated with modificational uses (e.g., timber harvesting, road building, recreational activity).

Your document presented six alternatives, four of these alternatives included some timber harvesting and road construction. The Agency's concerns with water quality degradation and soil erosion are the same as those expressed following our review of the draft Gallatin Forest Plan and DEIS. The Forest Service must set aside sufficient funding to implement a meaningful water quality monitoring program. Your organization should also be prepared to modify or change the activity if monitoring shows that unacceptable water quality and soil erosion impacts are occurring. EPA is assuming that the preferred alternatives or an alternative with timber harvesting is eventually selected.

The EPA has assigned a rating of EC-2 (Environmental concerns-Insufficient Information) to the draft report. EPA is concerned with possible water quality degradation and soil erosion if the preferred alternative or alternative involving timber harvesting and road construction is selected. Insufficient information has been provided to evaluate the impact of alternatives involving timber harvesting and road construction on water quality and soil erosion.

If you have any questions or concerns, please call me at 449-5432.

Sincerely yours,

John F. Wardell

John F. Wardell, Director
Montana Office

VI-41

United States Department of Agriculture
Forest Service
Gallatin National Forest
P.O. Box 130
Bozeman, MT 59771

Reply to 1920

Date

U.S. Environmental Protection Agency
John F. Waddell, Director
Region 8, Montana Office
Federal Building, 301 S. Park, Drawer 10096
Helena, MT 59626

Dear Mr. Waddell:

Thank you for your comments on the proposed Forest Plan, its DEIS, and the Draft Report/DEIS for the Hyalite-Porcupine-Buffalo Horn Wilderness Study Act Areas for the Gallatin National Forest. I would like to take this opportunity to respond to the concerns expressed in your letters of July 8, 1985.

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin for the next ten to fifteen years. The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

I would like to assure you that the Forest Service will continue to invite public review of project plans prior to implementation and that if projections indicate unacceptable environmental impacts are likely to result, we will not implement the project as it currently exists. My staff hydrologist will be devoting more time to evaluating and mitigating proposed projects where water is or could become an issue. We will continue to conduct environmental analyses for projects of the Gallatin National Forest tiered to the Forest Plan.

I plan on meeting Montana State's water quality standards through at least six different actions that will be clearly stated in the final Forest Plan. They are:

1. Intensive project planning which identifies the necessary Best Management Practices to be included in the contract(s) and the administration of the project.

United States
Environmental Protection
Agency

Region 8, Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, Montana 59626

343

EPA

JUL 8 1985

Ref: 8MO

Mr. Robert E. Breazeale
Forest Supervisor
Gallatin National Forest
Box 130
Bozeman, MT 59771-0130

Dear Mr. Breazeale:

This letter transmits the results of the U.S. Environmental Protection Agency's (EPA) review of the Gallatin National Forest's Proposed Forest Plan and Draft Environmental Impact Statement (EIS). I appreciate the opportunity to review these documents.

Though the Agency understands that it is difficult to be very specific about impacts of proposed uses on different parts of the Gallatin National Forest, the Forest Service must realize that it is difficult for EPA to provide detailed comments at this stage of the review process. The Forest Service should prepare plans for areas of this national forest once specific modificational uses are selected. These plans should be available for public review before the proposed use is implemented, and the proposed use modified or changed if information indicates that unacceptable environmental impacts may result.

Your plan includes the obligatory language that "Water Quality Standards for the State of Montana will be met or exceeded." The plan, however, does not always provide specific procedures to achieve these standards or describe monitoring practices to demonstrate compliance or identify problems. In a few instances, the plan gives more specific information. Maximum acceptable suspended sediment concentrations are provided for watershed #32, Upper Boulder River above Bramble Creek. The soil and water monitoring budget to evaluate water quality problems verify compliance with water quality standards, and evaluate Best Management Practice (BMP) effectiveness is only nine thousand dollars annually. This level of commitment is completely inadequate. Nine thousand dollars will not provide anywhere near the required water quality information to evaluate impacts of proposed modificational uses on surface and ground water, and soil erosion.

The proposed management alternative proposes an annual timber harvest of 21 million board feet (MBF) in the first decade increasing to 27 MBF through the fifth decade. A four percent sedimentation rate increase forest wide is projected if this alternative is implemented. The Agency believes that the alternative poses a significant threat to water quality and soil stability. The Agency is doubly concerned because of the unacceptable shortfall in monitoring funds to properly assess water quality degradation and soil erosion.

2. Increased training of my road, timber sale and grazing permit administrators in soil and water protection.

3. Inclusion of a complete set of watershed management goals, objectives and limitations for all 39 watersheds into which the Gallatin National Forest is divided.

4. Use of the R-1 Soil and Water Conservation Practices Handbook that is almost finalized.

5. Implementation of the water monitoring program of the Forest Plan.

6. Instituting compliance monitoring of projects and a sediment data network designed to test the validation of the R-1/R-4 Sediment Model to local conditions in cooperation with five other National Forests.

The Gallatin National Forest has been monitoring stream water quality, especially suspended sediment, since 1966 and is proud of its 20-year commitment to this effort which even pre-dates NEPA. To the extent possible, we used the results of that monitoring to assess water quality impacts from the relatively low levels of management activities that have already occurred and which will remain low or decline further. In 1982 my hydrologist completed a thorough analysis of cumulated water quality data collected here and he used that report in the development of the Gallatin National Forest Plan and DEIS. This extensive database and report provided us a firm basis for our planning analyses.

There is no evidence from the literature or our past work that the types of activities which routinely occur on the Gallatin National Forest pose any threat of ground water contamination. Mining proposals all have their own intensive surface and ground water monitoring networks and effectively lie outside the scope of Forest Planning. The one solid waste dump on the Forest has been tested and closed to further use. There is a separate EIS underway for the use of herbicides and insecticides for which my hydrologist provided site specific information.

There is no evidence from our monitoring that the level of development activities such as road construction and timber harvest which have occurred in the past 20 years has produced unacceptable increases in sedimentation. The Forest Plan does not propose to increase these levels. In fact, the amount of road construction will probably decrease. Therefore, we believe our estimate of 4% sediment increase in the next 10 years will not be a significant threat to water quality.

The EPA has assigned a rating of EC-2 (Environmental Concerns-Insufficient Information) to your draft Forest Plan and DEIS. The Agency is concerned with the potential water quality degradation and soil erosion, and terribly inadequate proposed water quality monitoring budget. Insufficient information has been provided to evaluate the impact of proposed modificational uses on water quality and soil erosion.

Sincerely yours,

John F. Wardell

John F. Wardell, Director
Montana Office

My reply to your comments about the Hyalite-Porcupine-Buffalo Horn Study Report include the above items. I share your concern on water quality and soil erosion. Let me assure you that the Gallatin has every intention of implementing a meaningful water quality monitoring program. We also are prepared to modify or change an activity if monitoring shows that unacceptable water quality and soil erosion impacts are occurring.

I appreciated your comments on these documents and I hope you will be satisfied with this letter and the changes in the final versions of these documents.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

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ER-85/675

AUG 16 1985

AUG 19 1985
USDA, Forest Service
Bozeman, MT 59715

Mr. Robert Breazeale
Forest Supervisor
Gallatin National Forest
Post Office Box 130
Bozeman, Montana 59771

Dear Mr. Breazeale:

We have reviewed the proposed land and resource management plan and draft environmental impact statement (DEIS) for the Gallatin National Forest, Montana. Our comments are as follows.

Wildlife

Results of the Section 7 consultation between the U.S. Forest Service (FS) and the Fish and Wildlife Service (FWS) should be incorporated into the final environmental impact statement (EIS) and Forest Plan. The FS is commended for its commitment to protect State of Montana "Species of Special Concern" and FWS "Sensitive Bird Species." The FWS has stated it will make staff time available to assist the FS for planning and implementation of this endeavor.

The draft EIS and Forest Plan should more adequately consider the importance of the Gallatin National Forest (GNF) area to the Rocky Mountain population of trumpeter swans. The rare trumpeter swan uses the entire Madison Arm and a part of the Grayling Arm of Hebgen Lake within the GNF. It is believed that these areas are critical to the future of the Rocky Mountain population of swans and should be designated as special management areas within which human use would be seasonally restricted.

The Madison Arm is a critical wintering area for approximately 20 percent of the Rocky Mountain (U.S. and Canadian) breeding trumpeter swans. Trumpeter swans require areas with open water throughout the year and an abundance of submerged aquatic vegetation. Because few such areas exist in the Montana, Idaho and Wyoming region, winter habitat for trumpeter swans is severely limited, Disruption of established wintering areas has seriously affected the entire Rocky Mountain population by causing further overcrowding at other areas. Crowding the swans into fewer wintering areas increases the chances for a disaster, such as the disease outbreak which occurred on the Henry's Fork of the Snake River this year (1985) and which resulted in the death of several swans. It is strongly felt that the continuing increase in winter recreation activities in the Madison Arm will ultimately have serious impacts on the wintering birds.

Therefore, considering the foregoing, it is recommended that the trumpeter swans and their habitat be afforded the highest priority for winter management of the Madison Arm of Lake Hebgen. Adequate protection could be assured if a special management area was created. Such an area should include all of the Madison Arm (from the mouth of the Madison River up to Edwards Point and including the South Fork), as well as a buffer that would encircle the Madison Arm and extent landward from the shore for one-quarter of a mile. It is also suggested that human use within this special management area should be restricted from November 15 through April 1 of each year.

United States Department of Agriculture | Forest Service | Gallatin National Forest | P.O. Box 130 Bozeman, MT 59771

Reply to 1920

Date

Bruce Blanchard
Director, Environmental Project Review
U.S. Department of the Interior
Office of the Secretary
Washington, D.C. 20240

Dear Mr. Blanchard:

The Forest Plan for the Gallatin National Forest has been completed. It provides the overall direction for management of the natural resources on the Gallatin Forest for the next ten to fifteen years.

I appreciate your interest and participation in planning the future of the Gallatin National Forest. Comments received from you and others have been instrumental in developing this final Forest Plan.

Thank you for your review comments of the proposed Forest Plan and draft Environmental Impact Statement for the Gallatin National Forest. Our consideration and use of your comments is as follows:

WILDLIFE

Results of the Section 7 consultation with the U.S. Fish and Wildlife Service will be included in the final Forest Plan.

The final Forest Plan will not reflect special management areas for the trumpeter swan. However, we currently are managing this species as if it were classified as sensitive. The Hebgen Lake Ranger District manages the South Fork Arm of Hebgen Lake for protection of the trumpeter. If we find we need more specific analysis for the trumpeter, we definitely will consider the four geographic areas you have mentioned. If the needs of the swan indicate a need for restriction of human activities, then we will work with the Montana Department of Fish, Wildlife, and Parks to try and secure those restrictions as they relate to fishing.

Region One of the Forest Service has established criteria for sensitive species. The trumpeter swan was classified as a "sensitive species" in August of 1986 and will be managed accordingly.

Recommendations contained in the "Montana Cooperative Elk-Logging Study" are incorporated in the Forest Plan and will continue to be incorporated in the final Plan as a Forest-wide standard and as a standard of Management Area II.

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The Grayling Arm of Hebgen Lake has historically served as a molting area for trumpeter swans. During the last three years, the number of swans using this area has declined sharply. It is felt that the increase in summer fishing pressure (especially by anglers using float tubes) has caused the swans to nearly abandon the area. In addition, Aldridge and Albino Lake, located north of Hebgen Lake, have been used as nesting areas by trumpeter swans for many years. Therefore, the Grayling Arm of Hebgen Lake, Aldridge Lake and Albino Lake should be included in any special management area designation. Accordingly, it is recommended that the final EIS and Forest Plan include 1) discussions on the importance of the GNF to the Rocky Mountain population of trumpeter swans and 2) analysis of the impacts that would be expected from the creation of a special management area to protect their habitat.

The report entitled "Elk-Logging Study," which is the result of a cooperative effort between the FS, FWS and the Montana Department of Fish, Wildlife and Parks, provides recommendations for coordinating elk and logging management. It is noted that the Forest Plan does not reference the study or include recommendations contained in it. Because other Montana national forests have adopted the study recommendations in their Forest Plans, it is recommended that the GNF Forest Plan also incorporate this study and its recommendations.

It is noted with interest that riparian areas are being treated as unique management areas. The management goals and standards listed for the riparian ecosystem (Management Area 7, on pages 22 - 27 of Chapter III of the Plan) are well organized. The management direction and intent seems 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, no consolidated statement of intent with respect to the Executive Order was found. The Forest Policy states that the Forest Service shall avoid, to the extent possible, long and short term adverse impacts which may be associated with the occupancy and modification of flood plains and with the destruction, loss or degradation of wetlands. It is suggested that discussion be included in the final EIS that would outline which activities would be in compliance with the Executive Order and Forest Policy, as well as those that would not be in compliance. Further, it is suggested that the wetlands (as defined by Forest Policy) be included in the final EIS as an affected environment and be discussed under Section IID, IIIB and IV of the document.

With respect to stream bank stability, water quality and the timing of grazing in the riparian zone, recent research (by the Bureau of Land Management (BLM) in Wyoming) indicates that stream banks are most unstable when soil moisture content is high; i.e., in the spring. Specifically, it has been found that reduced cattle numbers in the riparian zone in the spring do not significantly reduce the total amount of stream bank slumping caused by cattle nor improve water quality in streams. It is recommended the Forest Plan provide that sensitive areas be fenced to completely exclude cattle when their presence is shown to cause adverse impacts to water quality, stream bank stability, riparian shrubs and tree regeneration.

The Gallatin National Forest does not have flood plains as defined in EO 11990 and FSM 2527.05 and our "wetlands" are mainly wet meadows. We do have water-dependent (riparian) areas along our stream courses. Management direction for these areas (Management Area 7) was specific in the proposed Forest Plan and is even more specific in the final. All activities in Management Area 7 are directed by goal 5, "Manage streamside vegetation to provide for healthy timber stands with management direction giving priority to the needs of riparian zone-dependent resources". Riparian areas are discussed in the DEIS in Chapters II, III, and IV.

The forage utilization standards in Management Area 7 closely govern the use of these areas by domestic livestock. These standards should help us meet the goals. Monitoring will enable us to determine if we are meeting the goals and intent. Fencing is provided for in the Forest Plan under the range improvement section of the Range Resource Element, Chapter III. Fencing is planned mainly for implementing pasture systems in riparian areas in order to protect the riparian resource.

Yes, page III-45 of the proposed Forest Plan shows the whole realm of timber regeneration harvest systems. However, the harvest systems are not the sole determinate of harvest intensity. Intensity on page IV-14 of the DEIS refers to how the timber resource will be managed to meet the needs of threatened/endangered species versus managing the timber resource through silvicultural methods to maximize sawlog production. With the new timing and spacing standards added to timber management practices in Management Area 13, the harvest intensity in occupied habitat will not jeopardize the grizzly bear.

We have changed the indicator species from cutthroat to wild trout. We feel the health of our riparian areas can be monitored by the health of trout. Any management practices that adversely affect terrestrial habitat would have a consequent affect on the fisheries habitat. The other indicator species of elk, grizzly bear, goshawk, pine martin and bald eagle also will serve as indicators of healthy riparian habitat.

Item 6 of the Monitoring Plan under the heading of Wildlife and Fish is "riparian habitat conditions". In monitoring this item we will use measurements of vegetation, stream bank stability and sediment loading. A major effort of monitoring will be assuring that the riparian standards of Management Area 7 are being carried out.

MINERALS

We agree with your statement about mineral activities on unpatented claims in the wilderness and the final Forest Plan reflects this change.

The form you mention is part of an environmental assessment which will be done for new lease applications and which addresses the stipulation's need to be necessary and justifiable.

Leasing is discretionary. Hard rock mining is not discretionary. If we do not have withdrawals on our administrative sites, hard rock mining

Specific Comments

Page III-45 - Under timber regeneration harvest systems, the whole realm of timber management options is shown as available. This appears to conflict with the environmental consequence statement (EIS, page IV-14) that to protect threatened and endangered species, "the timber management resource will be harvested at less than maximum intensity."

Page III-23 - Cutthroat trout, when used alone, may not be an appropriate indicator species relative to determining the overall habitat value of riparian areas. First, it may be excluded from some reaches of streams by natural channel blocks. Second, it is not clear how the cutthroat would represent certain birds and mammals in the riparian guild. Some management practices may seriously alter terrestrial wildlife habitats while not affecting trout habitat. Therefore, wildlife needs may not be represented.

Page IV-4, Table IV-1 - To be in keeping with the intent of both Executive Order 11990 and Forest Policy, the wetland and riparian areas should be considered to be an individual monitoring heading (equivalent to Recreation, Visual Management, etc.). Items that could be measured to indicate change in condition should include the status of appropriate wildlife indicator species, grass and shrub use by cattle, diversity of vegetation parameters, stream bank stability and sediment trapping. The establishment of permanent sampling plots may be required to detect changes over time. As currently structured, the riparian area condition is an item to be measured under the wildlife and fish heading. It is not clear that this arrangement would sufficiently monitor the implementation of the Forest Plan. Because of the importance of these areas, it is suggested that this new monitoring effort be fully funded and that the precision, reliability, sampling intensity, reporting schedule and variability which would initiate further evaluation be in keeping with the spirit of both the 11990 Executive Order and the Forest Policy.

Minerals

The minerals discussion is comprehensive but somewhat generalized. More specific information and analysis would be helpful to mineral companies and government agencies.

Specific Comments

Page A-16, paragraph 5, last sentence - It is stated that ". . . minerals activities cannot take place on unpatented claims in wilderness." To be correct, it should read ". . . minerals activities cannot take place on unpatented claims in wilderness which do not have valid existing rights as of the date of withdrawal from mineral entry."

Page D-9, Item IV - It is suggested that language be built into this form based on the "necessary and justifiable" criteria discussed in the March 1, 1985, memorandum from the U.S. Forest Service Regional Forester to Region I Forest Supervisors (copy enclosed).

Page D-11 - It is suggested that a discussion be presented on what occurs with an actual operational proposal (APD); i.e., the mechanics of the proposal, generic impacts of drilling, what happens if abandoned, what happens if it goes to production, generic production related events and impacts, etc.

operations can occupy the sites and disturb the surface. Under FLPMA all withdrawals must be reviewed. Those not needed will be revocated.

Your comment concerning "contradictory statements about knowledge of mineral potential" is well taken and a change has been made in the final Forest Plan.

We have decided not include a discussion in this part of the Plan of what the possible effects following an APD are as this is included in Chapter IV of the Final EIS.

"Definitions of potentials should be provided." DEIS, page II-74, Table II-17. Potential is measured in thousands of acres. This is standard U.S. Geological Survey terminology and probably will not change in the final Forest Plan.

We agree that most oil and gas development sites can be effectively rehabilitated.

RECREATION

The Forest Plan, Chapter II Threatened/Endangered Species, gives clear direction as to how we will implement the Gallatin Grizzly Bear Management Guidelines. "Detailed standards developed for the Gallatin National Forest will be followed in maintaining and improving habitat, in minimizing grizzly/human conflict potential, and in guiding the resource activities." These details are found in Appendix G of the Forest Plan under the Recreation Guidelines of the Grizzly Bear Guidelines.

The statement in the DEIS (page IV-7) that "some wildlife habitat in the area will be destroyed or vacated" refers to already existing, developed recreation sites, some of which are in occupied grizzly habitat and some of which are close to Yellowstone National Park. These developed sites have been in place for many years. They are not new. This does not conflict with the consequences listed for threatened/endangered species (EIS pages IV13-14). However, any new recreation developments in occupied habitat would be evaluated using a cumulative effects process to judge whether these effects would be detrimental to the grizzly.

At present, considerable coordination effort takes place between the National Park Service and Forest Service. This is emphasized in the final Forest Plan as a goal for the Plan.

The minerals section of the Gallatin Grizzly Bear Management Guidelines provides direction for considering no surface occupancy for mining operations in occupied grizzly bear habitat. The Guidelines prevail.

The Gallatin does not have recreation costs, yield tables, and related information according to the Recreation Opportunity Spectrum (ROS) system that many Forests used. So, at this time, we cannot discuss our recreation outputs and effects in these terms.

Page D-17, Table VII-1, Mineral Withdrawal - It is suggested that the FS consider leasing some of these tracts with "No surface occupancy" stipulations. This would allow the same relative protection as a withdrawal but, where feasible, allows the U.S. Government to collect rental returns.

Page II-70, .9, Minerals, Oil and Gas - The first paragraph, last sentence and the third paragraph, first sentence, seem to be contradictory statements about knowledge of mineral potential.

Page II-74, Table II-17 - Definition of potentials should be provided.

Page IV-18, second paragraph - The impact discussion sounds a bit more ominous than perhaps justified. For example, experience within the Bureau of Land Management (BLM) has been that most oil and gas development sites can be efficiently rehabilitated.

Recreation

In regard to protecting park values for Yellowstone National Park which adjoins the Gallatin National Forest, forest management areas 13 and 14 are also grizzly bear management situations (MS) 1 and 2. As described, MS-1 emphasizes survival of the grizzly bear and MS-2 attempts to minimize grizzly/human conflict. The Forest Plan (pages III-44 and 48) states that the Gallatin Grizzly Bear Management Guidelines will be followed. However, the plan does not give a clear description of exactly how some forest activities will implement these guidelines. For example, how would enhancing recreation developments (Plan Page III-44) further the MS-1 and MS-2 grizzly bear management goals? The EIS (Page IV-7) states that "some wildlife habitat in the area will be destroyed or vacated." Does this include grizzly habitat? How close would it be to Yellowstone National Park? Does this conflict with the consequences listed for threatened and endangered species (EIS Pages IV-13 and 14)? It is suggested that the Plan and EIS address these questions.

It is noted on Page A-7 that Forest Service personnel contacted the Yellowstone National Park staff and discussed shared management issues. Yet it is not mentioned in either the Forest Plan or the EIS whether the plan would be compatible with the purposes and objectives of the adjoining park. Continued dialogue between Forest and Park staff to resolve problems and concerns is recommended and should be provided for in the documents.

Additionally, under Minerals (Plan Pages III-46 and 49; EIS Pages IV-17 and 18) no consideration is given to no surface occupancy as a stipulation to provide maximum grizzly bear protection. Such a management option is also not discussed under threatened and endangered species in the EIS (Pages IV-13 and 14).

The division of recreation into five types is different from other Forest Plans. This makes it difficult to compare projections between plans. Use of the same recreation types is suggested.

VI-47

WATER QUALITY

The Forest Plan is programmatic in nature and not designed to be site specific for detailed project activities. Additional analysis will be done at the project level to assess concerns such as the ones you suggested (i.e., ground water for grazing, administrative facilities, recreation, etc.).

We believe that Chapter II, Watershed Management, in the Forest Plan covers the same intent as the Lolo strategy only not as specific. In Appendix C of the final Forest Plan, we also spell out water quality standards, best management practices, and examples of goals and objectives for soil and water resources for all the watersheds on the Forest. These goals and objectives are designed to help achieve a desired future condition and account for such concerns as intermingled ownership.

Section 404 of the Clean Water Act is a legal requirement which we comply with, whether or not there is a standard written in the Forest Plan. Standards in the Forest Plan generally try not to replicate laws which we legally are bound to comply with.

The question of acid rain is legitimate. However, we have no information to do anything except speculate what the effects on water quality would be. We believe that it is outside the scope of the Forest Plan Final EIS to include it.

ECONOMICS

Jobs per output and income per output were generated from Regional economics models which used multi-year data to generate the relationships, but then applied those to a single year, 1980, as pointed out.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and its Environmental Impact Statement are also enclosed. Please review these documents let us know if you would like any additional information regarding the Plan.

If you have further questions regarding the Forest Plan, please contact our office. Again, I appreciate your involvement in planning the future of the Gallatin National Forest.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

Water Quality

It is suggested that the draft EIS more adequately address the use of ground water for potable water supplies for recreation areas and administrative/staff facilities in the Forest. Use of ground water for grazing should be considered. Protection of well and spring water supplies should be considered. The analysis should indicate plans and procedures to ensure good quality drinking water, including periodic monitoring. If irrigation is practiced on the Forest, this use of water should be evaluated. If landfills are located on Forest lands, precautions to protect ground water and surface water should be examined. Sewage disposal and sanitary facilities should be addressed and evaluated in terms of the protection of ground water and surface water quality.

Also, the Forest Plan volume should indicate how springs are to be protected in the vicinity of outfitter camps and corrals.

Specific Comments

Page II-6 - It is noteworthy that the FS has made the commitment to work closely with private landowners to develop watershed objectives in drainage areas that have intermingled ownerships and to delay, where necessary, management activities in order to ensure that the water quality standards presented on page II-1 will be met. It is suggested that the GNF consider adopting a strategy similar to that proposed by the Lolo National Forest to facilitate achieving watershed protection on lands with intermingled ownership. The elements of this strategy are:

a. Cooperative. Accelerate efforts to develop mutually agreed upon water quality and quantity management standards with other landowners practicing forest management in areas of intermingled ownership. Seek cooperative agreements with these landowners on the shared responsibilities for achieving or maintaining the standards.

b. Buffering. This approach is to defer or delay activities on National Forest land that could cause stream channel damage when coupled with activities that have taken place or are in progress on intermingled lands of other ownership. This approach will be used only as an interim action during watershed reparation. If reasonable solutions cannot be achieved within three years, approaches "c" and "d" may be used.

c. Land Acquisition. This will be considered only for small or isolated parcels of land in areas where watershed protection could be better achieved if lands were in a single ownership. Acquisition could be through purchase or land exchange.

d. Legal Action. The Forest will support existing State or Federal laws for watershed protection by involving responsible enforcement agencies as necessary and by supporting legislation aimed at strengthening watershed protection (e.g., Forest Practices Act).

Pages II-27 and 28 - It is suggested that an additional standard should be added to the watershed management standards listed on these pages that acknowledges the requirement of the FS to obtain necessary permits (i.e., Department of the Army permits under Section 404 of the Clean Water Act) prior to the conduct of projects that may require the placement of fill materials in wetland areas. Further, acid rain should be referenced as having a potential to influence water quality and fisheries.

Economics
In Appendix B-44 to 47, it is not clear whether jobs per output and income per output were generated from one year's data or data from a group of years. Years used and deviation from the average year should also be presented.

Thank you for this opportunity to comment.

Sincerely,

Bruce Blanchard, Director
Environmental Project Review

Enclosure

REPLY TO: 2820 Leases & Permits Date: MAR 1 1985

SUBJECT: Lease Stipulation Policy

TO: Forest Supervisors

Since the issuance of the BLM Stipulation Policy in April 1984 (IM No. 84-415, enclosed) there have been very few questions from the Forests on the meaning or intent of this policy. However, the occasional questions that have been received and a spot-check of some recent analyses and environmental documents indicates that there is a need to clarify and emphasize certain aspects of the policy.

Reasonable Use of Mitigation

First, it must be emphasized that the addition of stipulations for the protection of surface resources or uses is an action that modifies the basic rights granted by a lease, permit or license (hereinafter referred to as a lease). Further, the basic lease terms allow the government, irrespective of any lease stipulations added, to impose a wide range of mitigation at the operations proposal stage.

Lease stipulations must be capable of withstanding two basic legal tests: is the mitigation (stipulation) "necessary" and is it "justifiable"? To satisfy these tests the need for the recommended stipulations must be supported in fact. The environmental analysis and documentation must show that: (1) it is "necessary" to deny lease rights on all or part of the lease to avoid unacceptable environmental effects and further that (2) the least stringent stipulation that achieves the mitigation objective was identified and selected ("justifiable"; "appropriate or practical mitigation", 40 CFR 1502.14(f) and 1505.2(c); see also Robert G. Lynn, 76 IBLA 383 and BLM IM No. 84-254, Change 2, enclosed).

Review of Proposed Operations

When a proposed plan of operations such as an APD is submitted for lands administered by the FS, it is the responsibility of the FS to identify mitigation measures (permit stipulations) which are "necessary" and "justifiable". These permit stipulations should, as appropriate, adapt, implement or replace the mitigation provided by the lease stipulations or elements of the proposed plan of operations. The environmental analysis conducted at the time operations are proposed must consider the current circumstances, possible changes in relative resource values, and the merits of the lessee's proposal to conduct operations without causing unacceptable biophysical effects.

Stipulation Modification or "Waiver"

All lease stipulations used for environmental protection in the Northern Region contain a provision for modification or "waiver" if the mitigation objectives are no longer relevant or can be achieved in a less restrictive manner. Review of the applicability of the lease stipulations to the proposed lease operations will help ensure that opportunities for integrated management of surface and subsurface resources are not forgone.

For example, a Surface Occupancy Restriction Stipulation (timing) for elk winter range may not be "justifiable" at the time of operations, if the mitigation objective for elk protection can be achieved through the use of a less restrictive combination of permit stipulations such as requirements for road management and noise abatement measures. In such situations, the requirements of the lease stipulation(s) should be modified or eliminated and more "justifiable" permit stipulations substituted that more effectively yet less onerously achieve the mitigation objective.

The reverse is also true. If a situation develops that was not identified in lease stipulations, the basic terms of the lease allow the development of "necessary" and "justifiable" mitigation as long as the restriction is not so severe so as to preclude exercising the basic lease right.

Geophysical Prospecting Permits

The same principles apply, of course, to the review and approval process for geophysical prospecting permits. Here too, it is important that you assure that restrictions derived prescriptively from resource maps and/or programmatic analyses actually fit the present circumstance and are, therefore, "necessary" and "justifiable."

Questions or comments concerning this clarification of policy should be directed to W. Mark Weber (ext. 3592).

John Chandler
TOM COSTON
Regional Forester

Enclosure

cc: M&G-Weber/Adjudication Section
W&F-Gale/Escano
BLM-MSO-Adjudication-Embretson
BLM-MSO-Fluids-Fortner/Kruger
BLM-ISO-LaVelle
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Office of the Governor
Helena, Montana 59620

1807.

TED SCHWINDEN
GOVERNOR

MONTANA COMMENTS ON THE
1985 DRAFT GALLATIN NATIONAL FOREST PLAN
AND ENVIRONMENTAL IMPACT STATEMENT

Overview.

The Gallatin National Forest (GNF) Plan and Draft Environmental Impact Statement (DEIS) are well organized and easy to follow. The alternatives are clearly displayed and explained to the reader.

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.

In addition, the following concerns were identified:

- The DEIS inadequately addresses the implications of the timber supply situation in the GNF market area. 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.

- The proposed action (alternative 7) is one of the higher cost alternatives and may be unrealistic in light of current funding levels. In addition, the DEIS projects that the GNF will lose 1.6 million dollars per year on its proposed timber program.

- The GNF has apparently assumed that if more acres are alloted to recreation, use will increase as a function of this allocation. If existing recreation capacity exceeds projected use, (as most other Montana National Forests have assumed) the GNF's assumption is a significant departure from other national forest planning efforts.

- We are concerned that reference to fish and wildlife in the GNF Plan is generally in a mitigant fashion and tends to be primarily associated with timber harvest, road building, livestock grazing and mineral extractions. In addition, the most productive timberlands on the forest are classified for timber management with little or no acknowledgement of important wildlife values that are also present.

- The Plan only minimally mentions the blue ribbon fishery of the Yellowstone, Madison and Gallatin Rivers and does not address either the GNF's responsibility for water quality and quantity or for recruitment of young fish to these rivers.

United States Department of Agriculture | Forest Service | Gallatin National Forest | P.O. Box 130 Bozeman, MT 59771

Reply to 1920

Date

Honorable Ted Schwinden, Governor
State of Montana
Office of the Governor
Helena, MT 59620

Dear Governor Schwinden:

The review comments on the Gallatin National Forest proposed Forest Plan and draft Enviornmental Impact Statement (DEIS) by the Montana Interagency Planning Task Force is greatly appreciated. I hope the following adequately addresses the issues and concerns expressed by the group.

TIMBER

The Gallatin National Forest, in an attempt to provide for community stability within its area of influence over the long run and to resolve public issues within the capability of the resources available, has selected an average annual harvest rate of 21 million board feet (MMBF) of timber for the next decade.

The Gallatin National Forest is an area with a number of resource capabilities. Perhaps because of that, it is also an area of conflicting demand for those resources. In an attempt to strike a balance between the various desires of our publics, the Forest Plan provides that timber harvest is an appropriate activity on 24% of all forested land.

We feel that the final Forest Plan harvest level of 21 MMBF is appropriate. This harvest level is close to our historic average of 22 MMBF from 1946 through 1985. This level of harvest also appears to provide a good balance of age classes within the suitable forest area over time, and is still compatible with the other resource objectives of the Forest Plan.

A more complete timber supply study has been done and the harvest figures for the Gallatin have been updated to include the most recent years. The mill capacity for the two major mills in the area - Plum Creek in Belgrade and Brand S in Livingston - is about 80 MMBF based on two shifts. From 1977 through 1986, an average of 17.3 MMBF of timber has been harvested from the Gallatin. In the same time frame, an average of 21.0 MMBF has been sold.

o The Plan proposes to reduce the concentration of timber harvest on presently roaded lands by enlarging the timber base. Enlarging the base will require additional timber harvest and roading on steep, marginal sites. Road building on such sites will be very expensive, may increase sedimentation more than intensive harvest on more suitable timberland, and would increase the potential for additional below-cost sales.

These and other concerns are addressed in more detail in the following discussion.

1. Timber.

During the first decade, proposed harvest levels would be greater than the average of the last ten years, but would represent a decrease from levels seen in 1983 and 1984. Based on a two-shift mill capacity of 56 MMBF, a 34 MMBF yield from private land (based on 1979 data) and more than 21 MMBF from the GNF, the timber supply may be sufficient for local mills. The Plan states, however, that timber demand is expected to increase faster than supply, causing upward pressure on lumber prices. The Proposed Northern Region Plan in support of this conclusion is cited but no further statistical evidence is provided.

The DEIS inadequately addresses the implications of the timber supply situation in the GNF market area. Over the last 10 years the GNF has cut 13.7 MMBF and the forest industry harvested 45 MMBF on private lands, even though the industy's sustained yield capacity is only 34 MMBF. This suggests that in the future there will be an inevitable decrease in harvest on industry lands. A shortfall that must come from other suppliers if local mill needs are to be met. Given the expected changes in stumpage supply from other owners, the DEIS should clearly state how the harvest levels associated with the proposed action will affect community stability.

None of the Plan's assertions regarding timber demand, mill capacity, or potential supply from private land appear to have been based on appropriate analyses of market demand for timber products, on specific capacity of mills located on and off the Forest, or on current timber availability.

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. Due to 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 non-Forest Service timber supply, makes it virtually impossible to determine whether the proposed GNF harvest is too high or too low to maintain an adequate supply of timber to area mills. Perhaps the most useful, and the 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 with plants openings or closures. The Forest Service is currently involved in an analysis that will include several demand conditions. These studies will provide comments on specific forest plans. Results will probably not be available until late this year.

The Gallatin timber supply area has largely been Park and Gallatin Counties with one sale in the last 5 years going to Idaho. The two major mills in the area have obtained some of their harvest from other National Forests such as the Beaverhead and the Lewis & Clark. One small specialty mill, Idaho Pole Company, has even hauled from as far away as the Flathead National Forest.

Brand S mill in Livingston has been the major purchaser of Gallatin National Forest timber. Since 1981, Brand S has purchased an annual average of 11 MMBF from the Gallatin. It has also processed other Gallatin National Forest timber from purchasers of small sales. Brand S, through personal communication with Forest staff, has indicated that about 35% of their 40 MMBF capacity is coming from the Gallatin National Forest. Plum Creek, which also has a two shift mill capacity of about 40 MMBF, has only purchased one sale amounting to 3.5 MMBF on the Gallatin since 1981. Most of their volume has come from their own lands. A small mill in Stillwater County has recently purchased a 6 MMBF sale from the Gallatin, the only major sale they have purchased. See Chapter III and Appendix B of the Final EIS for the updated evaluation of the timber supply/demand situation on the Gallatin National Forest.

We agree with your concern that predictions in regards to future prices for timber are uncertain. We have conducted sensitivity analyses using zero real price increases and have displayed this in the final EIS, Appendix B.

The results of this analysis show that Present Net Value (PNV), suitable timber acres, and Long Term Sustained Yield (LTSY) are sensitive to these real price increases. For example, the maximum PNV benchmark has a PNV of $309 million, suitable acres of 65,000, and LTSY of 8.0 MMBF with the increases, versus (respectively) $304 million, 49,000 acres, and 6.2 MMBF without the increases. The PNV of the Preferred Alternative would also change slightly. However, in the Final EIS the real price increases were kept in the modelling process for decades 1 through 5. The mistake has been corrected in the Final EIS.

Management Area 9 often consists of areas which contain stands of stagnated trees which are highly visible, where high visual sensitivity is a concern. A variety of silvicultural treatments are described in the management standards to provide opportunities to manage for the important aesthetic values and to protect or enhance wildlife habitat over time. Resource analysis will be conducted prior to initiating projects which would significantly alter the vegetation.

It is our belief, that in clearcut harvest areas, thinning can enhance thermal cover for wildlife. Thinning can be an effective tool in promoting more optimum tree height and crown closure condition for improved thermal cover. It is not our intent to justify precommercial thinning. The management standards for Management Area 11 have been changed to emphasize wildlife.

The basic assumptions constituting the Forest Service's FORPLAN economic model are flawed. For instance, the GNF has assumed continually increasing real prices for timber over the planning period. Without an artificial lower bound constraint, this assumption causes the FORPLAN model to eliminate timber harvest for the first 4-5 decades. Since the probability of real price increases is uncertain, the economics of the timber program are uncertain.

Further, it appears that a real increase in lumber prices was assumed through the entire 150 year planning cycle. Because the 1980 RPA price increases were only projected through the year 2030, it is inappropriate for the GNF to assume real lumber price increases beyond that year.

In addition, Page III-35 states: "Past harvest has been concentrated on a relatively small part of the total capable base. This is because access was limited and roads were expensive to build in relation to the value of the timber." If real price increases do not occur, this situation will remain true in the future.

It is recommended that the GNF re-run the FORPLAN model using other price scenarios, including a zero increase in real prices, to test the sensitivity of the model to changes in timber prices.

The Proposed Plan, Page III-33, indicates that precommercial thinning will be used in Management Area 9. The Plan should identify what timber types will be thinned and justify the practice. The Plan attempts to justify pre-commercial thinning on the contention (Page III-39, Page III-45) that it enhances thermal cover for wildlife. In fact, the exact opposite is true. Thinning detracts from the thermal cover by removing important overstory cover.

The proposed plan includes two different definitions of "openings," (Page A-12) one based on timber criteria and the other based on cover necessary to provide hiding cover for an elk at a 200-foot distance. We recommend that the hiding cover criteria be used to determine whether clearcuts are "openings" in all management area designations where timber harvest is permitted, not just in management areas #11, 13 and 19a, as suggested on Page A-12.

Artificial regeneration of certain "harsh sites" is proposed (Page II-25). Given the marginal quality of much of the GNF timber base, from both a resource and economic standpoint, we question the advisibility of harvesting harsh sites which require artificial regeneration.

The Plan states that 5 MMBF per year will be harvested from beetle-infested stands. The proposed insect and disease management strategy is very good and should be implemented where feasible. However, the benefits of insect and disease control should be balanced against the demand for timber and the potential impacts of timber management on water quality and wildlife security. On suitable sites, planners and managers might consider shorter rotations, which may be more economical and may reduce the need for future road construction.

In actual Plan implementation, site specific analysis of timber activities will allow us to specifically determine opening criteria. It is likely that in other Management Areas the hiding cover criteria will be used if proposed sale areas are located in important big game habitat.

The different Management Areas have standards which emphasize different management goals depending on their capacity to meet multiple use objectives. In our project analysis work, we will utilize the new Montana Cooperative Elk-Logging Study Guidelines to help us determine silvicultural threatments to be implemented.

One of the goals for the Gallatin is to create an improved distribution of age and size classes of timber in the suitable base. This effort will be made to reduce adverse effects of future insect and disease attacks. In our project analysis, we will continue to consider shorter rotations and their effects on economics and future road construction.

The difficulty to "actively manage whitebark pine" for the benefit of grizzly is recognized by the Gallatin National Forest. One on-going effort we will be testing is planting. We have collected cones from the Palmer Creek area near Gardiner and have sown whitebark pine seed in our nursery. We plan to plant the seedlings in Palmer Creek in 1987. We are hoping this effort will provide a system of improving the availability of this important food source for the grizzly.

Wording for management within riparian areas has been placed in the final Forest Plan to provide that timber harvesting within the zone will only be undertaken if it will benefit the riparian zone-dependent resources. Special felling and yarding practices are identified.

We have corrected the harvest schedule difference found in Tables II-1 and II-21 for the final EIS.

An adequate range of treatment opportunities used in modeling includes those that have been shown emperically to acheive stated objectives in a cost effective manner.

The overall (and per unit) timber costs are higher in Proposed Action because it is projected that more costly intensified management along with increased mitigation will be conducted. These steps are being taken in the future to improve our management of soil, water, and wildlife resources and better meet public concerns.

WILDERNESS

The wilderness boundaries for the Republic Mountain and Lionhead areas, proposed by the Governor in his recommendation of May 10, 1984 to the Montana Congressional Delegation and the boundaries proposed in the proposed Forest Plan have been reconsidered and analyzed.

Although the map of the Republic Mountain area which was furnished the Montana Congressional Delegation by the Governor was small and difficult

The Plan proposes to "actively manage whitebark pine" for the benefit of grizzly bears, but does not describe the type of management to be used. In "Forest Habitat Types of Montana," Pfister et. al. (1977), emphasizes the importance of minimizing disturbance in fragile, high elevation whitebark pine types since tree growth is slow and regeneration is difficult. The proposed management of whitebark pine should be detailed in the Plan.

Page III-25, Proposed Plan, states that "Special logging practices which will minimize soil disturbance should be emphasized in riparian areas." This wording raises doubts as to whether these practices actually will be emphasized. Intended practices should be identified or referenced in the Plan.

Additional clarification is needed on the following points:

a. Table II-21 (Page II-105) and Table II-1 (Page II-45) show different harvest schedules for both alternatives 7 and 10 in the 5th decade, and for alternative 10 in decades 10 and 15.

b. The DEIS (Page B-26) states that silvicultural treatment opportunities were evaluated from an economic and timber yield standpoint and eliminated if they did not "...contribute to an adequate range." The meaning of "...an adequate range" should be explained.

c. The DEIS should explain why timber costs are higher for the proposed action alternative than for the current direction alternative, despite the fact that there is more harvesting, road construction, reforestation, and timber stand improvement work being accomplished under the current direction alternative.

2. Wilderness.

The preferred Plan proposes to add 23,291 acres of wilderness to the GNF in the Lionhead and Republic roadless areas. We encourage the planners to reconsider the Governor's May 10, 1984 wilderness boundary recommendation to the Montana Congressional Delegation for a 24,980 acre addition to the GNF portion of the wilderness system as follows:

Area	Acres
1545 Republic Mountain	480
1963 Lionhead	24,500
TOTAL	24,980

A detailed discussion of the wilderness values of these areas from the Governor's 1984 wilderness recommendations is attached for your consideration.

Most Management Area prescriptions for roadless areas allow the construction of roads through roadless areas to access adjacent Management Areas. The effects of such roading on the roadless base should be described in the Plan.

to read, we believe our proposal is the same. Both proposals include 480 acres and we agree with the Governor's rationale for the boundary.

Our final Forest Plan modifies the proposal in the proposed Plan for the Lionhead area to more closely fit the Governor's recommendation. We have adjusted the boundary in the southeastern portion of our original proposal to accommodate the snowmobile activity discussed in the Governor's rationale. We have not changed the remaining boundary as shown in our proposed Forest Plan. It was identified to follow topographic features along the eastern side, rather than section lines. On the western side, we have excluded an area within a cattle allotment where we hope to accomplish some sagebrush burning, fence construction, and noxious weed control.

We do not anticipate a need to construct a significant number of roads through roadless areas to access adjacent Management Areas. Need for roads could develop in the future and site specific analyses would be conducted to assess effects. Any roadless lands which could be penetrated would continue to be managed to emphasize dispersed recreation, wildlife, and scenic values.

As required by the Montana Wilderness Study Act (PL 95-150), the Forest Service will continue to manage the Hyalite-Porcupine-Buffalo Horn Study Area in a manner to maintain its wilderness character and potential for inclusion in the National Wilderness Preservation System until Congress determines otherwise. This requirement of the Act is subject to existing rights of private inholders.

The Governor's concerns for management of the Crazy Mountains is shared by the Forest Service. We have modified the management for Management Area 11 in the final Forest Plan to give increased emphasis to wildlife. Proposed new access points are identified on the Management Area map.

ECONOMICS

If future funding levels are less than required to fully implement the Forest Plan, there will be a reduction in outputs or targets. The management standards for the various resources will not be sacrificed to generate other resource outputs. We are not able to identify future budgets to determine the level of Forest Plan implementation. We will monitor Forest Plan implementation to assure that management standards are met for projects undertaken.

The statement in the Forest Plan, "The most efficient silvicultural treatment to accelerate tree growth in naturally regenerated stands on the Gallatin is to precommercial thin at approximately age 20", was meant to be in terms of growth. Economic criterion are not implied in the statement. The statement is applicable to all our commerical species forest-wide. Economic considerations will be utilized in our project analysis process on site specific cases.

There is no commitment within the Plan for the GNF to maintain the wilderness quality of the Hyalite-Porcupine-Buffalo Horn Mountain Wilderness Study Act area until Congress determines its future management. Roads and motorized use will apparently be allowed in the area. The wilderness quality of this area should not be compromised until Congress has resolved the wilderness issue.

The Crazy Mountains were identified as an area of special concern in the Governor's cover letter accompanying his wilderness recommendations. The proposed management of this area should be revised to include additional wildlife emphasis (Management Area 12) and increased dispersed recreational opportunities. Recreation area standards should be retained to provide access from several trailheads and to separate conflicting recreational uses where necessary.

3. Economics.

The proposed action (alternative 7) is one of the higher cost alternatives and may be unrealistic in light of current funding levels. The budget required to implement the proposed action is approximately 9.2 million dollars (1984 dollars); whereas the current budget is only 6.6 million dollars (1985 dollars). In addition, the DEIS projects that the GNF will lose 1.6 million dollars per year on its proposed timber program. The DEIS should address the impact of insufficient funding on the implementation of the proposed action. If funding levels are less than are required to implement the proposed action, reductions that will occur in the various resource output levels and associated monitoring activities should be identified in the Plan.

Page IV-36 of the DEIS states that: "The most efficient silvicultural treatment to accelerate tree growth in naturally regenerated stands on the GNF is to precommercial thin at approximately age 20." This statement may be true in terms of growth but it may not be an economically efficient assumption. Precommercial thinning can be very expensive, and in some stands the final returns (increased growth) may not justify the costs. Also, no mention is made of species, nor of what economic criterion were used. It is important that these points be clarified and that specific management regime(s) planned for precommercial thinning be identified in the Plan.

Page B-19 of the DEIS, under the prescription for intensive timber management, states that an intermediate harvest is only appropriate if it does not result in a reduction in final harvest volume. The rationale for this decision regarding intermediate treatments should be explained. Often, it may be more economical to commercially thin, despite resulting reductions in final harvest volumes.

In addition, Page B-19 further states that: "Minimum rotation ages are provided to assure 90 percent of CMAI [culmination of mean annual increment]." This statement infers that rotation age is solely a function of biological criteria. We contend that rotation age is more importantly a function of investment analysis criteria. The criteria used to determine rotation ages should be more clearly explained.

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The statement on Page B-19 of the DEIS has been changed in the final EIS by substituting the word "final" with "total".

The minimum rotation ages were selected on the basis of 90 percent of CMAI, because the growth curve becomes relatively flat at that point. The sentence in the final Forest Plan has been changed to read, "Minimum rotation ages are provided to strive for 90 percent of CMAI." We have also added the following, "Deviations to provide for other objectives are described in NFMA, Section 6."

The NFMA process requires the use of economic criteria in determining the appropriate volume of timber to sell. This was followed for each alternative analyzed in the draft and final EIS. We will also use economics as one of the decision criteria for the detailed analysis to be conducted for each sale proposal.

The Gallatin will continue to maintain a high concern for fisheries on the Forest and within the downstream "blue ribbon" rivers. See pages III-30 and IV-17 of the DEIS and page II-3 of the proposed Forest Plan. We believe the management standards for Management Area 7 and the detailed water quality management material found in Appendix C of both the proposed and final Forest Plans demonstrates this commitment.

We have corrected Figure II-29 in the final EIS.

The errors you point out concerning firewood volumes by alternative have been corrected in the final EIS. We have added Alternative 2 to Alternatives 7 and 10 as being high producers of firewood. The firewood volume figures in Table B-15 on page B-94 were printed under the wrong alternative columns. The numbers should have been located one column to the right. As an example, the figure 7.4 should have been printed under Alternative 7 instead of Alternative 6. We made the same error on page II-102.

The figure for total market benefit for Alternative 7 in decade 10 is a typographical error. It should read 17494 instead of 1794.

RECREATION

Recreation visitor use in campgrounds on the Gallatin has fallen off in the past few years. We believe that existing facilities will satisfy the demand duiring the next decade. However, there may be a need to add new camping facilities at specific sites should over-crowding occur.

We have planned for increasing our investments in trail reconstruction and construction to accommodate dispersed recreation activity. We are also placing emphasis in obtaining additional access routes to the Forest.

The timber management goals on page B-17 of the DEIS include a goal to: "Meet Regional Plan goals for volume of timber sold." However, no timber management goals are shown that require the use of any economic criteria in determining the appropriate volume of timber to sell. A goal to ensure that timber prescriptions are based upon economic criteria should be added.

The GNF provides headwater tributary streams for several of the highest quality wild trout streams in the country. The Madison, Gallatin and Yellowstone Rivers support in excess of 200,000 fisherman days of use each year. The GNF Plan only minimally mentions the existence of these blue ribbon rivers and does not address either the GNF's responsibility for water quality and quantity or for recruitment of young fish to these rivers. The economic importance of the Yellowstone, Madison and Gallatin Rivers is a matter of major concern to the residents of this area, and is deserving of mention and consideration in the Gallatin Plan. Recent economic analyses have shown that the Madison River fishery alone generates in excess of 10 million dollars annually to Montana's economy. The economic importance of the fishing industry on rivers draining the GNF must be acknowledged in the GNF plan.

In figure II-29 (Page II-86 of the DEIS) the bar showing changes in local employment for alternative 1 is incorrect and should show a slight increase. The bar for income is missing.

Page II-99 states that alternatives 7 and 10 will provide the greatest amount of firewood and poles, but in Table B-15 (Page B-95) available firewood listed for these alternatives is nearly the lowest. This inconsistency should be explained or corrected.

The total market benefit listed for alternative 7 in decade 10 (Page II-112 of the DEIS), is significantly lower than any of the volumes listed for the other alternatives. This inconsistency should be either explained or corrected.

4. Recreation.

Tourism and outdoor recreation are growing industries that are dependent upon scenic values and outdoor recreation opportunities. National forests have substantial potential for providing more opportunity for dispersed and developed recreation in Montana. This is especially true for the GNF which now has the highest level of dispersed recreation use of any Region 1 Forest (DEIS II-45).

With recreation having the highest present value benefit of all resources, the GNF should consider increasing its planned investment to enhance, accommodate and encourage additional recreation use. Developed recreation investment is deemed to be only modest with a $300,00 capital investment per decade (DEIS II-46). The investment for dispersed recreation is not readily discernable from the planning documents, but also appears to be deficient.

a. Alternatives.

Alternatives presented in the Plan should reflect a range of recreation investment options and treat recreation opportunity as a function of the land allocation process. Recreation use can be increased with additional investment in recreational improvements.

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A. Alternatives

A range in recreation investments was used by alternatives analyzed in the EIS.

B. Trails

History on the Gallatin demonstrates that very little trail loss occurs as a result of road building. Most often roads are located on sites where grades are more gentle and not on trail locations which rise more rapidly to reach ridge top locations.

We have increased trail reconstruction and construction from the 8 miles described in the proposed Forest Plan to 16 miles in the final.

The Forest Plan does not propose to geographically separate recreation uses, except on a localized basis where individual trails may be restricted. Such segregation will be shown on the Forest Travel Map, updated annually. The approach being taken is to display areas where opportunities exist for different kinds of recreation, so people can decide for themselves where to go for their desired experience. Separation of motorized, foot, and stock users into exclusive areas would make the Gallatin National Forest effectively smaller for each group and would require intensive administration.

When the Greater Yellowstone Area Grizzly Bear Cumulative Effects Analysis Process becomes operational, it will be used as one of many tools to quantify habitat effectiveness and mortality risk forecasting for current and future foreseeable land use activities in designated bear management units on the Forest. The cumulative effects analysis will eventually be applied to all occupied habitat on the Gallatin National Forest. Direction for this process is found in the forest-wide standards of the final Forest Plan and also in the management standards of Management Areas 13, 14, and 15.

If it is determined that hiking intensity can be increased between Windy Pass and Yellowstone Park without causing an adverse impact to grizzly recovery we may extend the trail.

C. Use Projections

The "region" referred to in the DEIS includes the "social and economic impact area" of Gallatin, Madison, Park, and Sweet Grass Counties described on page III-5. We have not assumed that an increased land allocation to recreation will increase use.

The decrease in fish numbers shown in Alternative 7 of the proposed Forest Plan, a result of proposed activities, did not consider reduced livestock use in the riparian zones and full implementation of system grazing. With stricter controls on livestock grazing throughout the Gallatin National Forest, plus further reductions in grazing utilization levels in the riparian zones, the final Forest Plan reflects a

b. Trails.

The Plan does not identify the amount of the 1,853 miles of existing trail to be lost because of increased road building in roadless areas and elsewhere. The possibility of a trail mileage decrease exists, especially if investment in new construction is only modest. Losses should be quantified and described. Trails and associated trailheads are essential to dispersed recreation. An overall decrease in trail mileage would reduce dispersed recreation opportunity.

The Plan should consider segregating certain trails for motorized and non-motorized use. Not all trail uses are compatible and some planning for separate facilities is desirable.

The proposed Gallatin Divide National recreation trail, including an extension south beyond Windy Pass along existing trails to Buffalo Horn Creek or further to Yellowstone Park, is supported. To end the trail designation at Windy Pass because it would encourage bear/human conflicts, does not seem justified unless further evidence is presented to suggest that this trail is a safety problem. To allow collection of petrified wood specimens but not encourage hiking in this area is inconsistent.

c. Use Projections.

Recreation is projected to increase on the GNF as a function of regional population and increasing participation rates (DEIS II-88). What constitutes the region is not explained, nor is the rate of increase in participation given. This information is needed.

Increasing numbers of non-residents are expected to seek out Montana to avail themselves of unique outdoor recreation, particularly since similar opportunities are diminishing in other states. Recreation projections and land allocations should take this trend into consideration.

The GNF has apparently assumed that if more acres are allocated to recreation, use will increase as a function of this allocation. If existing recreation capacity exceeds projected use, (as most other Montana National Forests have assumed) the GNF's assumption is a significant departure from other national forest planning efforts. The assumption needs clarification.

The DEIS on page III-13 attributes 214,000 Recreation Visitor Days (RVD's) of use to fisherman on the GNF. The Plan (Page V-14) projects this pressure to increase by 175% by the year 2030; yet the plan (II-61 and II-30 of the DEIS) projects a decrease in numbers of catchable trout. Considering the high recreational value of the GNF and the proposed increases in fishing use, we do not consider the Plan's projected decrease in numbers of trout as an acceptable impact.

Chapter V, page 12, item d, indicates that a 23% increase in demand for elk hunting has been projected during the decade 1980-1990 (Page V-12). DFWP Region 5 harvest questionnaire data indicated an average

significant increase in stream fish numbers for those streams within grazing allotments.

As printed out in Chapter V, page 12, item d, the approximately 23% increase in demand for elk hunting from decades 1980-1990 in southwest Montana was obtained from the 1978 Montana Statewide Comprehensive Outdoor Recreation Plan (SCORP) prepared by the Montana Department of Fish, Wildlife, and Parks. We assume the information collected in Region 5 was used in your projections for 1980-1990. Since most of the elk hunting which takes place on the Gallatin is in Region 3, we also used the SCORP projections for that area.

D. Access

The reconstruction and construction of roads indicated in the Forest Plan are commensurate with the need to provide safe access to National Forest lands for all users. The mileage indicated is similar to the mileage historically constructed or reconstructed on the Gallatin National Forest. Most construction will be low-standard local roads needed to harvest timber which will be closed between harvest entries. Substandard roads are reconstructed to provide safe facilities for users. Most trail activity will be in the reconstruction category, to keep them safe for the users. Some construction will be done to disperse use and tie systems of trails together for better utilization. Access to the Gallatin National Forest is often acquired over existing routes and will not required new construction. We will constantly strive to build roads and trails to the minimum standard needed to safely serve the user's need.

E. Other

The scenic resource of the Gallatin National Forest has been described in the Forest Plan in terms of "Visual Quality Objectives" (VQO). These objectives express the allowable deviation from a natural landscape due to management activities and development. The degree of allowable change in visual quality is described for each Management Area in Chapter III of the Forest Plan. Over 40% of the Gallatin National Forest will be managed to meet a visual quality objective of "Preservation," which means that only natural, ecological change may alter the landscape. This VQO has been applied to classified wilderness only.

About 23% of the Forest will be managed to meet a visual quality objective of Retention, meaning that the natural appearance of the landscape will be retained and any alteration to it will be essentially unnoticable. Another 23% of the Forest will be managed to meet an objective of Partial Retention. Alterations to the natural landscape may be noticed, but cannot become dominant over natural features, and must be designed to blend and harmonize with natural forms. The remaining portion of the Forest will be managed to meet visual quality objectives of Modification or Maximum Modification. These categories allow for more severe alterations of the landscape to provide for needed developments which cannot be accomplished without more evident change to natural

of 1,650 elk hunters per year in the 1960s versus 2,795 per year for the 1970s; an increase of 69%. Further discussion detailing the rationale of the GNF increases projections is needed in light of the DFWP trend data.

d. Access.

Access to the GNF is important and the aquisition of improved lake and river access is appropriate. We appreciate the integration of handicapped facilities in developed sites. The Plan should indicate that closed roads can provide increased access opportunities for handicapped persons, as well as walking hunter access and cross country skiing. While off road vehicle (ORV) use standards that prevent soil and vegetation damage are good, ORV use should be restricted on important big game winter range and other key wildlife areas.

e. Other.

The visual quality objective (VQO) on the GNF should be "retention" along most major travel routes, because natural attractiveness and scenic values should receive higher priority along road corridors.

5. Water Quality.

a. General.

The standards established in the Plan for watershed management are very good, and the GNF is commended for identifying the specific soil and water "beneficial uses" that warrant protection. Soil erosion control measures should be expanded to include control of runoff and sediment from parking areas.

As recognized in the Plan, public water supplies from watersheds on the forest are limited by reservoir storage capacity. Increased water yield during spring runoff in those drainages, without additional reservoir storage is not necessarily beneficial because of potential water quality problems associated with accelerated erosion.

The "Best Management Practices and Desired Watershed Conditions for the Gallatin National Forest" supplement to the Plan is appreciated. A short-term goal of each National Forest in Montana should be to develop a set of BMPs and management objectives for its major watersheds to supplement overall Forest Plans.

b. Monitoring.

A recent Forest Service summary report of the watershed policy and 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 co-efficients and assumptions used in the planning process, or

conditions. We have given special consideration to visual quality along major travel routes.

WATER QUALITY

A. General

There is a detailed interdisciplinary analysis process that identifies the suitability and scheduling of areas for timber harvest and road building. The capability of a watershed to handle logging and roading impacts is determined using strict field and office procedures. One of these procedures accounts for the cumulative effects on streamflow, of all past logging and roading, regardless of year or land ownership within the drainage. Another procedure determines the inherent capacity of the stream channel to handle the increased streamflow that is predicted to occur from the logging. If the predicted increases will exceed the channel's capacity, the proposed Forest Service logging is scaled back or postponed. This has happened in several drainages on the Gallatin National Forest in the past and we expect this procedure will continue. We are also trying to improve the scientific bases for these two procedures with local monitoring data.

B. Monitoring

Water quality is protected by the following measures in the final Forest Plan:

1. Strict forest-wide management standards have been added to the Forest Plan that provide for water quality protection, regardless of management area, in a manner that the State of Montana water quality standards will continually be met.

2. Proven soil and water conservation practices will be utilized on all projects involving soil or water resources.

3. An expanded water quality monitoring plan, which includes compliance of monitoring, has been added to the Forest Plan.

4. A management focus on achieving specifically written water management goals and objectives for all 39 watersheds on the Gallatin National Forest is included.

5. Tougher grazing utilization standards and a re-directed timber management program that strengthens the primacy of riparian dependent resources, like water quality, have been made.

6. The watershed improvement program is designed to repair damaged watersheds where water quality has been degraded. There are 770 acres inventoried in this program and we are trying to do the necessary work to restore these acres to good condition.

respond to public inquiries and appeals." In view of the tremendous values of the watersheds on the GNF (Gallatin, Madison and Yellowstone Rivers), it is imperative that the Plan contain a firm commitment to improve monitoring, including adequate funding.

c. Sediment.

The inadequacy of the current watershed monitoring is further exemplified in the sediment production model being used for the northern and intermountain forest service regions. The model is based on a host of arbitrary assumptions. Sediment yield calculations used in the Plan could easily be off by several orders of magnitude. Sediment yield calculations in the Plan should be portrayed as a range of values for each alternative to reflect the wide margin of error that exists.

The USDA Northern Region Guide to Predicting Sediment Yield from Forested Watersheds (October 1982, page 3) specifies that "any sediment yield analysis must be done on a watershed basis to be meaningful." This is of particular importance in watersheds where extensive roading and logging are planned. There is no evidence in the DEIS that this has been done or is proposed on the GNF.

A large portion of the explanation for sediment yield comparison for Table II-16 apparently has been omitted from the DEIS. As previously agreed upon by Region 1 Forest Service personnel, the following wording should be included in the sediment section of the DEIS: "Using road construction and timber harvest levels as the principle indicators, the alternatives are ranked as to their relative risk of affecting water-related beneficial uses, based on significant differences in sediment production potential. The alternative(s) ranked 1 has (have) the least risk of affecting such uses."

Page II-70, paragraph 1 states: "As long as soil and water conservation "best management practices" such as those just described are implemented to prevent or minimize adverse changes in water quality from planned activities conducted by the Gallatin National Forest, adverse changes that do result would not be considered violations of Montana's water quality standards." Planned activities may or may not be the best management prescription for a particular watershed. If adverse impacts occur as a result of poor application of BMPs, water quality violations may occur.

As recommended by the State of Montana and previously agreed to by the Region 1 Forest Service personnel, the GNF should include the following statement in the sediment section of the DEIS. "The effects of sediment production on water-related beneficial uses will be evaluated during the project development to ensure meeting forest water quality goals. Projects that will not meet state water quality standards will be redesigned, rescheduled or dropped.

Management practices will be used in all alternatives to carry out these activities to assure that they will accomplish Forest Plan goals, one of which is to meet and/or exceed state water quality standards."

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7. Finally, we are increasing the management emphasis and visibility of the watershed resource among our employees.

C. Sediment

The response for WATER QUALITY, A and B above, apply here.

Increased sediment production is not only a function of the amount of soil disturbing activities a particular alternative proposes, but also how the activity is accomplished along with post treatment activities.

In the Final EIS, Chapter II, the alternatives have been ranked according to their relative risk of producing sediment increases.

A statement concerning redesigning, rescheduling, or dropping projects that do not meet state water quality standards was included in the proposed Forest Plan on page IV-2, and has been repeated in the final.

D. Water Yield

We agree with your statements concerning water yield. We did not intend to portray increased water yield as an unqualified benefit of timber management.

E. Other

Systems for yarding across perennial streams are included in Appendix C under Best Mangement Practices.

The management standards for Management Area 7 (riparian or streamside) have been strengthened in response to public comment. The grazing utilization standards have been toughened. Timber harvest will be conducted in riparian areas only to support the needs of riparian-dependent resources, such as fisheries, wildlife, and watershed management.

The National Forest Management Act directs the Forest Service to give special consideration when planning activities within 100 feet of water. The Gallatin National Forest designates variable width buffer strips during project planning. Sometimes 100 feet is not enough and other times lesser distances achieve the needed protection. Rather than set a fixed amount of buffer, we believe it is better for the water-dependent resource to choose the necessary distance geared to actual field conditions on a case-by-case basis.

Several Executive Orders direct federal agencies to minimize development or occupancy of wetlands and flood plains which lie within riparian areas. We will avoid building new campgrounds, roads, and other facilities in Management Area 7 where there are feasible alternatives.

Sediment levels in the Yellowstone River have been high for the last several summers. Efforts are currently underway to determine the causes of these sediments and what can be done to ameliorate the situation. The proposed shifting of the GNF's timber harvest to the eastern districts and increased grazing may aggravate the sediment problem.

d. Water Yield.

Timing of runoff continues to be a concern of the State. Increased water yield in the spring, as proposed, may equate to lower flows during critical parts of late summer. Increased flow also means increased sedimentation potential. This has obvious implications to downstream irrigators and to stream fisheries. Portraying increased water yield as an unqualified benefit of timber management is not justified.

e. Other.

The Plan states that: "Yarding across perennial streams will require special mitigation measures." (Plan, II-25) The Plan should identify those measures and the criteria for their use.

The proposed plan includes clearcutting in its prescribed timber harvest for riparian areas. Clearcutting and other methods of harvesting timber in riparian areas can jeopardize streambed and bank integrity and water quality. A minimum 100 foot wide buffer zone in which no timber harvest activities occur is recommended along all forest streams.

6. Wildlife.

a. General.

We are concerned that reference to fish and wildlife in the GNF Plan is generally in a mitigant fashion and tends to be primarily associated with timber harvest, road building, livestock grazing and mineral extractions. Many species of big game are rarely considered and fisheries information in the Plan is minimal.

The most productive timberlands on the forest are classified for timber management with little or no consideration of wildlife values. This is particularly true for Management Areas (MA) 8, 9, 10 which do not acknowledge the presence of important wildlife. Since most productive timberlands on the forest have important widlife values, this is a serious deficiency.

The Plan gives the most productive forage producing lands on the GNF unqualified highest priority for domestic livestock grazing. This approach dismisses the fact that wildlife are dependent on these same lands.

Improved forage/cover ratios for wildlife have been used throughout the plan as a needed benefit of timber harvesting. The Plan does not substantiate the need to improve the forage/cover ratio for wildlife on the forest. We are not convinced that such a need exists on the GNF.

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WILDLIFE

A. General

For management activities which may cause detrimental effects on wildlife we have identified management standards or practices to mitigate those effects. We consider this to be positive for wildlife.

The Forest Plan provides a very high consideration for wildlife values.

The improvement of habitat and security requirements for big game are objectives of the Forest Plan. The Guidelines of the Montana Cooperative Elk-Logging Study were utilized in the development of Forest Plan management standards. These standards will be used for project planning and evaluation of timber sale activities and road construction. Some specific actions the Forest Plan takes to provide for habitat and security needs are:

1. Priority assignments of forage and cover for big game on winter range.

2. Maintenance and protection of calving, calf rearing, and fall rutting habitat.

3. Enhancement of forage availabilty on big game winter range.

4. Improvement and maintenance of habitat security by reducing road density through maintenance and propagation of vegetative cover and through the implementation of standards for location and timing of vegetation modification activities. This is a new standard in the final Forest Plan that applies to Management Area 11.

The Gallatin National Forest has a certain grazing capacity that is available to animals, be they domestic livestock or wildlife. Certain capacities historically have been assigned to the livestock industry. When these designations are on critical big game winter range and there is a conflict, the conflict will be resolved in favor of wildlife. This conflict resolution may result in elimination or redistribution of livestock, depending on the outcome of more site specific analysis and updated allotment management plans.

Other domestic livestock assignments are on wildlife summer/fall range, which is not in short supply on the Forest. In fact, after due consideration for wildlife, there is forage available for an increase in the domestic livestock allocation. The proposed Forest Plan showed this increase to be about 15%. The final Forest Plan will reflect an approximate 5-7% increase. This change is due to additional considerations given to riparian areas, grizzly bear management, etc.

The claim that "the Plan gives the most productive forage producing lands on the Gallatin National Forest unqualified highest priority for domestic livestock grazing" is not true.

Throughout the Plan and the DEIS, burning is discussed as providing beneficial wildlife habitat and forage. Further monitoring of wildlife use on the GNF prior to and after burns is needed before these statements can be substantiated. A recent study funded by the U.S. Forest Service (A.F. McNeal, 1984), concluded that mule deer avoided burned areas and elk did not select them on the sagebrush dominated winter range near Gardiner.

The Big Timber Ranger District made some significant changes from the previous draft GNF Plan which were very beneficial to wildlife. We appreciate these changes.

The Bridger Mountain Range represents an "island" type mountain range that contains one of the most dense populations of mule deer in southwestern Montana. A great deal of research has taken place on the mule deer populations in the Bridgers over the last 3 decades. Consequently, more is known about the population ecology of mule deer in the Bridgers than in any other area in Montana. The greatest potential conflicts between mule deer and the proposed Plan lie in the area of summer range. The very diverse, forested summer habitat administered by the GNF constitutes core habitat for adult female mule deer. These habitats are coming under increasing pressure to meet the Plan's proposed timber harvest quotas. Specific management recommendations for the Bridger Mountains developed by the DFWP can be found in Appendix A to these comments.

MA 11 (Plan, Page III-38) emphasizes big game habitat management. The wildlife and fish standards for this designation appear overstated if timber harvest is proposed as the primary means of managing game habitat. Mitigation measures following road construction, harvest, etc., should be described in detail.

MA 12 provides the strongest wildlife emphasis, but ironically, a significant amount of wildlife habitat is not assigned to MA 12. This classification misrepresents the amount of important wildlife habitat set aside, since much of it is at best marginal for wildlife. Additional land allocation recommendations developed by the DFWP are included in Appendix B to these comments.

Predator control on the GNF should be coordinated with the Montana Departments of Livestock and Agriculture as well as with the DFWP and the U.S. Fish and Wildlife Service. Rodent control guidelines should be developed for reforestation areas and incorporated in the Plan.

b. Grizzly Bear.

On page II-21 of the Plan, the proposed standards suggest that maintenance and improvement of grizzly habitat is possible through timber harvest activities. Substantiation that timber harvest will improve habitat for grizzlies and/or minimize potential grizzly human conflict is needed before these projects are implemented on the GNF.

While prescribed fire may be useful for grizzly bear habitat improvement, roads and timber management activities might displace grizzly bear habitat and increase potential conflict. Habitat displacement is an

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Improper livestock grazing practices can damage other resource values. Livestock management on the Gallatin National Forest is guided by proper grazing practices that should greatly reduce these impacts. These practices are described in the Forest Plan in Chapter II and throughout the standards in the management area descriptions of Chapter III. We are aware that conflict resolution is needed in some areas. This may result in elimination or redistribution of livestock, depending on the outcome of more site specific analysis and updated allotment management plans.

The 1.3 million acres of forested lands on the Gallatin National Forest have a limited species mixture that is about 50% lodgepole pine, 30% Douglas-fir, and 10% each of spruce and subalpine fir. Limber pine and whitebark pine exist at the lower and higher elevation extremes of the forested land. About 80% of these acres have trees that are over 130 years old, but very few acres have trees that are greater than 200 years old. Timber harvest is an effective tool to achieve vegetative diversity and, hence, diversity of animal communities. The Forest Plan proposes to classify about 300 thousand acres (24% of the forested acres) as suitable for timber harvest. This suitable base is kept fairly broad to better achieve the diversity objectives and to minimize the impact of timber harvest on specific areas. Other tools, such as prescribed fire, will also be used to achieve diversity objectives, especially in areas classed as unsuitable for timber harvest.

The future management of the Bridger Mountains will remain essentially the same as it has been in the past. A small portion of the roadless land will change to provide for expansion of the Bridger Bowl Ski area. The main mountain divide area will continue to provide for undeveloped dispersed recreation activities. The Forest Service will work closely with the Montana Department of Fish, Wildlife, and Parks to ensure good wildlife management.

The goals and management standards for Management Area 11 have been changed in the final Plan to give greater emphasis to wildlife. This significantly increases the amount of land to receive this priority.

We have added the Montana Departments of Livestock and Agriculture to the list of agencies to coordinate with for predator control projects. Prior to initiation of rodent control activities, we conduct analysis to assure that all state and federal laws are met.

B. Grizzly Bear

A biological evaluation of the DEIS and proposed Forest Plan was made for all threatened and endangered species on the Gallatin. This evaluation along with other documents was provided the U.S. Fish and Wildlife Service and they have determined that implementation, with the modifications incorporated into the final Forest Plan, would not jeopardize the species. In their biological opinion they also point out if properly carried out, silvicultural methods such as fire or timber harvest may improve grizzly habitat. The Forest Service will continue to

important factor contributing to the decline of grizzly bear populations, and habitat security may be just as important as food production in many areas. Roads constructed in association with projects to improve grizzly bear habitat should be closed following project completion to maintain habitat security and avoid potential conflicts.

Knight et. al (1982) is referenced on Page III-32 of the DEIS but not included in the reference section. In addition, since the 1982 estimate of 197 grizzly bears is a minimum estimate based on good data, the Plan should explain why three years later, it now questions the estimates as perhaps too high.

Livestock grazing permits in grizzly bear habitat should be frequently monitored and strictly enforced to ensure compliance and to anticipate problems.

c. Standards and Guidelines.

In Chapter (II), Forest Management Objectives, more quantifiable guidelines should be included. Examples are: 1) maintain a habitat effectiveness of 70% as defined by the elk logging guidelines on important seasonal or year-round wildlife use areas; 2) when entering previously unroaded areas for timber management, strive for 0 miles of open road per section after completion of cut.

The Elk Logging Guidelines developed cooperatively by the DFWP, Bureau of Land Management and the U.S. Forest Service are not included in the GNF Plan. We recommend that these guidelines and as the Montana Fish and Game Commission's Road Management Policy be included in the final Plan.

Guidelines which allow seismic testing after June 15 are designed to protect elk calving, but do not address fawning season for mule deer. In areas classified as high density mule deer summer ranges, such as the Bridger Mountains, we recommended that seismic testing be allowed after July 15, as June 15 is during the peak of fawning season for mule deer.

d. Hyalite, Porcupine, Buffalo Horn Study Area.

The Plan's proposed timber harvest in the Porcupine drainage (MA 19A) appears incompatible with the GNF's desire to manage this area primarily for wildlife. Timber harvest in this drainage would adversely affect wildlife.

The Plan proposes to restock an inactive sheep allotment in the Windy Pass area along the Gallatin-Yellowstone Divide. This area has exceedingly high values for summering elk and bighorn sheep. Grizzly and black bear also occur in the area. The introduction of domestic sheep into this allotment would result in competition for forage with elk and bighorns, possible disease transmission to bignorns, and sheep losses to grizzly bears and the concomitant problems. It appears inconsistent for the GNF to propose reintroducing domestic sheep into the area while stating that the proposed alternative does not provide sufficient range capacity for an increase in bighorn sheep (Page II-29).

consult with the agency in the planning of projects within grizzly occupied habitat.

We believe the discussion in the paragraph which starts on the bottom of page III-32 of the DEIS explains why we are concerned that the minimum estimate of 197 grizzly bears may be too high.

Livestock grazing permits in grizzly habitat will be monitored and enforced as provided by the Grizzly Bear Standards and Guidelines found in the Appendix of the Plan.

C. Standards and Guidelines

The Forest Management Objectives found in Chapter II were designed to be broad. The Forest-wide Standards found in the last part of the chapter are more quantifiable. We have added a statement in the wildlife standards to utilize the Montana Cooperative Elk-Logging Study. This document was not available at the time the proposed Plan went to press.

We will continue to evaluate applications for seismic testing on a case-by-case basis. The different systems of seismic testing have different effects on wildlife. We will also consult with DFWP biologists. We need to determine that restrictions are necessary and justifiable.

D. Hyalite-Porcupine-Buffalo Horn Study Area

Management of the Porcupine drainage emphasizes grizzly bear and big game. A portion of the drainage remains in the suitable timber base but is not scheduled for harvest.

The final Forest Plan does not allocate the Windy Pass area for domestic livestock grazing. The Forest Plan recognizes this area as being most valuable for the propagation and protection of the resident big horn sheep.

FISHERIES

The Forest Plan has been strengthened to increase the emphasis for fisheries, water quality, and riparian zone management. This was accomplished by reducing livestock utilization within riparian zones and harvesting timber within riparian zones only if it will be to the benefit of riparian zone-dependent resources. The Forest Plan provides that if adequate funds are not available to properly mitigate and monitor development type activities, the projects will not be implemented at the cost of fish, wildlife, and water quality.

The Forest Plan emphasizes the significance of the Blue Ribbon streams, the values of the downstream fisheries, and the effects of our on-forest management activities on their productivity. The effects of planned activities on fish numbers available to the downstream fisheries are displayed in the final Environmental Impact Statement.

In the "Comparison of Alternatives" (Page II-39-110) bighorn sheep and grizzly-domestic sheep problems are not addressed. The section on "consequences" states that the grazing alternative (alternative 2) would cause stress and perhaps disease to bighorns because of domestic sheep (IV-6), and yet effects are not considered to be a problem under the preferred alternative where the threat is just as real. The claim (Page IV-9) that domestic sheep only cause a problem on bighorn winter range is not substantiated by forest service research (N.J. Goodson, Effects of domestic sheep grazing on bighorn sheep populations - a review, Proc. Bien. Symp. North. Wild Sheep and Goat Counc. 3:287-313, 1982).

The GNF's proposed livestock grazing increases, timber harvest areas (MA 19A) and the stocking of domestic sheep in the Windy Pass area would seriously impact wildlife in this area.

7. Fisheries.

The underlying assumption of the Plan's fisheries section is that man can improve existing fish habitat by the construction of instream artificial habitat. We are unaware of the successful application of this concept in high gradient streams typical of the GNF. Habitat improvement on high gradient streams has generally proven to be ineffective, short-term and very costly.

Standards and guidelines for fish found on Page II-21 of the proposed plan are vague and without substance. We would suggest that the following standards and guidelines be substituted.

a. Provide for the needs of the fishery resource both on the forest and in those streams off the forest influenced by forest management activities. Coordinate fisheries needs with other non-water dependent activities, with fisheries given highest priority.

b. Activities that could significantly affect the existing quality of the fisheries shall occur only after adequate pre-impact baseline data have been collected and a monitoring program developed to measure impacts.

c. If significant impacts to fisheries occur as a result of forest management activities, detrimental activities in that drainage will be curtailed.

d. Mitigation of fishery impacts may include closing unroaded drainages with similar pre-impact fisheries to roading and development activities.

The Plan uses the cutthroat trout as an indicator of the health of GNF fisheries. Since cutthroat are common only to streams in the Yellowstone drainage, and found rarely in tributaries of the Gallatin and Madison Rivers, we do not believe cutthroat trout are a realistic indicator species for the GNF. We suggest that stream dwelling wild trout populations, regardless of species, be used as indicator species because they would provide a good barometer for monitoring forest activities.

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In order to further protect riparian areas and associated resources, we have made the following changes to the Forest Plan:

1. Management direction for timber harvest activities within riparian zones will give priority to riparian zone-dependent resources (fish, wildlife, etc.).

2. Utilization levels for livestock grazing within riparian zones will be reduced to a level more compatible with stream fishery needs.

3. Total livestock grazing forest-wide will not increase as previously shown in the proposed Forest Plan.

4. Forest-wide projects will not be implemented if funding is not available to properly mitigate and monitor the activities.

As suggested we have changed the indicator species of cutthroat trout to wild trout.

When the grazing model was developed for determining the effects of the alternatives, 25% loss of effective streambank cover was used as the maximum level before changes to fish habitat began to occur. This was based on the extrapolation of limited research data and professional observation made in the field. It is the intent of the monitoring process to further evaluate this predictive model as well as the other models used in the planning process and to calibrate and refine them whenever necessary.

The monitoring plan in the proposed Plan used cover loss of more than 25% as a criteria for monitoring fishery streams in grazing allotments. At the present, there is no known research data that suggests problems will occur to fish carrying capacities at this level of cover removal. However, if problems do become identified along streams with cover losses of less than 25%, the model and the recommended grazing levels will be re-evaluated. Until field data shows otherwise, 25% loss of effective cover will be considered as having no significant effects to stream fish carrying capacities.

Our statement on page II-60, "Numbers of fish in lakes and reservoirs are not highly sensitive to the effects of the alternatives" is true. The volumes projected to be harvested upstream from lakes and reservoirs does not significantly change under the ten alternatives analyzed in the DEIS.

We have reduced the harvest in the Hebgen Lake area from the 4 MMBF per year scheduled in the proposed Forest Plan to 2 MMBF in the final.

The Montana Department of Fish, Wildlife, and Parks (FWP) has the responsibility to stock fish in Montana waters. The FWP and Forest Service will continue to coordinate efforts to limit fish stocking to only those high use areas where natural reproduction is low or non-existent or for establishing new fish populations in areas agreed

We support the concept of limiting livestock grazing in riparian zones as proposed in the Plan. We are not aware of any data in the professional fisheries literature that supports the suggestion that the proposed grazing prescriptions will encourage healthy riparian vegetation for streambanks. In addition, given the proposed increase in livestock grazing and the Plan's limited riparian monitoring program (Page IV-4), the GNF's ability to adequately monitor or intensively manage riparian lands appears limited.

The proposed tolerance for monitoring riparian habitat conditions allows for a 25 percent loss in effective streambank cover before any corrective action is taken. That tolerance is too high and will result in unacceptable impacts. It should be re-evaluated.

Page II-60 of the DEIS states that lakes and reservoirs are not highly sensitive to the effects of land use alternatives. This is not an accurate statement. Hebgen Lake, to which the Plan attributes the largest number of trout of any body of water on the GNF, is nearly totally dependent on tributary streams for trout reproduction. Nearly all of these tributary drainages are scheduled for timber harvest in the future. The integrity of the tributary streams is essential to the fishery of Hebgen and many other lakes on the forest and is dependent on sound land use practices. The Plan must recognize the importance of these streams in the proposed management of the area. These streams include: South Fork Madison River, Cherry Creek, Rumbaugh Creek, Watkins Creek, Trapper Creek, Grayling Creek, Duck Creek and Cougar Creek.

The DEIS states that (Page II-14) increased road construction associated with timber harvest may have a negative effect on catchable-size trout. The Plan's proposed solution to this problem is increased fish planting. Studies have shown that planting is a poor solution for reduced fisheries. Stocking hatchery trout causes a decline in wild trout numbers which compounds the problem. Maintenance of existing quality fisheries should remain a priority in the Plan.

The proposed plan uses the Equivalent Clearcut Area (ECA) process to set standards for the amount of timber harvest allowed in different watersheds. We request that this process include the following:

a. A careful evaluation of stream channel measurements below the forest boundary to identify the effects of past timber harvest off the forest. This is of particular significance in the Shields River, a drainage that is suffering from increased water yield due to excessive past timber harvests.

b. A careful evaluation of the effects of timber harvest on adjoining private land be included in evaluating forest timber harvest plans.

There are no management area prescriptions emphasizing either fisheries or watershed management. Fish are not considered in any of the 26 management area prescriptions, despite the fact that the GNF claims 214,000 RVDs of fishing use. This should be corrected in the final Plan.

upon by both agencies. The Gallatin National Forest supports the State's goals of maintaining high quality, wild trout populations in as many streams and lakes as possible. The Gallatin does not intend to use fish stocking as a means of off-setting reductions in wild trout numbers that could otherwise be maintained or increased through good land ethics.

There is a detailed interdisciplinary analysis process that identifies the suitability and scheduling of areas for timber harvest and road building. The capability of a watershed to handle logging and roading impacts is determined using strict field and office procedures. One of these procedures accounts for the cumulative effects of all past logging and roading, regardless of year or land ownership within the drainage, on streamflow. Another procedure determines the inherent capacity of the stream channel to handle the increased streamflow that is predicted to occur from the logging. If the predicted increases will exceed the channel's capacity, the proposed Forest Service logging is scaled back or postponed. This has happened in several drainages on the Forest in the past and we expect this procedure will continue. We are also trying to improve the scientific bases for these two procedures with local monitoring data.

We have corrected the error concerning the different fish population numbers you discovered in the DEIS.

RANGE, WEEDS, GRAZING

The Gallatin National Forest is moving toward more intensive range management practices. Season-long grazing, as we know it today, will become a thing of the past. Deferred and rest-rotation pasture systems will continue to be implemented. New investments in fences, water, or other range improvements needed to implement these systems will be shared by the grazing permittees.

Livestock utilizaion standards in riparian areas have been reconsidered. Reductions in use have been made for heavy use pastures. The new standards are shown in Chapter III, Management Area 7.

Noxious weeds threaten the productivity of our rangelands and the stability of our watersheds. Weed concerns cross administrative boundaries and involve private land owners and county, state, and federal agencies. Weeds are emphasized in the final Forest Plan by the expansion of the objectives section in Chapter II.

People and animals moving between other areas and National Forest lands spread noxious weeds. It is not realistic to think that the public will be denied general access to public lands to prevent the spread of noxious weeds. Some local roads may be closed on a case-by-case basis.

Noxious weed management involves both prevention and control. Control in the short term will be a combination of biological, mechanical, and chemical means. In the long term, as biological agents are found, we will reduce our need for chemicals and shift our emphasis to biological

A comparison of Figure II-6 (Page II-61, DEIS) and Table II-20 (Page II-102, DEIS) is confusing. Table II-20 shows the Proposed Action to have the greatest number of catchable trout in 50 years (570,000). However, Figure II-6 shows the Proposed Action to have the fourth greatest catchable trout population in 50 years (about 507,000). This needs clarification.

Yellowstone cutthroat trout in the mainstem Yellowstone River are totally dependent on tributary streams for reproduction and recruitment. Several of these streams are on the GNF and should be given high priority in the Plan for protection. They are: Tom Miner Creek, Cedar Creek, Mol Heron Creek, Bear Creek and Rock Creek. Increases in baseline sediment rates in these streams would not be acceptable.

The following tributaries to the Gallatin River require special management considerations in the Plan:

a. Taylor Fork - already a high sediment producing drainage. No activities which might increase sediment yield in this drainage should be considered. The entire drainage should be managed for watershed protection.

b. Sage Creek - another high sediment producer. This drainage should be managed for watershed protection.

c. West Fork, Spanish Creek, Squaw Creek - these three tributary streams have high values as spawning streams for Gallatin River trout as well as supporting excellent resident trout populations. Any proposed land use activities in these drainages should be carefully evaluated and occur only if these streams can be protected. Squaw Creek is of particular concern since it has been logged heavily in the past and is scheduled for extensive timber harvest in the future.

8. Range/Weeds/Grazing.

Ideally the entire GNF range should be in good to excellent condition. The 23 percent of the range in fair condition should be improved if practical. The focus on range improvements to improve forage quality and provide more uniform utilization is appropriate. Managers may have to adjust stocking rates on some allotments if sufficient funding for structural and non-structural range improvements is not available. Monitoring of range condition and trend should be more frequent, and any downward trend should initiate further evaluation.

The utilization of heavy use pastures in riparian areas seems very high. The use of rotation systems involving heavy use pastures in riparian areas should be reconsidered, as this would allow significant deterioration of streambanks to occur every other year. The plan has good provisions for the use of transitory range.

The Plan should indicate when the proposed allotment plan schedule (Page II-22) will be available and identify the sources of the utilization standards for riparian areas (Page II-23).

agents. Prevention through actions like road closures and weed-free hay will also be part of our control strategy.

All pesticide use will conform to state and federal standards and be supervised by certified applicators.

ROADS

We consider the effects of road building on fisheries, water quality, riparian areas, aesthetics, wildlife, and other resources. Interdisciplinary teams, consisting of resource specialists, recommend actions to manage potential effects before construction starts. Many methods are available to mitigate each of these concerns, such as location of the road, closure periods, and special designs for the construction. These are agreed to before the road is located and designed, and reviewed before construction begins to assure each is adequately addressed.

VISUAL QUALITY

We have corrected the visual quality tables in the final EIS.

OTHER

The wording for item 21, page IV-6 has been changed from "significant soil loss" to "sediment concentrations exceed standards for watersheds (Appendix C)." This will provide quantifiable measurements.

The agency name errors have been corrected.

The Record of Decision for the Forest Plan is enclosed. It summarizes the final decisions made in the planning process and explains the rationale for these decisions. The final Forest Plan and its Environmental Impact Statement are also enclosed. Please review these documents and let us know if you would like any additional information regarding the Plan.

The detailed review of the Gallatin National Forest DEIS and proposed Forest Plan by Montana's Interagency Planning Task Force is appreciated. If you have comments concerning the final Forest Plan, please contact us.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

The control and monitoring of noxious weeds on the GNF should be included in the objectives identified for the Plan. In addition, a discussion of the proposed methods for noxious weed control on harvest sites, along roads and trails, and on rangeland is needed.

We commend the GNF for stating, "Forage and cover needs of big game will be given primary emphasis on winter ranges that are critical to their survival" (Page II-3). Many of our comments on the proposed plan are intended to help the GNF achieve this stated objective.

The proposed plan calls for a 15.2 percent increase in livestock AUMs from 43,400 to 50,000 (Page II-5) by permitting grazing on areas that have not been used for several years. This increase in livestock grazing may conflict with riparian area management and wildlife habitat improvement goals in some areas unless grazing systems are carefully designed and monitored. It may also conflict with goal #7 (Page II-1) to "provide habitat diversity with increased emphasis on non-game and small game species." Many species of non-game depend on tall grass cover. The proposed grazing increases could actually decrease habitat diversity by removing areas of tall grass cover that are presently not utilized. Proposed management of these unused allotments should be specifically detailed in the Plan.

We support the decision not to reopen closed livestock allotments in grizzly bear situation one areas, but urge this philosophy also be applied to domestic sheep in situation two areas.

9. Roads.

Specific road construction standards should be included in Chapter II of the Proposed Foest Plan. The inclusion of specific construction and mitigation standards would make it easier to evaluate the effects of the Proposed Plan.

The Plan proposes to reduce the concentration of timber harvest on presently roaded lands by enlarging the timber base. Enlarging the base will require addition timber harvest and roading on steep, marginal sites. Road building on such sites will be very expensive, may increase sedimentation more than intensive harvest on more suitable timberland, and would increase the potential for additional below-cost sales.

More specific direction on road management should be provided in the Proposed Plan. The Plan states (Page II-7) that about 70 percent of local roads will be closed following timber harvest, but that no decision has yet been made on management of new roads. At a minimum, specific dates when this information will be available should be provided.

It is recommended that potential soil and water quality degradation resulting from erosion of the road bed or right-of-way be included as an additional criteria for determining the need for road closure.

10. Visual Quality.

There is an apparent error in Table II-7 (Page II-53) for both alternatives 7 and 10. The acreage figure should be 1314 not 1503, and the percentage shown should be 76 percent not 97 percent. This change will bring Table II-7 into agreement with Table II-3 (Page II-53) and the alternative output summary on Page S-7.

11. Other.

The Plan's proposed management coordination in areas of checkerboard ownership is appropriate (Plan, II-6).

"Significant soil loss" should be defined on Page IV-6, item 21.

Applicants for special use permits to conduct mining operations must apply for Section 401, Clean Water Act Certification. State certification should be added to the compliance check list.

There are errors on Page A-3, Appendix A, B., Consultation with others. The Montana Department of Natural Resources and Environmental Sciences should be changed to the Montana Department of Health and Environmental Sciences. The Montana Department of Natural Resources and Conservation is correct. The agency responsible for administration of fish and wildlife is the Montana Department of Fish, Wildlife and Parks.

APPENDIX A

Montana Department of Fish, Wildlife and Parks
Wildlife-Related Management Area Recommendations
For The Gallatin National Forest

1. The following areas are recommended for wildlife only MA classification. It is further recommended that they be withdrawn from the timber base to prevent excessive cuts in other MAs:

   a. Nurses Lakes and Pruitt Park: These are presently classified as MA 10, 11 and 16. These areas contain year-round moose habitat, black bear habitat, spring-early-summer-fall and winter elk range, and excellent mountain grouse habitat.

   b. Elk Creek and north side of Long Mountain: These are presently classified as MA 11 but are excellent elk, bear, deer and grouse areas.

   c. Headwaters of Picket Pin and Iron Creek: Presently classified as MA 16. They are not active grazing allotments but could be reactivated. It is excellent summer elk and black bear range.

2. The following recommendations are made regarding the proposed GNF management of the Bridger Mountains:

   a. Limit future logging activity to presently unmanaged even aged stands and do not cut over-mature, old growth stands into even aged condition.

   b. Do not apply results from the Elk/Logging Study to mule deer populations. Mule deer are in general far less mobile and more dependent on traditional areas for habitat needs and thus far less able to deal with land use disturbance than elk.

   c. The proposed timber harvest in the Livingston and Brackett Creek population units appears excessive. The proposals include removing 9.75 million board feet of timber between 1984-1987 from 48 cutting units in 6 drainages. We believe this proposal, when combined with Burlington orthern timber harvest plans, would result in major reductions in mule deer populations in these areas.

   d. We suggest that no areas on the west side of the Bridgers be assigned timber management prescriptions. The west side of the Bridgers are made up of marginal timber stands located on very steep slopes. Previous cuts in Johnson Canyon and other areas on the west side indicate little if any forest regeneration. Wildlife values should take precedence over these marginal timber stands.

e. We recommend that a Research Natural Area be set up in the Bridgers on the following contiguous sections:

T2N R6E S. 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 38, 29, 30.

T2N R5 E S. 12, 13, 24, 25.

This area is a truly representative mountain foothill environment that remains undeveloped. It contains representative foothill plant communities from foothills to alpine and healthy populations of mule deer, elk, whitetailed deer, moose, black bear, mountain goat, lion, wolverine, bobcat, coyote and non-game species. Numerous archaeological sites also exist in the area.

APPENDIX B

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS COMMENTS

LAND ALLOCATIONS UNDER ALTERNATIVE 7 - PROPOSED ACTION

We request the following land management emphasis allocation be changed:

GENERAL AREA	LOCATION	MANAGEMENT EMPHASIS FROM	TO
Rock Creek	Sec 20, 24, 26	8, 11	12
Tom Miner	Sec 30, 24	13, 14, 15	12

Justification: There are very low numbers of moose on portions of the Livingston and Gardiner Ranger Districts. Available data point to a habitat problem, although this problem has not been specifically identified. The above-referenced sections are committed to timber management, yet have important values as moose winter range. Cutting these areas without adequate knowledge of moose habitat relationships may intensify the problem.

Windy Pass	Sec 4, 9, 10, 16, 22, 27, 28, 33, 34	17	12

Justification: This area has exceedingly high values for summering elk, bighorn sheep, and grizzly bears.

Milla Gulch	Sec 14	17	12
Tie Gulch	Sec 12	17	12
Eightmile Creek	Sec 2	17	12

Justification: These areas have important thermal cover values for elk.

West Pine Creek	Sec 6, 8	8	11

Justification: These timbered areas are adjacent to elk winter range so thermal cover should be taken into account.

Meadow Creek	Sec 2	8	12

Justification: This timbered area is important for moose.

South of Cooke City	Sec 25, 28-31, 33, 36	4, 13	14

Justification: This area is an unroaded, rather isolated timbered bench above and south of the Cooke City highway. To the south is contiguous land with a wilderness character and a MA14 (grizzly-recreation) designation. We would recommend that the entire area be managed as MA14 so that it remain unroaded and provides a continuous area of undisturbed habitat for grizzlies.

Emigrant Gulch	Sec 23-26	8	11

Justification: This relatively small patch of dense timber is adjacent to important elk winter range on Emigrant Peak and provides important thermal cover for elk. We recommend redesignating this area so these thermal values can be managed for.

East of Natural Bridge		16	17

Justification: This is an important elk winter range and spring calving area.

North of Glen Mtn Road	Head of Box Canyon	11	12

Justification: This is deer and elk winter range and spring black bear range.

Crazy Mtns-West Side		10	11 or 17

Justification: There are many management areas listed as MA10 which are forested lands intersparsed with grasslands. These are very productive summer fawn-rearing areas for mule deer and among the best mule deer areas in southwest Montana. Since wildlife is not included in the management goals of MA10 areas, they should be changed.

Upper Shield River Smith Creek		8	11

Justification: The upper areas of these drainages provide for elk habitat security and productive mule deer summer range. The drainage is heavily logged and heavily roaded by both private landowners and the forest service. This has made the remaining forested sections even more valuable as elk security. With the proposed MA8 designation, this is not taken into account.

GOVERNOR'S 1984 WILDERNESS RECOMMENDATIONS
GALLATIN NATIONAL FOREST

GALLATIN NATIONAL FOREST - 1545

Forrest: Gallatin
1983 Roadless Area Net Acres: 700
Recommended Wilderness Acres: 480

I. WILDERNESS ATTRIBUTES:

Republic Mountain is a small roadless area and a logical extension to the North Absaroka Wilderness which it borders on the south along the Wyoming border. Cooke City lies about one-half mile from the northeast of the boundary; Silver Gate lies about one-half mile northwest from the boundary.

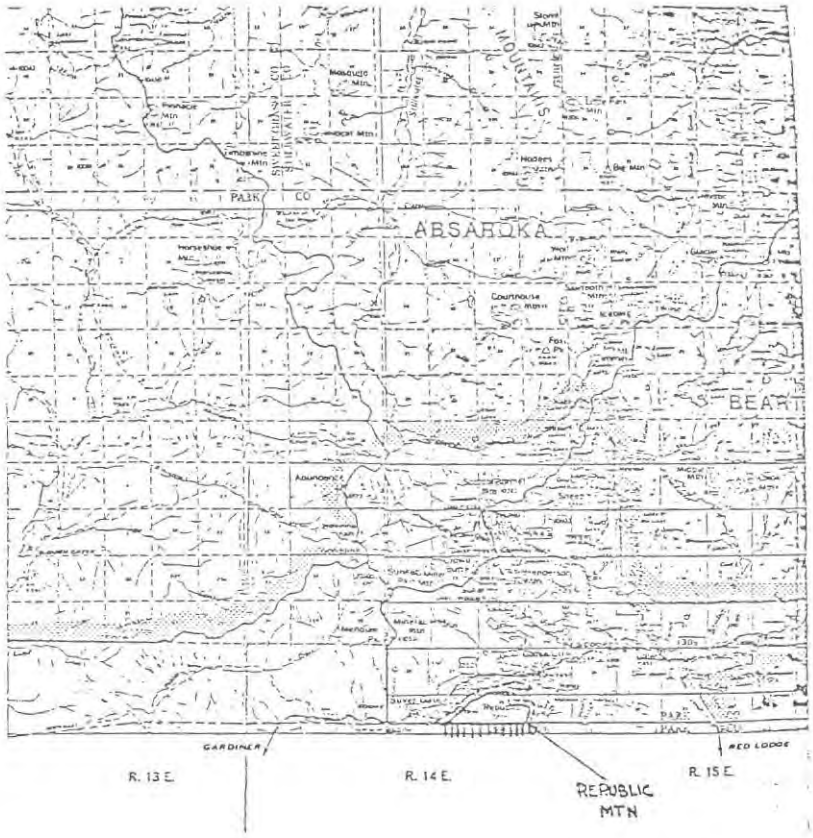
The area consists of the steep north slope, but not the peak, of 10,179 foot Republic Mountain which dominates the area. Rugged terrain, including cliffs, talus slopes, ravines, and spur ridges, typifies the area. The area is a logical extension of the North Absaroka Wilderness and forms a more definable boundary than the Montana-Wyoming state line.

II. RESOURCE VALUES:

No commercial forest exists within the area. Area is rated "very high" to "medium" for locatable minerals, and "low" for oil and gas. Area is highly visible from Cooke City and Silver Gate and for travelers among the Beartooth Highway.

III. BOUNDARY RATIONALE:

Level terrain near the base, where evidence of past mining activity exists, and where snowmobile use is possible, has been eliminated from the recommended boundary. Also a narrow strip of forest land caused by a penetration of private land is eliminated by the boundary change.



KEY

- 1983 ROADLESS INVENTORY AREA
- RECOMMENDED WILDERNESS AREA
- EXISTING WILDERNESS AREA

NOTE: SCALE IS NOT ½ INCH = 1 MILE

LIONHEAD ROADLESS AREAS - 01963

Forest: Gallatin
1983 Roadless Area Net Acres: 32,783
Recommended Wilderness Acres: 24,500

I. WILDERNESS ATTRIBUTES:

The Lionhead Roadless Area lies adjacent to the Continental Divide between Idaho and Montana some 10 miles west of West Yellowstone. The lower slopes are timbered, while rugged, alpine peaks make up the higher elevation. The peaks reach 9,000 - 10,000 feet of elevation, and consist of rockland, talus, steep mountain valleys with some lakes and open alpine grasslands. The peaks dominate the view in the nearby surrounding area.

II. RESOURCE VALUES:

The area receives a variety of recreation use both motorized and non-motorized with 70 percent of the use estimated to be semi-primitive and non-motorized. The southeast corner of the area contains snowmobile use areas considered to be important for "advanced" snowmobiling.

Over 2/3's of the area is non-forest or unproductive forest land. Most of remaining 1/3 is commercial forest land but generally of poorer quality and on steep, high-elevation slopes.

Livestock graze on 2,030 acres supporting 590 AUMs.

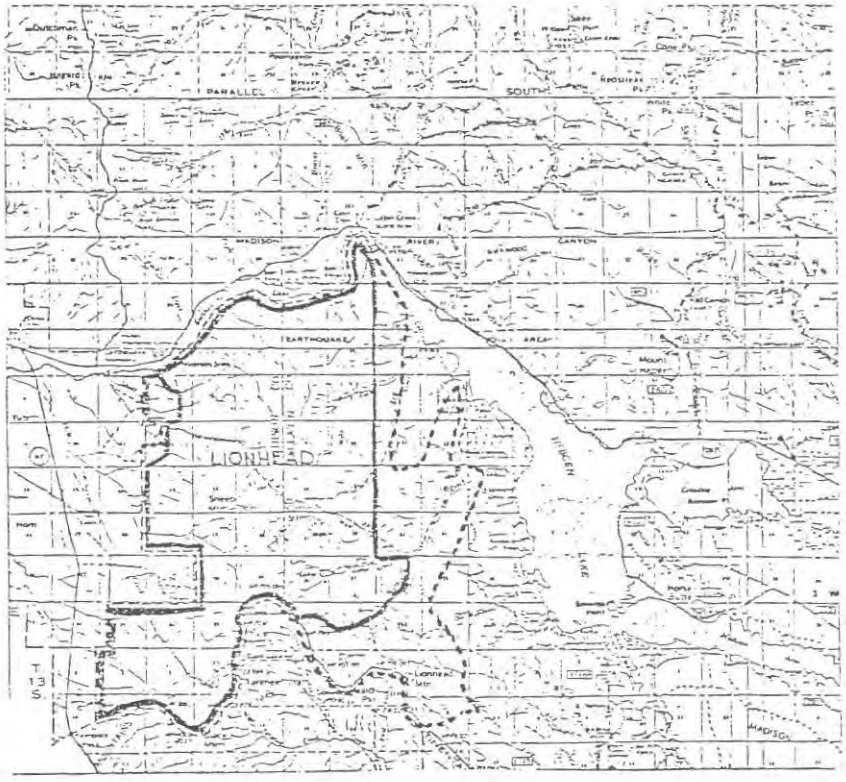
A population of Big Horn sheep inhabit the area.

About 4,500 acres of the roadless area are included in oil and gas lease application. One oil and gas lease of less than 1,000 acres exists on the western boundary.

III. BOUNDARY RATIONALE:

A boundary adjustment has been made to eliminate the oil and gas lease on the west side; on the east side a boundary adjustment eliminates areas of tentatively suitable timber, and a boundary adjustment in the southeast corner eliminates most snowmobile use areas and travel corridors and will help accommodate other motorized use.

If the area of oil and gas lease application were excluded from the boundary, the small wilderness size, would be further reduced.



KEY

1983 ROADLESS INVENTORY AREA

RECOMMENDED WILDERNESS AREA

EXISTING WILDERNESS AREA

NOTE: SCALE IS NOT ½ INCH = 1 MILE

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:
M.19 Gallatin National
Forest Plan

July 1, 1987

Mr. Robert Breazeale
Forest Supervisor
Gallatin National Forest
P.O. Box 130
Bozeman, Montana 59771

Dear Mr. Breazeale:

We have reviewed the information in your June 18, 1987 letter concerning the changes you have incorporated into the Final Gallatin National Forest Plan and Environmental Impact Statement. In view of these changes, your September 26, 1987 correspondence and our February 14, 1986 biological opinion, which still stands, we do not see a need to reinitiate formal consultation.

We appreciate your efforts to conserve listed species and their habitat.

Sincerely,

Dale R. Harms
Acting State Supervisor
Fish and Wildlife Enhancement

RMH/clh

USDA Forest Service
BOZEMAN, MT 59715
JUL 2 1987

SUPF	FIBER
SYSM	TMBR
LAW	SL/HY
CONT	FIRE
BF/PUR	RES
PERS	ADM
REC/L	EZEE
PLAN ✓	ENG
IC	FISH
EXEC ✓	AR/LA
RANGE	DR
SAWM	FILE

"Take Pride in America"

2095

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:

M.19 Gallatin National Forest Plan
6-1-86-F-005

October 8, 1986

Mr. Robert E. Breazeale
Forest Supervisor
Gallatin Naional Forest
P. O. Box 130
Bozeman, MT 59771

Dear Mr. Breazeale:

We have reviewed the information in your September 26, 1986 letter concerning the changes you have incorporated into the Final Gallatin National Forest Plan and Environmental Impact Statement. In view of these changes and our February 14, 1986 biological opinion which still stands, we do not see a need to reinitiate formal consultation.

We appreciate your efforts to conserve listed species and meet our joint responsibilities under the Endangered Species Act.

Sincerely,

Dale R. Harms
Acting Field Supervisor
Endangered Species

cc: Reg. Forester, Missoula, MT
ARD (FA/SE)

RMH/lal

USDA Forest Service
BOZEMAN, MT 59715

OCT 0 9 1986

SUPP	FIBER
SYSM	TMBR
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RANGE	[illegible]
SAWM	

United States Department of Agriculture | Forest Service | Gallatin National Forest | P.O. Box 130 Bozeman, MT 59771

Reply to 1920

Date

U.S. Fish and Wildlife Service
Endangered Species, Field Office
Federal Buildin*
301 South Park
Helena, MT 59626

Dear Mr. Brewster:

Thank you for the time and effort you put into preparing the biological opinion for the Gallatin National Forest Plan. This letter is our response to that biological opinion, explaining how we have incorporated your recommendations into our Final Plan.

The Forest recognizes that this biological opinion cannot identify site specific and cumulative effects of all projects planned for the life of the Forest Plan and further consultation will be necessary for projects which may affect threatened and endangered species. We have a Plan standard which states that we will do a biological evaluation of projects which have the potential of adversely affecting or jeopardizing threatened and endangered species. This could involve either formal or informal consultation, depending on the outcome of the evaluation.

Grizzly Bear

Lands within occupied habitat will be managed according to the standards set for MS-1, MS-2, and MS-3 in the Yellowstone Grizzly Bear Guidelines which have been adopted in the Forest Plan. The management area standards for all MA's which occur in occupied habitat have standards which refer to the Forest-wide standards and Appendix G for direction.

A new Forest-wide standard has been added to the Plan which says the cumulative effects analysis process will be used to quantify habitat effectiveness and mortality risk for land use activities. This will occur when the process becomes operational for the bear management units on the Forest.

In MA 7, a new standard for grizzly bear management has been added which directs us to use the guidelines in Appendix G to maintain and enhance the food sources and security cover of the riparian areas in occupied habitat.

FS-6200-11b (7-81)

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

2095

IN REPLY REFER TO:
M.19 Gallatin NF Plan

February 14, 1986

Mr. James Overbay, Regional Forester
United States Forest Service
Region 1, Federal Building
P.O. Box 7669
Missoula, MT 59807

Dear Mr. Overbay:

This is the Fish and Wildlife Service (FWS) biological opinion prepared in response to your December 3, 1985 request for reinitiation of formal consultation on the Gallatin National Forest Plan. The species considered in this consultation are the threatened grizzly bear (Ursus arctos horribilis), bald eagle (Haliaeetus leucocephalus), American peregrine falcon (Falco peregrinus anatum) and the gray wolf (Canis lupus). The FWS has examined the proposed activity in accordance with the Section 7 Interagency Cooperation Regulations (50 CFR 402, 43 FR 870) and the Endangered Species Act of 1973 (ESA), as amended. This biological opinion refers only to the potential effects on threatened and endangered (T/E) species and not the overall environmental acceptability of the proposed action.

VI-79

Biological Opinion

It is the FWS biological opinion that implementation of the proposed Gallatin National Forest Plan (Plan), with inclusion of all changes and or modifications described in the December 3, 1985 biological assessment, is not likely to jeopardize the continued existence of any of the four wildlife species mentioned above. In addition, we believe the proposed Plan will promote the conservation of the American peregrine falcon and bald eagle. Background and biological information pertinent to this determination follow. Further informal and formal consultation will be needed on project specific actions as the Forest implements the Plan.

Project Description

The proposed Plan guides all natural resource management activities and establishes management standards for lands administered by the Gallatin National Forest. It describes resource management practices, levels of resource production and management, and the availability of lands for resource management. The proposed

In MA 13, several new standards have been added to address your concerns for grizzly bear security in areas of timber harvest. Under wildlife coordination, we have added standards that in all timber sales we will consider:

1. Maintaining or enhancing security by road management,
2. Enhancing habitat components of the bear by silvicultural methods where there is a demonstrated need,
3. Enhancing cover where timber harvest can provide quickest results, and
4. Prepare a biological evaluation of projects which could jeopardize the bear.

In addition, under timber scheduling, we have incorporated your recommendations for the scheduling of timber sales not specifically designed to enhance habitat conditions. These include standards for:

1. Duration of activity,
2. Re-entry schedule, and
3. A definition for security area.

The Ten Year Sale Plan of the Proposed Forest Plan has been modified by applying these standards for scheduling sales. The result of that modification has been a reduction of harvest within grizzly occupied habitat over the 10 year period of approximately 40 MMBF to approximately 20 MMBF.

Gray Wolf

It appears that the management direction contained in the Forest Plan will be adequate if at some future time there is a decision to manage for wolf recovery.

Bald Eagle

Standards for the bald eagle management has been added to MA 5 and MA 7. These standards, plus adoption of "A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem" in the Forest-wide standards of the Plan, we feel, will contribute to the recovery of the species.

Conservation

The Forest recognizes that actions which conserve Federally listed threatened and endangered species is a mandate as well as well as insuring that its projects do not threaten these species. We are projecting an increase in elk populations under the Plan which can provide more prey. We have also incorporated the Cooperative Elk Management Guidelines into our Forest-wide guidelines for use in determining elk habitat and security needs and as a way of putting more emphasis on managing for elk, one of whose benefits is to provide a prey source for threatened and endangered species. In addition, and in line with the conservation effort, our second highest priority in our land acquisition program is to acquire land with

Plan is based on the proposed action (Alternative 7), described in the Gallatin National Forest Plan Draft Environmental Impact Statement (DEIS). The proposed Plan sets forth specific forest-wide goals, objectives, standards, schedule of management practices, and monitoring and evaluation requirements for the next 10 years and proposed management direction for the next 50 years.

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 Gallatin National Forest determines may affect T/E species, at the time it is designed and implemented. In this consultation, the FWS reviewed the Gallatin Forest Plan to determine:

1. If the proposed land resource allocations and management prescriptions would preclude the survival and recovery of listed species.

2. Whether the Forest policies, management standards, guidelines and prescriptions are compatible with the intended purpose of the ESA.

3. If leasing of oil and gas and ensuing activities will preclude the survival and recovery of any threatened or endangered species.

Following our review of the proposed Forest Plan and DEIS, your biological assessment, and conversation with your staff, we conclude the Gallatin National Forest Plan preferred alternative provides proper assurances that the proposed action would not preclude survival and recovery of listed species. Overall, the Plan provides the following:

1. Both the Plan and DEIS reiterate as a matter of policy and direction that no action will be taken that will adversely affect a threatened and endangered species, and that all proposed or existing activities funded or authorized by the Forest will be reviewed to determine potential affect for listed threatened and endangered species.

2. The proposed Forest output/activities (Average Annual First Decade) are evaluated via the Plan's DEIS and biological assessment and correlated with the conservation of listed species.

high threatened and endangered species value. This is encompassed in a Forest-wide standard, Lands.

Cabin Creek

The Final EIS displays six options that were considered for managing dispersed recreation use in Cabin Creek and their effects on grizzly bear, along with effects on other resources. The option which was selected was one that was discussed in informal consultation with you in May of 1986. This option designates five major trails which would be open to motorized vehicles less than 40 inches in width from July 15 to October 30 each year. We specifically looked into your concerns about opening Trial No. 206 this early and determined that the bears would be dispersed from this area by that date and would not be adversely affected by motorized use on that trail. This direction is now contained in MA 20, Cabin Creek, of the Forest Plan.

Management Areas

Three other management areas in occupied habitat have been changed between the Draft and Final Plan - MA 19A which was the suitable timber MA in Porcupine-Buffalo Horn has been deleted. There is now no suitable timber in the Porcupine-Buffalo Horn and Elkhorn drainages. MA 14 and 15 of the Draft Plan have been combined into MA 15 in the Final. MA 15 becomes dispersed recreation, grazing, and grizzly bear emphasis. MA 14 is a new management area which emphasizes the management of the Northern Yellowstone Migratory Elk herd which generally winters in occupied habitat on the Forest. The changes in MA 13 have been discussed previously.

Occupied Habitat

One final change between the Draft and Final Plans is the addition of approximately 49,000 acres of MS-1 and approximately 34,000 acres of MS-2 to grizzly bear occupied habitat on the Gallatin. This change was a result of habitat component mapping the Forest has cone recently and is consistent with the recommendations the Forest mad to the Grizzly Bear Recovery Update process which is currently being done.

Consultation

Based upon our earlier conversations with you and our presentation of these changes to you, we presume that the Final Plan will not jeopardize the grizzly bear and will help to conserve the other threatened and endangered species on the Foresst. We request a letter from your office indicating this which we will publish in the Final EIS.

Thank you for your continued interest in the Gallatin National Forest.

Sincerely,

Robert E. Breazeale

ROBERT E. BREAZEALE
Forest Supervisor

Enclosures

3. The Plan's output objectives will be updated every 10 years with each update meeting consultation (Section 7 ESA 1973) requirements.

4. A stated goal of the Plan is to provide habitat necessary to contribute to recovery of T/E species and stated overall objectives are to emphasize recovery of listed species.

5. With inclusion of the recommendations and modifications identified in the biological assessment, the Forest-wide standards identified in MA-1 through MA-26 adequately address T/E species.

6. The proposed Plan states that to facilitate recovery, proposed programs, projects or activities for authorization or funding by the Federal agency will be evaluated for affect on listed species in consultation with the State and the Fish and Wildlife Service.

7. Adequate commitments to T/E species, relative to oil and gas leasing, have been addressed in the Grizzly Bear Standards and Guidelines (Appendix G) and in the Resource Protection Guidelines and Stipulation Requirements (Appendix D) of the Plan.

Grizzly Bear

To assure the viability of the Yellowstone grizzly bear population and its habitats, Forest activities must be at a level and conducted in a manner to assure that (1) bears are not adversely impacted directly, indirectly, or cumulatively; (2) important habitat components are not adversely modified or destroyed; and (3) that sufficient area is left undisturbed from detrimental human activities to meet the biological requirements of grizzly bears. These objectives can be met in the Forest planning process by: (1) allocating sufficient space to accommodate grizzly recovery in which grizzly management is the primary use or grizzly bear supportive allocations are made; and (2) prescribing in areas of occupied grizzly habitat that have non-supportive allocations, sufficient grizzly prescriptions to assure that the activities are made compatible with the biological requirements of the bear.

The lands allocated to grizzly bear habitat management (Management Areas 13, 14, and 15), stratification of occupied grizzly bear habitat into Management Situations 1, 2, and 3, and implementation of their attendant guidelines provide a process to assure that the above objectives are met. We believe that if the occupied habitat is managed in accordance with the direction for MS 1, 2 and 3, and that human/bear conflicts are minimized so as to prevent human-induced mortalities, the grizzly population will

respond by expressing the parameters identified for recovery in the Grizzly Bear Recovery Plan. Thus, this opinion is contingent upon the guidelines for MS 1, 2, and 3 being fully implemented.

Other Management Areas (MA-1, 2, 4, 5, 7, 19, 19A, 20, 24, 25 and 26) in occupied habitat emphasize no man-caused mortalities and maintaining habitat security through application of the Forest Grizzly Bear Guidelines. The Yellowstone Grizzly Bear Guidelines in Appendix G of the Plan are intended to be an extension of the Forest-wide Standards, and are intended to be applied in all management areas in occupied habitat, whether referred to or not in the management standards. This was an important consideration in this consultation. In addition, our no jeopardy conclusion is contingent upon inclusion into the Plan of the following recommendations which were outlined in the biological assessment:

Page II-22, add the following standard: "5. When the Greater Yellowstone Area Grizzly Bear Cumulative Effects Analysis Process becomes operational, it will be used as one of many tools to quantify habitat effectiveness and mortality risk forecasting for current and future foreseeable land use activities in designated bear management units on the forest."

Page III-23, MA-7 - Under "Wildlife and Fish" add: "Grizzly Bear"; with the following standard: "In occupied habitat, utilize the guidelines (Appendix G) for maintenance and enhancement of natural food sources and security cover in this riparian habitat component for the grizzly bear."

Page III-45, MA-13 - Add in "Timber, Timber Management" the following: "The cumulative effects analysis process (when operational) and Grizzly Bear Guidelines (Appendix G) will provide the basis for managing timber sales in this management area. All timber sales that are within this management area will consider: 1) maintaining or enhancing habitat security for the grizzly (i.e., road management); 2) enhancing forest habitat components by silvicultural methods (i.e., fire or timber harvest) for the grizzly bear where security will not be jeopardized and where there is a demonstrated need, for example, to a) provide openings in forest cover to increase production of browse species for ungulate prey species; and b) improve white-bark pine nut availability; and 3) enhancing cover where regeneration timber harvests would provide the quickest results for the grizzly and its prey. A biological evaluation will be prepared for all developmental activities within this management area."

In addition to the cumulative effects analysis process, the following criteria will be used for scheduling timber sales in respect to 1) duration of activities, 2) timing of re-entry, and 3) definition for security areas. These criteria will apply to all timber sales in Management Area 13 (occupied habitat), and are not specifically designed to enhance habitat conditions for the grizzly bear.

1) Duration of Activity

a) In MS 1 -- restrict sale activities to no longer than three (3) consecutive years.

b) In MS 2 -- restrict sale activities to no longer than five (5) consecutive years.

2) Re-entry

a) In MS 1 -- one entry per decade.

b) In MS 2 -- a minimum of two (2) years inactivity following 1-3 years of consecutive activity - or - a minimum of five (5) years following 4-5 years of consecutive activity.

c) For both MS 1 and 2, re-entry should not occur unless 40 percent or more of the drainage can be maintained in cover (20% hiding, 10% thermal, +10% in either hiding or thermal cover) distributed evenly throughout the area. Refer to the glossary in the "proposed Forest Plan" for the definition of the "thermal" and "hiding" cover.

3) Security Areas

In both MS 1 and 2, provide security areas immediately adjacent to the influence zone of the project area on a site by site basis. Security areas typically should be 5,000 acres or larger, contain a similar compliment of vegetative habitat components that existed in the influence zone, and be in areas that are roadless or where the open road density is one mile per square mile or less. Roaded areas may be managed to meet this objective by imposing road closure restrictions.

An area of particular concern in this consultation was the 10 Year Timber Sale Plan (Appendix H) which reflects the frequency, duration and amount of timber harvest activity in occupied grizzly bear habitat. Through informal consultation, this portion of the Plan was found to be incompatible with grizzly bear management objectives and to be inconsistent with the timber sale scheduling criteria. In the December 3, 1985 biological assessment, the Forest Service provided a revised 10 Year Sale Plan (enclosure 1) which has been modified to be consistent with the scheduling criteria and grizzly bear management objectives.

Gray Wolf

Two major factors in managing for wolf recovery include: 1) the maintenance of a year round prey base (primarily deer, elk, moose and beaver); and 2) avoidance of wolf/human conflicts/encounters that would result in wolf mortalities. Three goals of the Forest Plan are 1) provide for a slight increase in big game populations by providing habitat to support them; 2) maintain populations of all wildlife species and provide habitat diversity with increased emphasis on nongame and small game species; and 3) manage roads to in part provide for resource protection and wildlife security. The management direction and guidelines developed for grizzly bears on the Gallatin National Forest should also have positive effects on the wolf. This direction, plus the Forest-wide guidelines for elk and riparian habitat, and the winter range management areas will help insure that a year round prey base for wolves is maintained and security cover is provided.

Bald Eagle

The final Pacific States Bald Eagle Recovery Plan (PSRP) is scheduled to be completed in fiscal year 1986. The primary objective of the recovery process is to provide secure habitat for bald eagles within the recovery area and to increase population levels in specific geographic areas to the extent that the species can be delisted. Implementation of the proposed Plan as it relates to bald eagles will insure adequate consideration to the species through implementation of the management guidelines described in "A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem" and the "Montana Bald Eagle Management Guidelines". These plans are designed to implement the PSRP on a local level.

The bald eagle population goal for Montana is 99 breeding pairs. This population goal is the Pacific States Recovery Team's recommendation for delisting the bald eagle in Montana. The habitat goal is the number of bald eagle territories needed, based on a 71% occupancy rate, to achieve the population objective. Montana's habitat goal is 140 nesting territories. It is important to recognize that in order to achieve the management goal it is necessary to meet both the population and habitat objectives of the Pacific States Bald Eagle Recovery Plan. The Gallatin National Forest has developed nest site management plans for all occupied bald eagle nest territories. These plans are currently being updated and will be reviewed by the Greater Yellowstone Bald Eagle Working Group and the U.S. Fish and Wildlife Service. In the biological evaluation, the Forest recommended the following additions to the Forest Plan regarding bald eagles:

Page III-17, add "Bald Eagle" as resource element with following standards: "Inventory, maintain and enhance (i.e. fish and waterfowl habitat) integrity of immature bald eagle gathering areas and existing/potential nesting and feeding territories for mature bald eagles in the Quake/Hebgen Lake Complex."

Page III-23, MA-7, under the resource element for Wildlife and Fish, add the following standard: "Manage and enhance, if necessary, traditional bald eagle feeding areas, such as, ice-free bodies of water where waterfowl congregate and cold water fish are prevalent, for the bald eagle's continued use."

Inclusion of the above recommendations, commitments to comply with the bald eagle management plans and employment of habitat enhancement techniques to occupied and potential habitat will provide the necessary recognition to contribute to recovery of the bald eagle at a beneficial level.

Peregrine Falcon

The primary objective of the American Peregrine Falcon Recovery Plan for the Rocky Mountain Southwest population is to increase populations to a minimum of 183 breeding pairs sustaining a long-term average production of 1.25 young per annum by 1995. Montana's contribution to the recovery goal is the reestablishment of 20 active pairs. Although not specifically mentioned in the Plan, peregrine falcon re-introduction on the Forest has been underway since 1984. Peregrine falcon re-introduction on the Forest is being carried out in cooperation with the U.S. Fish and Wildlife Service, the Montana Department of Fish, Wildlife and Parks and the Peregrine Fund, Inc. Management areas that included historical and suitable nesting habitat for the peregrine are MA-5, 6, 12, 14 and 19. Suitable nesting territories in these MA's will be managed for security and welfare of the re-introduced peregrine. The Forest has made a commitment to inventory to identify, maintain and protect existing and potential peregrine habitat for population continuance and expansion while emphasizing re-introduction on the Forest lands. The Forest Plan and current activities will provide the necessary recognition to contribute to the recovery of the peregrine falcon at a beneficial level.

Conservation Recommendations

Section 7(2)(1) of the ESA provides two mandates for Federal agencies which should be viewed with equal importance: (1) to insure that none of their activities jeopardize the existence of listed species or destroy or modify critical habitat; and (2) to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of listed species. Both the Gallatin Forest Plan and DEIS reiterate as a matter of policy and direction that no action will be taken that will adversely affect a T/E species. We believe the following conservation recommendations should be considered for inclusion into the Plan. These recommendations, if included in the Plan, would assist in the conservation of listed species.

1. The Gallatin National Forest falls within the Yellowstone Recovery Area for the Northern Rocky Mountain wolf. Although the probability of natural reestablishment of wolves in the Yellowstone Ecosystem is remote, the chance does exist. The Gallatin National Forest should monitor and document any wolf activity and take those steps necessary to prevent human-caused mortality.

   The primary objectives of the Northern Rocky Mountain Wolf Recovery Plan (revised Agency Review Draft) is to remove the wolf from the T/E species list by securing and maintaining at least 30 breeding pairs dispersed over three (3) recovery areas with a minimum of 10 breeding pairs maintained in each of the three recovery areas for a minimum of three (3) successive years. Translocation of wolves into the Yellowstone area appears to be the only viable method of establishing and recovering a population at this time. We believe the Gallatin National Forest should take a more aggressive role in support of wolf recovery in the Yellowstone ecosystem and in assuring adequate potential habitat and prey exists, should wolves become reestablished.

2. On a biomass basis, ungulates comprise the bulk (more than 90 percent) of wolves' diets during summer and fall in the Rocky Mountains; during winter, wolves prey almost exclusively upon deer, elk and moose. Grizzly bears also utilize large ungulates during the spring and fall months and are an important food item in the Yellowstone Ecosystem. Seasonal habitat for bald eagles is an important element in the maintenance and recovery of the species. The objective of managing these habitats is to maintain optimal conditions to maintain numbers of bald eagles over winter. Physical condition of bald eagles during winter and spring may directly affect reproductive success. Ungulate carrion is also an important food item for bald eagles in the Yellowstone area, particularly during harsh winters when rivers are ice covered.

   The preferred alternative projects a slight increase in elk numbers. The management of other ungulates (i.e., moose) was lightly addressed. We believe that in light of the importance of ungulates to listed species that more emphasis be placed in managing this resource. The Forest should consider implementing appropriate Cooperative Elk Management Guidelines into the plan, and specifically into the Management Area prescriptions. Many of the management recommendations in elk management guidelines are complimentary to the management of the listed species that occur on the Forest.

3. Emphasis should be placed on land acquisition, conservation easements, land exchanges, etc., for important grizzly bear, bald eagle, peregrine falcon, Northern Rocky Mountain wolf and ungulate habitats. .

This completes the FWS biological opinion on the proposed Gallatin National Forest Plan. If the proposed 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 Endangered Species Act is appreciated.

Sincerely,

Wayne G. Brewster

Wayne G. Brewster
Field Supervisor
Endangered Species

cc: Director, FWS, Washington, DC (OES)
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Tribe	Fleisher
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McMenus	
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Timko	F[illegible]
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CHAPTER VII: GLOSSARY

A

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 such as 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.
AMENTITY 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.
AVAILABLE FOREST LAND	Land that has not been legislatively or administratively withdrawn from timber production by the Secretary of Agriculture or Forest Service Chief.
AUM	See Animal Unit Month.
AVERAGE ANNUAL CUT	The volume of timber harvested in a decade, divided by 10.

B

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 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, 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 (BMPs)	The set of practices in the Forest Plan which, when applied during implementation of a project, ensures that water related benefical 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.

C

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 and or water to produce resources, supply goods and services, and allow resource uses under a specified 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 synonomous 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.
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.
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.
COMMERICAL 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; 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 years after final 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.
CONCERN	See Management Concern.
CONDITION CLASS	A descriptive category of the existing tree vegetation as it relates to size, stocking and age.

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.
CONTINENTAL DIVIDE	The drainage divide between waters flowing to the Atlantic Ocean and the Pacific Ocean.
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 (UTILITY CORRIDOR)	A linear strip of land which has ecological, technical, economic, social, or similar advantages over other areas for the present or future location of transportation or utility routes.
COST	The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical or environmental in nature.
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 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 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.
CUTTING CYCLE	For a crop or stand, the planned interval of time between the beginning of one cutting period and the beginning of the suceeding cutting period.

D

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 discernably different in important respects if market or non-market outputs from the National Forests were cut off.

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.
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 berry picking.
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.

E

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, particularily 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 cumlative.
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 HIDING COVER	Vegetation, primarily trees, capable of hiding 90 percent of an elk seen from a distance of 200 feet or less.
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 end of the planning horizon will equal or exceed the volume that would occur in a managed Forest.
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 an 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 earthy 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 ages between trees forming the main canopy level of the stand does not usually 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. Cutting methods include clearcutting, shelterwood cutting, and seed tree cutting.
EXTRACTIVE USE	Use of natural resources that removes them from their natural setting.

F

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.
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 constructed 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.
FUEL BREAK	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.
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.

G

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. 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 by forest and rangeland renewable 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.

H

HABITAT EFFECTIVENESS	The measure of how open roads prevent full utilization of habitat by elk. As road densities increase, habitat effectiveness declines.
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.

I

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 strategy 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.

K

"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.

L

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.
LOCAL DEPENDENT INDUSTRIES	Local industries relying on National Forest outputs for economic activity.
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 intensity of management consistent with multiple use objectives
LVL	Level

M

M	Thousand
MM	Million
MAUM	Thousand Animal Unit Months.
MBF	Thousand Board Feet
MMBF	Million Board feet
MMCF	Million Cubic feet
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 intensities 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 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.
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.

N

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)	An act which encourages productive and enjoyable harmony between man and his environment; promotes efforts to 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 MANAGEMENT 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.
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.
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.
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.
NON-INTERCHANGEABLE COMPONENT	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.
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.
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.

O

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 TIMBER	See Overmature Timber.
OPPORTUNITY	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.

P

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 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 OUTPUTS	Resource outputs that have market or assigned dollar values.
PRIMITIVE RECREATION SETTING	A classification of the recreation opportunity spectrum 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.
PRIMITIVE SETTING	A large area (generally at least 5,000 acres) at least three miles from all roads, railroads or trails with motorized use. The area is essentially a natural environment unmodified by man.
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.
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 identified through public participation relating to management of National Forest System lands.

R

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 seeded to native or adapted introduced 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	A monetary value that compensates for inflation.
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.
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) — Provides a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into six classes:

Urban
Rural
Roaded Natural Appearing and Roaded Modified
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Primitive

URBAN

Urban ROS class settings are characterized by high levels of human activity and by concentrated development, including developments for recreation opportunities. In urban settings, levels of recreation use vary and can be extremely high or dense. There are a preponderance of signs and other indications of regulations on the users' behavior. The landscape is dominated by human structures, and green-space is only sporadically dominant.

RURAL

In the Rural class settings, the sights and sounds of human activity are readily evident, though less pronounced and less concentrated than in the Urban class. Levels of use vary, but do not reach those concentrations of the Urban class except at specialized and developed sites. While the characteristic landscape is often dominated by human-caused geometric patterns, there is also a dominant sense of open, green-space.

The principles adopted by the ROS system to assess the visual attractiveness of the Urban and Rural settings dictate the human-caused visual patterns will dominate the landscape in these two settings. However, this should not be interpreted to mean that these areas are visually unattractive. On the contrary, there are many examples of beautiful cities, quaint villages, and the pastoral beauty of farm and ranch lands.

ROADED NATURAL APPEARING

The Roaded Natural class is characterized by predominately natural-appearing settings, with moderate sights and sounds of human activities and structures. The overall perception is

one of naturalness. Evidence of human activity varies from area to area and includes improved highways, railroads, developed campgrounds, small resorts and ski areas, livestock grazing, timber harvesting operations, watershed restoration activities, and water diversion structures. Roads and motorized equipment and vehicles are common in this setting. Density of use is moderate except at specific developed sites, and regulations on user behaviors are generally less evident than in the Urban or Rural classes.

ROADED MODIFIED

A distinct subclass of setting features exists within the Roaded Natural class. This subclass occurs where human modification is locally dominant or codominant with a natural-appearing landscape, much like the rural setting. However, the recreation opportunities provided are significantly different from the Rural setting. For example, although numerous, highly improved roads might exist in this subclass, there is a sense of remoteness because of the distances from major travelways. In addition, the density of recreation use is often low compared to the Rural class. Also, users have the opportunity for exploration and to use both on-road recreation vehicles and ORVs. Camping is not confined to developed campsites, so users have considerable autonomy in choosing sites and using equipment.

SEMI-PRIMITIVE

Both the Semi-Primitive Motorized and Semi-Primitive Non-Motorized classes are characterized by predominately natural or natural-appearing landscapes. The size of these areas gives a strong feeling of remoteness from the more heavily used and developed areas. Within these settings, there are ample opportunities to practice wildland skills and to achieve feelings of self-reliance.

The most significant difference between the semi-primitive motorized and non-motorized settings is the presence or absence of motorized vehicles.

In the non-motorized settings, the presence of roads is tolerated, provided they are closed to public use, they are used infrequently for resource protection and management, and the road standards and locations are visually appropriate for the physical setting. In many cases, old roads are acceptable as non-motorized travelways so long as they do not reflect miss-use or poor stewardship of the land. These roads would have motorized use in the semi-primitive motorized class, especially by ORVs.

PRIMITIVE

The Primitive settings are characterized by essentially unmodified natural environments and their size and

configuration assure remoteness from the sights and sounds of human activity. The use of motorized vehicles and equipment is not permitted except in extreme emergencies, such as preserving a life or the resource.

In the Primitive class, the user is forced to be self-reliant and expects low levels of user density.

In the semi-primitive and primitive settings, the use of the visual management system plays a critical role in assessing and maintaining conditions which support the naturalness of the area. For example, it may not be enough to forbid

motorized use in the non-motorized ROS classes. The character of any roads or other structures, such as buildings, bridges, or fences,must also be in harmony with the natural landscape.

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 semi-primitive 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, picniking, 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 Resouces 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 Sevice 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 aquatic 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.
RESPONSIBLE LINE OFFICER	The Forest Service employee who has the authority to select and/or carry out a specific planning action.
RETENTION (VQO)	See Visual Quality Objectives (VQO).
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.

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.

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 APPEARING 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.
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
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.

S

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 the 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 specifications 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 requlations, 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. Seimic 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. <u>Portable</u> - 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.

SEMI-PRIMITIVE 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.
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.
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. It includes all cultural management practices performed during the life of the stand such as regeneration cutting, fertilization thinning, improvement cutting, and use of genetically improved tree seeds and seedlings to achieve multiple resource benefits. 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 they produce.
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.
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 optimum 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 perennial streams.) a. First-order streams are unbranched streams, that is they have no tributaries. b. 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.

c. 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.

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.

SUSTAINED-YIELD OF PRODUCTS AND SERVICES — The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land.

SYSTEM ROADS	See Forest System Road.

T

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..
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.
THREATENED AND 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 rotational crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For purposes of Forest planning, timber production does not include production of fuelwood or harvest from unsuitable lands.
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.

U

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 TIMBER LAND	Lands not selected for timber production in the suitability 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.

V

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 input 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 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: Only ecological changes are allowed to alter the natural landscape.

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 natural 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.

W

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 STUDY — An analysis to determine an area's appropriateness, cost, and benefits for addition to the National Wilderness Preservation System.

WINTER RANGE — The area available to and used by big game during the winter season. Must contain forage or browse to feed the big game. Winter range areas tend to have a low amount of snow cover to enable the animals to reach the forage.

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.

Y

YARDING — The operation of hauling timber from the stump to a collecting point.

Z

ZONE OF INFLUENCE — A delineated geographic area within which the present and proposed actions exert an important influence on residents and visitors.

CHAPTER VIII: REFERENCES

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APPENDIX A: IDENTIFICATION OF ISSUES, CONCERNS AND OPPORTUNITIES

A. Process

The Notice of Intent to prepare a Forest Plan and Environmental Statement was published in the Federal Register in October 1980.

A preliminary scoping of issues, concerns, and opportunities (ICO's) was completed by August 1980. Past planning actions and public involvement activities, along with current management concerns, led to the original listing of tentative issues.

A letter was mailed December 1980 to persons who previously indicated an interest in the Forest Plan. Included were times and dates for public workshops to be held as part of the ICO identification process.

In November 1980 an information brochure containing a review of Forest Planning to date and a list of tentative ICO's was sent to 1800 addresses. These brochures were sent to adjacent and intermingled landowners, livestock permittees, trade groups, sportsman's groups, and others who had expressed an interest in Forest Planning. A separate letter was enclosed with the brochures sent to adjacent and intermingled landowners highlighting issues related to landowner cooperation. The brochures contained a response form and 335 of these forms were received back from the mailing.

A news release announcing Forest Plan workshops was distributed to local media. Workshops were held in Bozeman, West Yellowstone, Livingston, Big Timber, and Gardiner, Montana, in December 1980. Planning team members and District staff conducted the workshops using the nominal group process. A total of 263 persons attended. Similar workshops were held at the Supervisor's and District Offices in which 86 Forest Service employees participated. More than 500 issues and management concerns were identified and ranked at these workshops.

The following affiliations were identified from the 598 total written responses (public meetings plus mailer response forms): 71 individuals owning land adjacent to or within the Forest boundary, 61 members of wilderness groups, 68 members of conservation groups, 83 snowmobilers or ORV riders, 42 members of hunting/fishing groups, 106 members of industry or industry-related groups, 61 members of wildlife groups, and several public agencies. The remainder listed no affiliation. Geographic distribution was as follows: Bozeman, 45%; Livingston, Big Timber, Gardiner, West Yellowstone, and other Montana communities, 25%; out-of-state, 10%; and unidentified, 20%.

A cross-section group of people representing a broad range of interests --including Montana Department of Fish, Wildlife and Parks; County planning; timber industry; wilderness advocates; outfitters and guides; snowmobilers; trail bikers; wildlife groups; watershed protection advocates; fishermen; stockgrowers; woolgrowers; and minerals and petroleum industry representatives-- was organized during the early part of this planning process to provide advice

and to act as a sounding board throughout the process. This group of interested leaders met with the Forest Supervisor and members of the planning team several times in workshop efforts to provide assistance in the major planning steps. Refer to Section B, Part 2, for a list of the group's membership.

In addition, a letter containing background information on Forest Planning and tentative issues was sent to the Montana state clearinghouse on May 4, 1981, and to the County Commissioners of the following counties: Park, Madison, Meagher, Sweetgrass, and Carbon. Letters of inquiry and telephone contacts were used to determine the existence of any Native American religious or cultural sites on the Gallatin Forest.

About 500 items identified at workshops and from the response form were initially grouped by MIH (Management Information Handbook) codes. This list was reviewed by the interdisciplinary team to sort the issues into three categories: (1) those ICO's which could be addressed by the Forest Plan; (2) those ICO's which could or have been resolved by laws, regulations, or current policy; and (3) those capable of being resolved at the Forest level.

ICO's of similar nature which could be addressed in the Forest Plan were summarized by issue statements. These statements were reviewed by the team. The statements were then divided among team members and each wrote a summary of public comment to fit each statement. The entire team then reviewed the summaries and statements. A cover letter was written and the issues and summaries mailed to workshop participants and those responding prior to January 15, 1981.

The ID team and Management Team cooperated to formulate problem statements that incorporated the issues, management concerns, and management opportunities.

The interdisciplinary and management teams determined major issues to be addressed in the Plan in the design of alternatives and in the FORPLAN model. The following criteria were used to screen the ICO's: ranking of ICO's at workshops, past history of the ICO, perceived intensity of conflict surrounding the ICO, and expected duration of the ICO. The Regional Forester approved 13 major issues: recreation, wilderness management, MWSA Wilderness Study Areas, fish and wildlife, threatened/endangered species, livestock grazing timber harvest, water and soils, minerals, landownership, access to the Forest, and fire as a management tool. A fourteenth issue was added in 1983 to address the roadless re-evaluation question (see next paragraph).

Additional public involvement was initiated in September 1983 to aid in resolution of the roadless (undeveloped) area management issue. Prior to this, Forest planning had examined a broad range of uses for roadless areas but had not included an evaluation for wilderness designation except for the Hyalite-Porcupine-Buffalo Horn Montana Wilderness Study Act area. Approximately 2,400 letters were mailed to people who had expressed interest in the Forest planning process. Along with the letter which expressed our desire to obtain comments and concerns on all of the roadless areas on the Gallatin, maps of the areas were included which identified the areas and their acreages. The guidelines or criteria used to define the area were also provided.

About 150 responses were received. This input was utilized to formulate alternatives. The letters received and a summary of the issues and concerns is available in the Planning Records.

B. Consultation with Others

1. Agencies and Indian Tribes

a. Contacts

The agencies that follow are on the Forest Plan mailing list. They received Forest Plan Notes which provide information on status of the plan, comments requested and public meeting dates. The Indian tribes mentioned were contacted by mail and/or telephone to determine the presence of any sites of religious or cultural importance to them on the Forest.

Bozeman City Council
Bozeman City County Planning
City County Planning (South Park County)
Environmental Protection Agency, Region 8
Gallatin County Commissioners
Indian Tribes--Representatives of:
- Confederated Salish and Kootenai (Pablo, MT)
- Blackfeet Tribal Council (Browning, MT)
- Crow Tribal Council (Crow Agency, MT)
- Ft. Belknap Community Council (Harlem, MT)
- Chippewa-Cree Business Committee (Box Elder, MT)
- Northern Cheyenne Tribal Council (Lame Deer, MT)
- Ft. Peck Agency (Poplar, MT)
- Crow Educational Committee (Crow Agency, MT)

Livingston City-County Planning Board
Madison County Commissioners
Meagher County Commissioners
Montana Bureau of Mines and Geology
Montana Department of Intergovernmental Agencies
Montana Department of Intergovernmental Relations - Montana State Clearinghouse
Montana Department of Natural Resources and Environmental Sciences
Montana Department of Natural Resources and Conservation
Montana Department of State Lands
Montana Energy Office
Montana Farm Bureau Federation
Montana State Fish, Wildlife, and Parks Department
Park County Commissioners
Rural Areas Development Committee
Rural Electrification Administration
Sweetgrass County Commissioners
Sweetgrass County Planning Board
USDA Soil Conservation Service
USDI Bureau of Land Management
USDI Fish Cultural Development Center
USDI Fish and Wildlife Service
USDI Missouri Basin Region
USDI Yellowstone National Park

b. Review of Plans

Montana Department of Fish, Wildlife, and Parks. 1978 Montana State-wide Comprehensive Outdoor Recreation Plan:

Sets harvest goals for elk, mule deer, bighorn sheep, moose, and mountain goat. Outlines strategies for managing habitat for these species, including:

--Road closure, walk-in hunting areas.
--Use of cooperative elk-logging study recommendations when planning timber sales.
--Construction of minimum number of roads.

U.S. Department of Interior, Fish and Wildlife Service, 1982, Grizzly Bear Recovery Plan.

Presents a comprehensive recovery plan for grizzly bears in the "conterminous United States." The plan includes as one section the recovery plan for the Yellowstone ecosystem. Serves to coordinate measures for bear recovery among all the land management agencies who administer the ecosystem.

Bridger-Teton, Shoshone, Custer, Gallatin, Targhee National Forests, Grand Teton and Yellowstone National Parks. 1979. Guidelines for Management Involving Grizzly Bears in the Greater Yellowstone Area.

Presents five different grizzly management situations for the greater Yellowstone area. Describes criteria for identifying these management situations and guidelines for implementing management practices designed to facilitate grizzly bear recovery.

U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, Bureau of Land Management. 1980. Island Park Geothermal Area: Idaho, Montana, Wyoming: Final EIS.

Describes alternatives for leasing 488,031 acres of Federal lands in three states for geothermal energy. Part of this acreage occurs on the Hebgen Ranger District of the Gallatin National Forest.

U.S. Department of Energy, 1977. Bonneville Power Administration, Pacific Northwest Long-Range, East-West Energy Corridor Study, Phase I.

The study identifies the following potential corridors that occur on the Gallatin National Forest:

--Corridor R-23: Crosses the northernmost Bridger Mountains via Sixteen-Mile Creek.

--Corridor R-24: Crosses the Crazy Mountains from the Shields River drainage on the west to the Middle Fork of the Sweetwater on the east.
--Corridor R-30: Crosses the Madison Range from Jack Creek on the west to Big Sky on the east.
--Corridor R-31: Crosses the Gallatin Range from Buffalo Horn Creek on the west to Tom Miner Creek on the east.
--Corridor R-32: Crosses the Madison Range from Indian Creek on the west to just north of Taylor Fork on the east.
--Corridor R-33: Roughly follows the course of the Beartooth Highway from Gardiner on the west to Cooke City on the east.

The corridors identified in this study reflect general capability for linear facility siting and are not planning units. Site-specific studies would be conducted before determining any facility location.

U.S. Department of Agriculture, Forest Service. 1981. The Continental Divide National Scenic Trail: Comprehensive Plan.

Describes the portion of the Continental Divide Trail along the southern boundary of the Gallatin National Forest where the Gallatin adjoins the Targhee National Forest.

2. Other Consultations

Group: Local Timber Industry--Inland Forest Resource Council, Plum Creek, Inc., Burkland Studs, Idaho Pole, Brand S, and others.

Contact: Discussions about timber inventory and yield tables; costs of timber management activities; suitability of lands for timber production; concerns about programmed sell reduction and consequences for local mills; discussion of concerns about restrictive constraints on timber production; effect of further wilderness designation on Forest timber base; discussion of the alternatives and their effect on the timber industry.

Group: Western Environmental Trade Association (WETA)

Contact: Discussions of Forest planning process,including issues and concerns, and need to include minerals, oil, and gas as an issue. Presented and discussed the rating system used for evaluating mineral and oil/gas potential on the Forest and the guidelines for exploration and development of minerals or energy resources in the Forest Plan.

Group: Burlington Northern Timberlands, Inc.

Contact: Team discussed landownership considerations and cooperative management of adjacent or intermingled lands.

Group: Wilderness Advocacy Groups-- Montana Wilderness Association, Madison-Gallatin Alliance, and Others.

Contact: Forest Planner and Planning Team Leader met with Bill Cunningham, Rick Meis, Dr. Tenney, and others to discuss "Alternative W" as proposed by the Montana Wilderness Association. (This suggested alternative is similar to the wilderness recommendations in Alternative 5.)

Group: Environmental Quality Groups--Greater Yellowstone Coalition, Audubon Society, Trout Unlimited, Gallatin Wildlife Association, Bozeman Environmental Information Center, and Others.

Contact: Forest Planner and individual Planning Team members met with leaders of groups on several occasions to discuss their concerns and issues and to assist in alternatives development.

Group: Cross-Sectional Group--This group brought together leaders and concerned individuals from the local area to provide advice and to act as a sounding board throughout the forest planning process.

Contact: Members of the ID and management teams met with the cross-sectional group five times between January of 1982 and June of 1984 to present and discuss the forest planning documents as they were developed.

Group: Grizzly Bear Recovery Team

Contact: Met with the Recovery Team to discuss identification of Management Areas for grizzly on the Gallatin National Forest. Also discussed management practices to facilitate grizzly bear recovery.

Group: Montana Department of Fish, Wildlife, and Parks

Contact: Met with representatives of this department several times. Discussed elk numbers, big game management, big game habitat, and winter range on the Gallatin. Also discussed fisheries on the Forest and in blue ribbon streams with headwaters and tributaries on the Forest.

Group: State of Montana Planning Task Force--Governor's Office and representatives from the following Departments: Agriculture; State Lands; Natural Resources and Conservation; Fish, Wildlife, and Parks; Health; Commerce; and Livestock.

Contact: Attended meetings with the Governor's Taskforce. Presented and discussed the planning alternatives with members of the taskforce.

Group: Yellowstone National Park-- Park Superintendent and Staff.

Contact: Discussed management issues shared by the Gallatin National Forest and Yellowstone Park related to the Forest Planning effort. Issues included grizzly

bear management, elk herds that migrate from the Park to the Gallatin Forest in winter, and development along the Park borders.

Group: Motorized Recreation Advocacy Groups-- Montana Snowmobile Assn., Bitterroot-Grizzly Motorcycle Alliance, American Motorcycle Assn., and Others.

Contact: Spokespersons were included in the cross-sectional citizen's group that met periodically with the Forest Supervisor and Staff. Concerns of this group included nonwilderness uses of nonroaded lands, road closures, and management of motorized use on Forest lands.

Group: Indian Tribes--Salish Cultural Committee, Arlee, MT; Blackfeet Tribal Business Council, Browning, MT.

Contact: An initial mailing to 8 indian tribes in Montana and Wyoming led to pursuit of additional information from the Salish and Blackfeet. John Peregoy, a Gallatin National Forest employee, visited the Salish Reservation and spoke with tribal elders. He also placed several phone calls to individuals on the Blackfeet Reservation. (These contacts are documented in Planning Records, Core File #18.)

C. Major Issues, Concerns, and Opportunities

Following is a discussion of the major issues, concerns, and opportunities (ICO's) that are the focus of the Gallatin Forest Plan and DEIS. A detailed discussion of the present situation for each of these is given in Chapter 3. More discussion of how the ICO's are differently treated in each alternative is provided in Chapter 2, Chapter 4, and Appendix B.

Each of the 14 major ICO's to be addressed in the Forest Plan and DEIS will be discussed in three parts: 1) public perceptions of the ICO, 2) possible resource interrelationships between ICO's, and 3) how the ICO will be resolved (via policy statement or through the alternatives). Of these 14 ICO's, some are treated primarily by proposed land uses that vary by alternative and the remaining are resolved by a policy statement that does not vary by alternative, or by a combination of alternative prescriptions and policy statements.

The following discussion is based on an analysis of the Forest's public involvement, including all responses from the public workshops, from the mailings, and from the Forest Service employee meetings (Documentation of Public Issue Analysis, Planning Records).

1. HOW WILL THE GALLATIN FOREST PROVIDE A BROAD SPECTRUM OF RECREATION OPPORTUNITIES TO MEET IDENTIFIED DEMANDS?

a. Public Participation

The issue centers on a need to provide a balance of recreation opportunities to satisfy different kinds of users. The public stated a desire for continued or enhanced availability of various kinds of recreational opportunities, including primitive dispersed, roaded and off-road, motorized and nonmotorized, winter

activities, and activities at developed sites (campgrounds, for example). Hunting and fishing opportunities were important to many persons.

b. Resource Relationships

The ability of the Forest to provide dispersed recreation is related to a number of other issues including timber harvest levels, road management, and the roadless/wilderness issue. The non-motorized and motorized components of dispersed recreation are somewhat competitive.

c. Procedure to Resolve

For dispersed recreation, this issue is addressed primarily different by land use alternatives using several dispersed recreation prescriptions. Additionally, varied amounts of roading in different alternatives provide different mixes of dispersed recreation types. Additional direction on this issue is provided in Forest-wide standards and guidelines (Part II, Forest Plan). Appendix A in the Forest Plan is an analysis of dispersed recreation carrying capacity that applies to both wilderness and nonwilderness lands on the Forest.

Prescriptions for developed recreation do not vary across the range of alternatives. As a policy, expressed in Chapter 3, most developed recreation development will take place using private capital--as, for example, in expanding ski areas on the Forest. A limited expansion of developed sites such as campgrounds will take place where there is a need that private development cannot fill.

2. HOW SHOULD THE HYALITE-PORCUPINE-BUFFALO HORN WILDERNESS STUDY AREA BE MANAGED?

a. Public Participation

Comments on wilderness or nonwilderness recommendations for the area were divided. Some persons wanted all or parts of the area to become wilderness. Others wanted the area to remain roadless, but not become wilderness. Some thought the area should be a recreation area with fewer restrictions than designated wilderness, but with no roads or resource development. Others expressed a desire to harvest its timber resources or to allow for minerals activity. Public perceptions also varied somewhat as to key values of different portions of this large area. The Hyalite area has especially high value to many people for recreation, whereas some other parts of the area--Porcupine, for example--are more associated with elk winter range, livestock grazing, or other values.

b. Resource Relationships

Other resource values that must be considered in managing this area include timberlands at the lower elevations, watersheds and lake fisheries, livestock grazing south of Windy Pass, and portions of the Gallatin Petrified Forest along the border with Yellowstone Park. Wildlife is another important resource of the area--especially in the southern portion. About 26,000 acres of grizzly bear Management Situation 1 habitat occur near the boundary with Yellowstone

Park. The Porcupine and Buffalo Horn drainages provide winter range for resident elk and some migratory elk out of the Park.

c. **Procedure to Resolve**

Different amounts of wilderness for the study area were analyzed in the various alternatives, including no wilderness and 100-percent wilderness. The proposed action--Alt. 7--includes no wilderness within the area, but planned management includes the Hyalite Peaks Scenic and Recreational Area, the Porcupine Wildlife Management Area, and a proposed National Recreation Trail along the Gallatin Divide.

3. **HOW SHOULD UNDEVELOPED (ROADLESS) AREAS BE MANAGED?**

a. **Public Perception**

Public comment on the roadless areas tended to reflect three general viewpoints: (1) Designate all or some of the areas as wilderness; (2) develop and road the areas with no special consideration for their roadless status; and (3) manage parts or all of the areas as nonwilderness, but under some special classification such as backcountry, special recreation areas (no roads), or wildlife/recreation areas. Most persons felt that each of the different roadless areas had to be judged on individual merits. Some persons who want no additional wilderness were concerned about losing opportunities for motorized recreational activities if lands are designated wilderness. Parts of the Gallatin range, the Lionhead area, and the Crazy Mountains drew the most interest as possible areas for additional wilderness.

b. **Resource Relationships**

Tradeoffs with other resources must be considered in any decision to either recommend unroaded lands for wilderness or withhold them from roading and development. The 330,608 acres of lands in the Forest's unroaded inventory excluding designated wilderness and the HPBH area (ICO #2, above) contain 130,422 acres of lands capable of sustaining commercial timber production. This timber would be unavailable without roading. Moreover, lands presently unroaded that become wilderness are closed to mineral entry. Hardrock or oil/gas exploration cannot take place, claims cannot be filed, and oil/gas leases are not issued. If unroaded lands do not become wilderness, but remain unroaded through some special management designation, costs and difficulties of minerals activities increase.

Some resources would benefit from roadless status, including water quality, fisheries, and grizzly bear.

c. **Procedure to Resolve**

The amount of the Gallatin Forest's 360,608 roadless acres (excepting MWSA) that are modeled as wilderness varies by alternative--from 0 percent to 100 percent. Resolution of this issue is addressed in detail in Appendix C and Chapter 2 of this EIS.

4. WHAT WILL BE THE MANAGEMENT DIRECTION FOR THE ABSAROKA-BEARTOOTH AND LEE METCALF WILDERNESSES?

a. Public Perception

Many of the comments on wilderness management indicated a desire for management flexibility to the extent allowed under the Wilderness Act. For example, one person wanted "a flexible, common sense management policy" and another objected to "people control"--that is, permit systems or codes of restrictive rules.

Many persons emphasized protection and preservation of the existing wilderness. This could conflict with the preference of some persons for user freedom, since rules or controls could be necessary to prevent damage to the wilderness through overuse or high-impact user practices.

A management concern emerged that there is a need to regulate professional guides and outfitters in existing wilderness. Some persons advocated wildlife habitat improvement in existing wilderness, such as by prescribed fire. Some suggestions of individuals would be illegal to implement, such as desires for chainsaw use or limited motorized use in present wildernesses.

b. Resource Relationships

Management of existing wildernesses would involve the Forest's recreation and livestock grazing programs. Grazing presently exists in both the Lee Metcalf and Absaroka-Beartooth Wildernesses. Facilities--trail construction and maintenance, end of road facilities--would be part of a wilderness management program. The Forest's landownership program could be involved where additional access to the wilderness boundary proved necessary or owners of included lands needed to access their property. (Private lands presently exist within the A-B Wilderness.) Fire management--including the use of prescribed fire (unplanned ignition) for wildlife habitat improvement--is another part of wilderness management (see ICO #14, below).

c. Procedure to Resolve

The existing wildernesses on the Gallatin Forest are not treated differently in the Forest's range of alternatives. Management of the Absaroka-Beartooth Wilderness is developed in a set of management standards and guidelines (Forest Plan, Appendix F). These standards and guidelines were part of an A-B Wilderness Management Plan that was incorporated into the Forest Planning documentation. An analysis and policy statement on recreation carrying capacity that applies to both wilderness and nonwilderness lands appears as Appendix A in the Forest Plan. Standards and guidelines for the newly-created Lee Metcalf Wilderness are presently under development.

4A. HOW SHOULD THE CABIN CREEK RECREATION AND WILDLIFE AREA BE MANAGED?

a. Public Perception

This issue was added with the creation of this special management area by Congress in the Lee Metcalf Wilderness and Management Act of 1983. Issues for the Cabin Creek area emerged at the time Congress conducted public input and fact finding for this legislation. Included among the key issues were concerns

of livestock operators regarding motorized use regulations; management policies that would be appropriate to the area; extent and dates of snowmobile use of the Big Sky Snowmobile Trail and related play areas; and concerns of outfitters/guides regarding regulations that would apply to them. Management policies regarding wildlife management and habitat improvement were also significant facets of this ICO.

b. **Resource Relationships**

Issues are meaningful because the Forest's management is given latitude to set management policy in the area within certain limits. Administrative and commercially related use of motorized vehicles may be allowed at the discretion of the Secretary of Agriculture. Dates and rules for winter snowmobile use as allowed under the act need to be established. A program for wildlife habitat improvement needs to be developed. The Forest has some discretion under the Act to regulate outfitter/guide activities in the area. All these points have involved some controversy.

c. **Procedure to Resolve**

This newly created management area was not treated differently across the range of alternatives.

Management policy is presently being developed for this newly created management area.

5. **HOW WILL FISH AND WILDLIFE HABITATS BE MANAGED TO MAINTAIN VIABLE POPULATIONS OF INDICATOR SPECIES TO MEET FISH AND WILDLIFE OBJECTIVES ESTABLISHED IN COOPERATION WITH THE MONTANA DEPARTMENT OF FISH, WILDLIFE, AND PARKS?**

a. **Public Perception**

Many persons felt that the Forest needs to develop a big game management plan which would identify such things as carrying capacity, necessary summer and winter range, habitat improvement measures, and measures necessary to reduce livestock and elk competition. Some persons linked wildlife management with the need for quality hunting and some did not. Some people took issue with managing for big game only and asked instead for an emphasis on all wildlife and all habitat.

Although the fisheries of the Forest did not elicit wide discussion as an issue, it seems probable that some people who expressed concern about water quality were expressing concern for fisheries.

b. **Resource Relationships**

The big game management facet of this ICO interacts with timber and livestock grazing programs, with road construction and management (e.g., road closures), and is sensitive to management of riparian areas and budgeting for wildlife habitat improvement.

Winter range is the limiting factor for big game populations on the Forest. The degree to which elk must compete with livestock for forage on their winter range will affect the numbers of elk that can overwinter on the Forest. Thus there is an interaction between big game and livestock grazing.

Fisheries populations are impacted by stream sedimentation, and sediment levels can increase in drainages where timber harvest and related roading are taking place. Limiting equivalent clearcut area (ECA) in drainages can affect timber harvest scheduling. Livestock grazing improvements to minimize trampling of stream beds and banks protect fish habitat, reduce sedimentation, and thus benefit fisheries in the streams affected.

Nongame species benefit from habitat diversity on the Forest. Habitat diversity creates more ecological niches and thus permits a greater number of nongame species to make their homes on the Forest. Maintaining habitat diversity means sustaining an adequate amount and distribution of various tree size and age classes on the Forest including "old growth," defined as timber stands greater than 120 years in age. The maintenance of adequate old-growth will not affect scheduling of timber harvest on this Forest.

c. Procedure to Resolve

Differing amounts of Forest lands are given special wildlife emphasis in the different alternatives. Different intensities of livestock grazing on elk winter range occur in different alternatives. This results in different elk overwintering capabilities for the different alternatives. Measures to ensure big game habitat security, such as road closures on summer range, are available where needed under the management standards and guidelines in the Forest Plan. Minimum levels on old-growth acreage in all alternatives, plus forestwide standards and guidelines on snag management and residue management (Forest Plan), are some of the measures to ensure diversity of nongame wildlife species.

6. WHAT WILL BE DONE TO MAINTAIN OR IMPROVE IMPORTANT HABITAT OF THREATENED OR ENDANGERED SPECIES?

a. Public Perception

The chief public concern that emerged regarding threatened or endangered species was to "manage land to preserve grizzly bear and grizzly habitat." Some persons stated that grizzly bear recovery should take precedence over other values or resource activities where there is a conflict. There was no significant public comment on the bald eagle, which has nesting sites on the Forest.

b. Resource Relationships

The Recovery Plan (USDI,1982) for the grizzly bear population in the Greater Yellowstone Ecosystem will require that lands necessary to grizzly bear recovery (so-called Management Situation 1 lands) are managed with the welfare of the grizzly bear the first priority. This means that livestock grazing or timber harvest within grizzly bear Situation 1 areas must be conducted so as not to jeopardize the grizzly. This makes these resource activities more restrictive and costly. Road closures and restrictions on recreational activities may also be necessary at times to minimize man/bear encounters.

c. Procedure to Resolve

All of the alternatives considered provide for grizzly bear recovery, and Management Situation 1 lands are identified the same in all alternatives. Some alternatives will bring about recovery more rapidly than others, due mainly to levels of investment. The alternatives which schedule resource activities in Management Situation 1 areas will incur higher costs due to the measures needed to avoid impacts on the grizzlies. Grizzly bear management is set forth in the forestwide standards and guidelines (Part II, Forest Plan), in standards and guidelines for the 3 special grizzly bear prescriptions (Part III, Forest Plan). Additional Forest grizzly bear policy is summarized in Appendix K of the Forest Plan.

7. WHAT LANDS ARE SUITABLE FOR GRAZING, AND HOW WILL THE RANGE RESOURCE BE MANAGED TO PROVIDE FOR GRAZING?

a. Public Perception

There were two major facets to the grazing ICO. First, there was concern that the Forest Service should continue to emphasize range management and improvement. Secondly, people wanted areas most suitable for livestock grazing managed to maximize forage production.

b. Resource Relationships

Some tradeoff occurs between livestock grazing on elk winter range at certain levels of intensity and the number of elk that can winter on the Forest. Livestock grazing within grizzly bear Situation 1 areas must be managed to avoid conflict with the grizzly. Riparian areas can be impacted by livestock with consequences to nongame wildlife, fisheries, and water quality if management practices are not implemented to prevent this.

c. Procedure to Resolve

Assignments of land for livestock grazing differ in each alternative. The range is from approximately the current level of livestock grazing on the Forest to levels about equal to maximum anticipated demand.

Standards and guidelines to coordinate livestock grazing activities with other resource values are found for all management prescriptions that include grazing activity (Forest Plan).

The interaction of livestock grazing activities with other resource activities is more fully discussed in Chapter 4.

8. WHAT SHOULD BE THE LEVEL OF TIMBER HARVEST THAT CAN BE SCHEDULED ON LANDS AVAILABLE, SUITABLE, AND CAPABLE FOR TIMBER PRODUCTION? WHAT MIX OF PRODUCTS BEST MEETS THIS SCHEDULE? WHAT RANGE OF VEGETATIVE MANAGEMENT (I.E., SILVICULTURAL SYSTEMS) PRACTICES WILL BE USED ON VARIOUS FOREST TYPES?

a. **Public Perception**

The most significant facet of this issue was that the Forest Service should clearly define the timber goals and then provide a sustainable yield of timber. There was also concern with the bug-kill problem. Many people wanted to accelerate the harvest of dead and dying trees and manage to reduce future losses due to insect epidemics.

b. **Resource Relationships**

The acreage on the Forest managed for timber production together with the scheduling of harvest by decade relate directly to miles of road constructed by decade. This affects types of dispersed recreation available, sedimentation of streams, fish populations in streams, availability of big game hiding cover, and amount of roadless lands remaining on the Forest. The amount of old growth timber remaining in the course of the harvest program will affect the variety of nongame wildlife species found on the Forest. Timber harvest can also increase water yield.

Conversely, openings created by timber harvest are of benefit to wildlife--including elk--if certain threshold levels of hiding cover are maintained and if roads are closed after harvest is complete. Harvest in mosaic-type timber stands in winter range areas can increase the Forest's overwintering capacity for elk if the harvest is conducted to achieve this benefit. Timber harvest is a valuable tool for increasing habitat diversity to benefit nongame wildlife species.

c. **Procedure to Resolve**

Analysis of suitable timberland, timber harvest regimes, nondeclining sustained yield, and other timber program parameters change in each of the alternatives.

Interaction of timber harvest with other resource values is addressed in forestwide standards and guidelines (Part II, Forest Plan) as well as in standards and guidelines for all management prescriptions that involve timber harvest (Part III).

The relationships between timber management and other resource values are described more completely in Chapter 4.

9. **WHAT SHOULD BE DONE TO PROTECT WATER QUALITY AND SOIL PRODUCTIVITY?**

a. **Public Perception**

The concern expressed was the need for maintaining good water quality throughout the Forest. Many people felt tht activities which could degrade water quality should be eliminated or closely supervised. There was some concern for careful streamside management.

b. **Resource Relationships**

It should be borne in mind that most of the sedimentation presently occuring in Forest streams is natural, and would occur if man had never come to the area.

The following discussion is limited to man-caused increases over the natural baseline.

Protection of water quality chiefly relates to timber harvest and road construction. Sedimentation and turbidity of streams can also be increased by intensive livestock grazing where trampling of streambeds and banks occurs. Intensive recreational use, such as camping by streams, can increase coliform bacteria counts downstream. Soil productivity can be reduced by erosion related to development, particularly in areas of sensitive soils or on steep slopes.

c. **Procedure to Resolve**

To assure protection of water quality and soils, the Forest Plan requires specific standards be met by management activities. Significant soil and water capabilities and limitations must be identified through a soil and water resource analysis for projects and activities. Water quality on the Forest will be managed in accord with Federal and State standards.

Best management practices (BMP's) will be developed during the environmental analysis process and incorporated into all land use and project plans as a principal mechanism for controlling non-point pollution sources and meeting soil and water quality goals. The desired future conditions of designated watersheds on the Gallatin National Forest will be described and quantified. They will be used to guide project activities in relation to soil and water quality standards and goals (Appendix C, "Water Quality Considerations," Forest Plan). Water standards also play an important part in the monitoring plan (Part IV, Forest Plan).

10. **WHAT SPECIAL ATTENTION WILL BE GIVEN TO THE USE AND MANAGEMENT OF RIPARIAN AREAS?**

a. **Public Perception**

This ICO attained major importance with regard to the number of forest resources it affects. It appeared as a facet in several other ICO's, including ICO's 5,8, and 9.

The chief concern was protection of the riparian areas, both for themselves and for the other resources that depend on them.

b. **Resource Relationships**

Riparian zones--that is to say, streamside vegetation, lakeshore areas, and wetlands--are high-value areas for wildlife, livestock grazing, water production, fisheries, and other Forest resources. At the same time, these areas are fragile and are vulnerable to overuse or damage.

c. **Procedure to Resolve**

The management of riparian areas was not different in different alternatives. However, a separate management area prescription for riparian areas was prepared for the Forest Plan (Part III). This prescription calls for multiple use management while placing priority on riparian-dependent resources: Soil, water, vegetation, fish, and wildlife. Two forestwide standards have also been written

covering riparian areas (Part II). Riparian areas have also been discussed in Appendix C (Forest Plan).

11. WHAT WILL BE THE EFFECTS OF THE MANAGEMENT OF GEOTHERMAL, OIL, GAS, AND MINERALS ON RENEWABLE RESOURCES?

a. Public Perception

The public expressed three views on energy resources and minerals: (1) Allow exploration and development of these resources; (2) Manage the activities to protect the surface resources and minimize the adverse impacts; and (3) Require reclamation of the land.

b. Resource Relationships

Minerals activities have the potential to affect surface resources such as wildlife, recreation, and water quality. Conversely, protection of surface values can require constraints on mineral activities, especially where the following conditions are present: (a) Sensitive soils and unstable slopes; (b) big game winter range; (c) riparian (wetlands) areas; or (d) habitat for threatened or endangered species.

c. Procedure to Resolve

Minerals resource activities were not treated differently across the range of alternatives except for varying the amount of wilderness. At present, no oil/gas or hardrock exploration activities are allowed in wilderness; no oil/gas leases exist in wilderness areas; and minerals activities cannot take place on unpatented claims in wilderness.

Standards and guidelines have been developed and included in the Forest Plan to protect surface resources with the recognition that minerals and petroleum development are a benefit to the Nation. Specific measures to protect surface resources while allowing minerals activities are spelled out in Part II of the Forest Plan, as well as in the standards and guidelines for Management Area No. 24 that appears in Part III.

12. HOW SHOULD NATIONAL FOREST LANDS IN INTERMINGLED OWNERSHIP BE MANAGED? HOW WILL LANDOWNERSHIP PROBLEMS BE RESOLVED TO SUPPORT LAND MANAGEMENT GOALS?

a. Public Perception

A number of people expressed concern about the problems associated with the intermingled landownership pattern on the Gallatin National Forest. The major public comment was the desire to consolidate this "checkerboard ownership" in order to solve some of the problems related to it. The preferred method of consolidation appears to be through exchanging National Forest lands for private lands within the National Forest boundary.

b. Resource Relationships

The presence of intermingled landownership--so-called "checkerboard"--creates management problems such as lack of access to Forest lands, trespass on private

lands, or difficulties for both Forest and private managers in developing resources in checkerboard areas.

c. **Procedure to Resolve**

This ICO was not treated differently across the range of alternatives. Policy formulated by Forest management to address this ICO--consistent with regional and national policy--is as follows:

The intermingled checkerboard ownership pattern will remain generally intact. Exceptions may occur when it is determined a specific ownership change is needed in response to major public issues, management concerns, or resource management goals.

In watersheds with intermingled landowners, efforts will be made to develop mutually agreeable watershed protection plans. Also, the Forest will cooperate with intermingled and adjacent landowners in developing roads or road systems which serve the needs of both parties.

This policy, along with the standards and guidelines to implement it, is presented in Part II of the Forest Plan.

13. **WHERE SHOULD PUBLIC ACCESS TO NATIONAL FOREST LANDS BE ACQUIRED AND WHAT TRANSPORTATION FACILITIES SHOULD BE CONSTRUCTED AND MAINTAINED?**

a. **Public Perception**

Lack of public access to the National Forest was one of the most frequently mentioned ICO's. Large blocks of the Forest cannot be reached by the public because of private lands between the Forest and the existing public road system. The public has expressed a desire for access to these lands while the private landowner is concerned about the effects of public access on him and his property.

The other facet of this ICO centers on the Forest's need for a transportation system adequate to manage and protect the resources of the National Forest. A well-planned transportation system is very important to integrated resource management on the Forest.

b. **Resource Relationships**

Resource values such as timber harvest, mineral activity, and dispersed recreation are dependent upon access. In some instances, access is granted by other landowners for Forest management activities without including right of access for the general public.

The size and cost of the Forest's transportation system relates directly to management needs. The timber program especially affects the transportation system because funds generated from timber sales pay the high costs of roading. Depending on management emphasis of any particular area, roads built for timber use may or may not be left open for other users.

c. Procedure to Resolve

Public access was not addressed in formulation of the alternatives, but zones on the Forest where new access is needed are identified on the Management Area Map (Supplemental Map Package). The Forest presently has an ongoing access program that has resulted in an average of two new public accesses each year for the past 8 years (Access Report, 1977, Gallatin National Forest). This program is being continued.

With regard to the Forest transportation system, miles of collector and local timber roads constructed or reconstructed by decade differ across the range of alternatives, and tend to reflect the timber programs in the alternatives. Roads and trails needed to implement the Forest Plan will be identified in a Forest transportation plan. This plan will be developed by Forest engineering consistent with the management direction expressed in the Forest Plan, and will assure that transportation facilities are available to carry out the Forest Plan's scheduled resource activities. In addition, standards and guidelines for road and trail construction are displayed in Part II of the Forest Plan under "Facilities." Guidelines for road construction and maintenance in sensitive areas--such as grizzly bear Situation 1 areas, winter range, riparian, and sensitive soils areas--are found under individual management area prescriptions in Part III of the Forest Plan.

14. WHERE AND UNDER WHAT CONDITIONS SHOULD FIRE BE USED AS A TOOL FOR LAND MANAGEMENT?

a. Public Perception

Fire management appears to be an emerging issue because of the large amount of fuels created by the mountain pine beetle epidemic. The need most commonly expressed by the public was to designate areas where fires should be allowed to take their natural course. Places suggested for this policy were the Lee Metcalf and Absaroka-Beartooth wildernesses. A small number of people expressed opposition to any kind of a "let burn" policy because they do not like to see the forest burned under any circumstances.

b. Resource Relationships

The use of fire as a management tool relates to protection of Forest timberlands when it is used to reduce fuel loading and thereby reduce risks of major wildfires. Prescribed fire is also an important means of supporting management area objectives, particularly where range and habitat improvement programs are necessary. Prescribed fire (unplanned ignition) is the sole means of improving winter range and increasing habitat variety in wilderness areas.

c. Procedure to Resolve

A Level 2 "cost plus loss" analysis was done by Forest fire management specialists (described in Appendix E, Forest Plan) and became the basis for budgeting and implementing a fire suppression program for each of the alternatives. Prescribed fire was utilized to a different extent in the different alternatives. Acreages burned using prescribed fire for timber, range, and wildlife programs are displayed by alternatives in Figure II-19, Chapter 2.

Fire management policies are presented in the Forest Plan in three places: (1) As forestwide standards and guidelines in Part II, (2) as specific standards and guidelines for individual management prescriptions (Part III), and (3) in Appendix E, Fire Management Analysis. This analysis provides the rationale for the various standards and guidelines applied.

A plan permitting prescribed burning (unplanned ignition) for the Absaroka -Beartooth Wilderness was implemented in 1982. This plan remains in effect. Similar practices will be utilized in the Lee-Metcalf Wilderness and the Cabin Creek Special Management Area.

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APPENDIX B: DESCRIPTION OF THE ANALYSIS PROCESS

A. Introduction

1. Planning Problem

The Forest Service is responsible for determining how best to manage National Forest lands based on public desires and land capabilities. The capability of the Gallatin National Forest is influenced by its mountains with rocky, jagged peaks and forested slopes with short growing seasons. Forty-one percent of the Forest is currently wilderness. The remainder of the Forest supports roaded and unroaded recreation including big-game hunting and viewing scenery; harvesting timber; and domestic grazing. There is a dependent recreation-outfitter industry, a local wood products industry, numerous dependent water users, and some dependent livestock permittees.

Public interest includes divergent viewpoints about the use of commodities such as timber, forage, and minerals, and noncommodities such as wilderness, unroaded recreation, scenery, wildlife, old growth, and diversity. The Forest's major planning goal is to provide enough information to help decisionmakers determine which combination of goods, services, and land uses will maximize net public benefit. The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework to address this objective, and also state that the requirements of the National Environmental Policy Act (NEPA) and its regulations (40 CFR 1500-1508) must be applied in this analysis process.

2. Planning Process

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management, principally: (1) processes formerly used to make individual resource decisions are now combined to help make integrated management decisions, and (2) new mathematical modeling techniques are used to assist in the problem of assigning land uses, including identifying the most cost-efficient pattern of land management. The 10-step planning process is discussed in the NFMA regulations and in Chapter 1 of this document. Appendix B describes the analysis phase of this process, including steps 3, 4, 5 and 6. The judgment phase, steps 1, 2, 7 and 8, is described in Chapters 1, 2, and in Appendix A. The execution phase, steps 9 and 10, is presented in the Proposed Forest Plan.

a. Inventory Data and Collect Information (Step 3)

The interdisciplinary team determined what data was necessary based on the issues and concerns. The analysis of the management situation, formulation of alternatives, and monitoring require data on resource capabilities, existing supply and demand, expected outputs, and benefits and costs. Existing data was used whenever possible but was supplemented with new data to help resolve sensitive issues or management concerns. Data is on file in the Forest Supervisor's Office.

b. **Analysis of the Management Situation (Step 4)**

This analysis examines resource supply and market conditions and determines suitability and feasibility for resolving issues. A land use analysis model (FORPLAN) was used to address a number of specific requirements, including benchmarks. Requirements include: (a) the projection of the Forest's current management program; (b) determining the Forest's ability to produce a range of goods and services from minimum management to maximum production; (c) evaluating the feasibility of reaching the national production goals (RPA targets) and social demands identified as issues and concerns; and (d) identifying monetary benchmarks which estimate the output mix which maximizes present net value (or minimizes the cost) of resources having an established market or assigned value and meeting other departure analysis requirements. The "analysis of the management situation" document is on file in the Forest Supervisor's Office.

c. **Formulation of Alternatives (Step 5)**

The information gathered during the first four planning steps is combined and analyzed to formulate alternative management plans. The alternatives reflect a range of resource management direction. Each major public issue and management concern was addressed in one or more alternatives. Management prescriptions and practices were formulated to represent the most cost efficient way of attaining the objectives for each alternative. Both priced and nonpriced outputs are considered in formulating the alternatives. Additional information covering alternatives is also on file in the Forest Supervisor's Office.

d. **Estimation of Effects of Alternative (Step 6)**

The physical, biological, economic, and social effects of each alternative were estimated and analyzed to determine how each responds to the range of goals and objectives assigned by the RPA program. FORPLAN was used to estimate some of the economic and physical output effects while other methods were used for remaining effects. The analysis included: (a) direct effects; (b) indirect effects; (c) interaction with other Federal, State, local and Indian tribe land use plans; (d) other environmental effects; (e) energy requirements and conservation potential; (f) natural or depletable resource requirements and conservation potential; (g) historic and cultural resources; and (h) means of mitigation.

B. Inventory Data and Information Collection

1. Forest Data Base

a. **Capability Areas**

The basic resource data storage unit is the capability area. Capability areas are lands delineated for the purpose of estimating their response to various management practices, resource values, output coefficients, and multi-resource or joint projection functions (FSM 1920.5). There are approximately 7,000 capability areas. Forest capability areas were based on the following criteria:

1) **Compartments**

Timber inventory compartment boundaries were utilized as subdivisions of subwatersheds to provide a link to the timber data base. The 135 compartments also provide a means to separate data for Gallatin, Madison, Meagher, Park, Sweetgrass, Stillwater and Carbon Counties in Montana.

2) **Habitat Type and Land Type**

The basic capability unit was identified by the combination of vegetative habitat type, an indicator of biological potential; and land type, an indicator of physical characteristics such as slope, aspect and elevation.
Sixty-five habitat types and 200 land types were identified.

b. **Analysis Areas**

These are one or more capability areas or parts of capability areas combined for the purpose of analysis in formulating alternatives and estimating various impacts and effects (FSM 1920.5). Capability areas were further stratified by existing timber types or condition classes and then aggregated into analysis areas based on similarities in capability, timber types, and economic effects. There are 543 analysis areas.

c. **Production Coefficients**

Resource outputs were developed for each analysis area by linking resource suitability and economics to analysis areas. Analysis areas suitable for timber production were linked to timber PI type maps which were linked to timber outputs. Analysis areas suitable for cattle grazing were linked to range allotment maps which were tied to forage production estimates. Forage production for elk was limited by the amount of suitable winter range. Recreation coefficients were tied to population trends and historical use patterns. Water and sediment coefficients were developed for both naturally occurring and management induced erosion. Other resource data including costs, benefits, slope, geology, and riparian areas were utilized to further refine or constrain outputs.

Major output production coefficients used on the Forest were expressed in the following units:

Timber	Thousand cubic feet/acre
Dispersed recreation	Rec. visitor days/acre/decade
Winter elk forage	Pounds/acre/decade
Summer elk forage	Pounds/acre/decade
Livestock forage	Pounds/acre/decade
Equivalent clearcut acres	ECA/acre/decade
Local road construction	Miles/acre/decade
Developed recreation	Rec. visitor days/acre/decade

d. **Suitable Lands**

Table B-1: Identification of Lands Tentatively Suitable for Timber Production

Type of Area	Wilderness And Special Management Acres	Other Acres	Total Acres
Total net Forest area	758,212	977,200	1,735,412
Water	2,833	10,283	13,116
Nonforest land	205,564	181,954	387,518
Forest land at least 10% stocked with trees	549,815	784,963	1,334,778
Forest land not capable of producing industrial wood	403,244	329,734	732,978
Productive Forest land	146,571	455,229	601,800
Land withdrawn from timber production by Congress	156,300	0	156,300
Developed Recreation sites and Administrative sites	0	5,500	5,500
Available productive Forest land not technologically suited for timber production			
-Irreversible resource damage	0	0	0*
-Restocking not assured	0	0	0*
Tentatively suitable for timber production	0	440,000	440,000
-Montana Wilderness Study Act area	0	30,964	30,964
-All other areas	0	409,036	409,036

* Lands that would have fallen into these categories were screened out in other catergories when the timber inventory was done in 1975.

Nonforest habitat types were assigned to all nonforest lands on the Timber Planning maps. Following is a list of the nonforest habitat type codes and names used: (G11) alpine & barren, (G12) mountain meadows, (G13) mountain grasslands, (G14) foothill grasslands, (15) sagebrush, (G16) mountain brush, (G17) juniper, (G18) agriculture, (G19) aquatic, (G21) rockland, (G22) talus, (G23) scree, (G24) prairie grasslands and (G29) open water.

Lands not capable of producing industrial wood were determined using the criteria listed below. (see 36 CFR 219.29b).

Criteria were:

1. Low elevation forest habitat types which border grasslands have low stockability and may revert in succession to grassland for decades, if disturbed. Common habitat types in this zone include the Limber pine series, Ponderosa pine/bunchgrass habitats, and the Douglas-fir/grasses habitats.

2. Administrative sites.

3. Upper subalpine lands which are forested but have a very limited growing season (frequently less than 30 frost-free days).

   These include habitat types: whitebark pine-subalpine fir/mountain gooseberry (810), whitebark pine-subalpine fir/grouse whortleberry (820), whitebark pine-subalpine fir (850), and whitebark habitat type (870).

   These habitat types and associated land types are discussed in Gallatin NF Land Type Survey, Davis, 1980.

   These lands typically occur above 8200 feet in elevation, on steep to gentle slopes, and have shallow, moderately coarse textured to medium textured soils. These soils have many rock fragments. On gentle to moderate slopes, most water flow is subsurface, but on steep slopes there is a rapid "flush" of streamflow in the spring. These land types support the habitat types listed above, or are non-forest. The combined criteria of habitat type and land type provide the most accurate indication of upper subalpine lands that are not capable of commercial production of timber.

   Further explanation of the above habitat and associated land types can be found in Schaeffer,1978; Pfister and others, 1977; Gallatin NF Landtype Survey, Davis,1980.

4. Rock lands occur with scattered forested lands and habitat types which would normally be considered productive, but are not capable of producing crops of industrial wood due to stocking limitations and slow growth. A full range of productive habitat types occur on these sites. These land types are rocklands, avalanche chutes, talus, or very thin fragmental or skeletal soils and occur at all elevations, many are the result of glaciation. They often support poorly to moderately stocked timber stands. Some of these sites are PI-typed as nonforest or noncommercial forest, while others were identified during habitat type mapping and land type mapping with field checking.(Davis, 1980; Gay, 1976; Schaeffer,1978).

5. No forested habitat type lands were excluded from the tentatively suitable category because of restocking not being assured. In the timberlands inventory that was completed for the Gallatin National Forest in 1975, criteria was included that lands on which restocking could not be assured would not be classified as productive forest land. This assertion was caried forward in developing the Forest Plan and using the 1975 inventory information to develop analysis areas and production coefficients for tentatively suitable lands.

e. Land Uses and Scheduling

The condition classes of existing vegetation were used to schedule management activities over time for the various benchmarks and alternatives.

f. Monitoring

Forest planning data provides a base from which changes can be measured and will also be used to monitor implementation activities.

g. **Plan Implementation Programs**

The data base provides biological and physical data that will help develop subsequent programs for plan implementation. As more information is available, the data base will be updated and improved.

2. **Sources of Data**

Sources of existing inventory data used in the analysis are as follows:

1. Forest Service Manual, Management Information Handbook (MIH 1309.11) provided definitions for outputs, activities, effects and other information.

2. Forest habitat types were inventoried in conjunction with the timber management planning effort from 1976 to 1978. The process is documented in Forest Habitat Types Of The Gallatin National Forest (Schaeffer,1978) and based on Forest Habitat Types of Montana (Pfister and others, 1977).

3. Land types were derived from the Gallatin NF Landtype Survey (Davis, 1980).

4. The national watershed identification system was used to identify regions and subwatersheds on the Forest. A map base and overlay legend was used that was based on U.S.G.S. Hydrologic Unit Map, 1974.

5. Compartments are the timber compartments identified in the timber inventory system and are subdivisions of the subwatersheds map base, 6/75.

6. Administrative boundaries are delineated on the Gallatin Forest Map of 1981.

7. Slope was used in conjunction with land types to help delineate analysis areas. The slopes were extracted from U.S. Geological Survey maps.

8. Timber outputs were derived from the 1975 timber inventory. Timber types or size and condition classes were developed by Forest Service personnel.

9. U.S. Geological Survey maps, 1948-1976, and aerial photos, 1975, were utilized to delineate streams, lakes, and riparian areas.

10. The recreation opportunity spectrum was utilized to map opportunities and develop capacity coefficients. The Recreation Information Management System was utilized to develop recreation visitor days. Hunting recreation was developed from Elk and Deer Hunting Opportunity Evaluations (Reid, 1981 July 1).

11. Elk and livestock forage information was adopted from Range Analysis Handbook, FSH 2209.21-R1; Wildlife Surveys Handbook, FSH 2609.21; Clipping Studies (USDA Forest Service, nd) and Production Coefficients and Economic Guidelines for Big Game and Livestock, (Reid, 1981, July 1).

12. Geologic information was developed from "A Geological Overview of the Gallatin NF," (Ramsey 1978).

13. Mineral potential maps were developed utilizing the McKelvey system, BLM oil and gas plats, published reports, MILS data, industry data and field knowledge of those areas currently leased or staked by industry.

14. Current sediment conditions are based upon local monitoring data from 1964 or 1968 of streams by forest personnel (Glasser and Jones, 1982).

15. Current water yields and water yield increases which result from management activities were predicted from published USGS data from 1890 through 1981, Farnes (1972), and Glasser (1981).

16. The visual resource was mapped using the Visual Management System (USDA Forest Service, 1977).

17. Economics. Stumpage value was based on bidder transaction evidence for 1974 to 1980; price trends from Haynes and Adam (1980); other resource values (price trends) from 1980 RPA reports (Beasley, 1978); and costs were developed by Forest personnel as documented in planning records.

18. Fisheries coefficients were based on estimates obtained by the Montana Department of Fish Wildlife and Parks, (1981) and adjusted by Gallatin Forest biologists as documented in planning records.

C. The Forest Planning Model (Including FORPLAN)

1. Overview

This section describes the primary components of the Forest planning model. The discussion includes analysis process, analytic tools (including FORPLAN), and the assumptions and details of analysis areas, prescriptions, and yield coefficients which are used in the analysis.

FORPLAN is a linear programing computer model designed to analyze thousands of possible management activities, practices, and resource outputs on specific land areas in order to select an optimal set capable of meeting various management constraints and goals (objective functions).

The specific land areas (analysis areas) were delineated by characteristics which have a fairly uniform response to management activities, costs, and benefits. Management activities and practices were assigned to analysis areas based on their suitability (see Part C of this section). Specific combinations of activities and outputs were assigned to analysis areas to represent various multiple use prescriptions, called management prescriptions. Each of the 543 analysis areas has from 1 to 10 management prescriptions.

Production coefficients for resource outputs were developed for each combination of analysis area and management prescription. FORPLAN assigns those management prescriptions to analysis areas which produce the goods and services that optimize the objective function, after meeting all constraints.

Alternatives were generated by constraining management prescriptions available to analysis areas, constraining the access to analysis areas for timber harvest in a particular decade, or constraining the outputs from analysis areas or groups of analysis areas. These constraints were designed to achieve the goals

of an alternative. The conditions set by the constraints must be satisfied before the objective function is optimized. The analysis of the benchmarks and alternatives utilized the same objective function, to maximize present net value. In other words, after meeting all constraints the FORPLAN model assigned the remaining opportunities to efficiently produce the highest amount of priced outputs.

2. Analysis Process and Analytical Tools

a. Preliminary Analysis

Analysis leading up to FORPLAN included designing management prescriptions (Planning Record: Taskforce Meetings 5/81), assigning practices to prescriptions (Planning Record: Revised Prescriptions 5/82), developing management costs for each practice and predicting resource outputs (Planning Record: Cost Tables - AMS), and benefits (Planning Record: Development of Costs and Outputs for FORPLAN 5/81). Outputs predicted include timber yield, elk forage, range forage, recreation use, and road development.

Cost efficiency was considered by the interdisciplinary team while they were developing a realistic and flexible set of management prescriptions. Professional judgment played a major role. FORPLAN was later used to examine the comparative cost efficiencies of prescriptions.

Practices which required analysis included grazing and other activities in riparian areas, road construction, road access acquisition, fire suppression, and timber management guidelines for reforestation, silvicultural systems, logging method, and rotation age. The growth prognosis model was used to develop existing and regenerated managed and unmanaged timber yield tables (Wykoff and others, 1980).

Major decisions that resulted from the preliminary analysis include the following that apply to all prescriptions:

1. All roads will be built and maintained to Forest-wide standards and guidelines.

2. Road construction standards in riparian areas will follow the guidelines in the Forest's riparian management area prescription.

3. Necessary access roads to the National Forest are provided for in all prescriptions.

4. An appropriate level of fire suppression, based on a Level II Fire Analysis, is assumed for each prescription.

5. Timber sales are planned and administered to Forest-wide standards and guidelines, including coordination with cultural, visual, recreation, wildlife, soil, and water resources.

6. Timber slash disposal and reforestation activities will take place in all timber harvest prescriptions.

7. Controls on road use and access for wildlife are included.

b. FORPLAN Analysis

The FORPLAN linear program was utilized to provide the basis for optimal land uses, management prescription selection and activity scheduling for each analysis area. This process results in selection of the most cost efficient management prescriptions and land uses that meet a given set of constraints and an objective function of maximizing present net value.

c. Additional Analysis

A social impact assessment and the identification of baseline social economic conditions were developed for the local area. Water yield and sedimention were estimated for each alternative and benchmark using output from FORPLAN. Additionally, the transportation system, grizzly bear habitat, fisheries habitat, and minerals availability were analyzed using FORPLAN output. A Level 2 Fire Analysis was conducted, also.

3. **Identification of Analysis Areas**
(Planning record: Developing Analysis Areas, 5/81)

The rationale for delineating the analysis areas follows:

a. Level 1

The Level 1 areas represent the distinct geographic areas of the Forest. All are mountain ranges except for the Hebgen plateau.

ABSARO	Absaroka Range
CRAZY	Crazy Mountains
BRIDG	Bridger Mountains
GALL	Gallatin Range
MAD	Madison Range
HEB	Hebgen Plateau

The LEVEL 1 categories serve to divide the Forest into large, geographic planning units for the purpose of monitoring the spacial character of costs and outputs, to address issues where location is important (such as recreation and wildlife), and to display effects to the local publics. The Level 1 areas also provide an appropriate level for setting timber scheduling constraints to ensure that a disproportionate amount of timber harvest does not come from a few parts of the Forest.

While developing criteria for Level 1, both ranger districts or mountain ranges were considered. It was decided that the use of mountain ranges would make the display more clear to the public.

b. LEVEL 2

The breakout of the level 2 areas was as follows:

ABW*	Absaroka-Beartooth Wilderness
LMW*	Lee Metcalf Wilderness
CCWLMA*	Cabin Creek Wildlife Management area
MWSA	Hyalite-Porcupine-Buffalo Horn MWSA Area
NON-RD	Lands within inventoried roadless areas
ROADED	All other lands

* No further stratification required because the management of these areas was established by law.

The following criteria were used to specify Level II stratification areas:

1. Delineate areas with special land classifications or studies.
2. Delineate areas where geographic cohesiveness is necessary for analysis.
3. Delineate areas to show developed/undeveloped as pertains to roads.

The original areas identified in the Level II stratification were modified after the passage of the Lee Metcalf Wilderness legislation in 1984 to incorporate the changes brought about in this act.

Level 2 areas, ABW, LMW, AND CCWLMA, have special land status classification which was legislated by Congress. It is important to be able to track costs and outputs of these lands as spatially distinct units. Lands within the ABW, LMW, and CCWLMA areas are represented by a single analysis area because each area is managed according to a legislatively mandated management prescription. For this reason they are not further stratified beyond Level 2.

The Hyalite-Porcupine-Buffalo Horn, MWSA area, a Congressionally mandated study area, is further stratified in Levels 3 through 6 to allow analysis of various potential management strategies for various parts of the MWSA. These need to be explored to determine the suitablity or unsuitability of the various parts of the area for wilderness classification or other uses, as well as tradeoffs of commodity outputs resulting from wilderness classification. As another consideration, the MWSA lands require analysis of land management alternatives in a separate study report as well as separately prepared recommendations to Congress. Breaking out MWSA as a separate display in FORPLAN--or the capability of doing so--expedites the preparation of this separate report. Land management prescriptions for the Hyalite-Porcupine- Buffalo Horn area is also one of the key issues.

The NON-RD category of Level 2 includes the lands within the identified roadless areas other than the MWSA area which are presently being tracked in the Forest's roadless inventory, as follows:

1547	Chico	1550	Dry Canyon
1371	North Absaroka	1742	Box Canyon
1541	Crazy	1914	Reef
1543	Bridger	1545	Republic
1912	Beartooth	1963	Lionhead
1548	Gallatin	1549	Madison

Lands other than these inventoried roadless areas or the congressionally designated special use lands (e.g., ABW) are all considered ROADED in Level 2. The stratification of LEVEL 2 is issue responsive, relating to the management of the HPBH area and management direction for the Forest's existing wilderness areas.

c. LEVEL 3

The level 3 criteria focus on the wildlife issue of big game management, particularly with regard to numbers of wintering elk that can be supported on the Forest:

ELKDWN	Elk/Deer Winter Range
SUMMER	Big Game Summer Range
WILD	Wilderness

This breakout allows monitoring of AUM outputs from big game winter range and thus allows calculation of elk carrying capacity on the Forest for the different FORPLAN runs. Costs and productivity changes associated with investments in wildlife habitat improvement or timber harvest on winter range areas can be tracked and displayed. The wilderness category (WILD) indicates areas not further stratified.

d. LEVEL 4

The stratification in Level 4 is according to the suitability of the vegetation to produce timber and range outputs:

HT	Commercial Forest: 50 cu ft/ac/yr or greater growth potential.
LMT	Commercial Forest: 20 to 49 cu ft/ac/yr
M	Mosaic of 20-80 percent timber/range
G	Noncommercial forest and nonforest
W	Designated wilderness

This stratification distinguishes between high (HT) and moderate-low (LMT) timber-producing lands; mixed timber/range areas (M) and lands principally suited to grazing or other uses (G). The wilderness (W) category is a way of distinguishing areas not available to vegetative manipulation.

In developing Level 4, the mosaic (M) classification was added to provide a place to locate the mixed CA's that previously caused difficulty in balancing the Forest's commercial forest acres and productive rangeland total acres.

Originally, efforts were made to distinguish productive areas in more detail in Level 4--including breakout by species--but greater detail at this level was found unworkable. This was partly because of constraints of model size, but also because it was considered desirable to be capable of mapping through Level 4.

e. LEVEL 5

Level 5 stratifies the Forest in terms of slope. The percent slope has a bearing on roading costs, management opportunities and other costs.

L40	Slopes less than 40%
G40	Slopes greater than 40%
WILD	Designated wilderness

Originally, soil sensitivity was also considered in the Level 5 stratification, but it was later decided to identify areas of unstable soil outside of the analysis area stratification so as to avoid exceeding 600 analysis areas--the maximum recommended for the LP model.

f. LEVEL 6

Level 6 addresses the issues of establishing timber harvest levels and grazing levels on the Forest by stratifying for timber species and condition classes as well as for high and low productivity rangelands. The condition classes are important in determining timber yields, establishing harvest rotations, evaluating susceptibility to forest fire, and for monitoring remaining levels of old growth on the Forest.

DFSAWW	Douglas-fir -	Med. & well stocked mature sawtimber.
DFSAWP	"	Poorly stocked mature sawtimber
DFISAW	"	Immature sawtimber
DFPOLE	"	Poles
DFSEED	"	Seedlings/Saplings
DFNOST	"	Non-stocked
LPSAWW	Lodgepole	Med. & well stocked mature sawtimber.
LPSAWP	"	Poorly stocked mature sawtimber
LPISAW	"	Immature sawtimber
LPPOLE	"	Poles
LPSEED	"	Seedlings/Saplings
LPNOST	"	Non-stocked
RANGHI		High productivity rangeland
RANGLO		Low productivity rangeland
ROCK		Rock and lake surface
WILD		Wilderness

At one time the lodgepole pine and spruce-alpine fir condition classes were displayed separately. However, they were combined when the Forest's timber planner determined that costs and yields for LPP and SAP are much the same, so that there was no adequate justification for separating them.

The above analysis area criteria initially resulted in about 800 analysis areas which were aggregated according to the following criterion, to meet the requirements of FORPLAN:

> Combine all analysis areas less than 160 acres into other analysis areas with similar characteristics. Whenever possible aggregations were made at Levels 4 and 6 between classes of the same vegetation types.

This aggregation resulted in the following:

	Analysis Areas	Thousand Acres
Absaroka Range	94	827
Crazy Mountains	59	95
Bridger and Bangtail Mtns.	64	92
Gallatin Range	163	280
Madison Range	78	303
Hebgen District	85	138
TOTALS	543	1735

The above totals include the following special areas:

Absaroka Wilderness
Lee Metcalf Wilderness Area
Cabin Creek Wildlife Area
Montana Wilderness Study Act Area

4. **Identification of Prescriptions**

a. **Overview**

NFMA regulations define management prescriptions as "management practices and intensities selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives" (36 CFR 219.3). Generally, a management prescription is a set of treatments or practices to develop and/or implement some combination of resources on a particular type of land.

The interdisciplinary team reviewed the public issues and management concerns, used professional judgment and RPA program targets for guidance in developing multiple use management prescription goal statements.

Management practices, standards, and guidelines were then developed and assigned to each goal statement by interdisciplinary work groups. Practices were developed and assigned based on current research, feasibility, cost efficiency, potential for resource damage, and ability to meet minimum management requirements. The management standards and guidelines needed to accomplish the goals of a prescription include the minimum management requirements, mitigation measures, and resource coordination that are required by existing laws, regulations, and policy. Forest-wide standards and guidelines were developed to cover practices which are common to all precriptions and which apply the practice.

The result was a set of 14 multiple-use management prescriptions (9 of which were used directly in FORPLAN) with a broad range of emphasis, intensities,

practices, standards, and guidelines. All of the prescriptions emphasize a single resource or several resources such as timber, wildlife, range, or wilderness management. Intensities of management, such as investment level, vary within some prescriptions, increasing the range of choices available to the FORPLAN model. Cost efficiency was considered by the team during the development of these prescriptions. Cost efficiency was accomplished by designing prescriptions at minimum cost levels to achieve the objectives of the management activities.

The management prescriptions were designed to:

Project the current program to evaluate implications
Explore resource potentials
Explore opportunities to improve efficiency
Explore opportunities to resolve issues and concerns
Meet national targets (RPA).

Completed prescriptions were reviewed, discussed, and revised as necessary by the management team, the interdisciplinary team, and the core team. The review criteria included the following (Planning Records: Taskforce Meetings-Prescriptions, 1981):

1. Does each prescription adequately convey what the desired future land condition should be?

2. Does the prescription provide the technical management direction needed by a land manager to achieve the stated future condition?

3. Does the prescription provide the information needed for developing the costs and outputs for FORPLAN?

4. Does the prescription address the planning issues and concerns?

The goal statements and related issues are as follows:

1) **Timber Prescriptions**

The timber prescription addresses the emphasis of managing timberlands for the long-term growth and production of usable wood fiber. Four distinct timber harvest FORPLAN investment intensities were developed, representing different strategies of timber management including:

Timber--Plant/Precommercial Thin/Commercial Thin
Timber--Natural Regeneration/Precommercial Thin/Commercial Thin
Timber--Natural Regeneration/Precommercial Thin
Timber--Natural Regeneration/Extensive

The timber prescription addresses the third part of the timber issue, "What range of vegetative management (i.e., silvicultural systems) practices will be used on various forest types?"

2) Permanent Range Prescription

The goal of this prescription is to provide livestock forage production at a level which would prevent deterioration of the range resource. Three investment and management intensities (low, medium and high) address this prescription's goal. The objective of the high investment option was to help attain RPA targets if possible. The range prescription addresses the second part of the range issue, "how will the range resource be managed to provide for grazing?"

3) Developed Recreation Prescription

The goal of this prescription is to manage the Forest's developed recreation areas to (1) meet RPA targets or (2) to approximate current conditions. The prescription was designed to be responsive to the recreation issue, "How will the Gallatin Forest provide a broad spectrum of recreation opportunities to meet identified demands?"

4) Three Dispersed Recreation Prescriptions: Roaded, Nonroaded, and Recreation/Wildlife

The first two prescriptions have as a goal to emphasize dispersed recreation with provisions for needed facilities, either in roaded or nonroaded settings. These prescriptions are responsive to the issue described above concerning "recreation opportunities to meet identified demands."

The goal of the recreation/wildlife prescription is to manage for a balance of dispersed recreation and wildlife values. It addresses the recreation issue stated above and the wildlife/fish issue, "How will fish and wildlife habitats be managed to maintain viable populations of indicator species to meet fish and wildlife objectives established in cooperation with the Department of Fish, Wildlife and Parks?"

5) Big Game with Timber Harvest Prescription

This prescription had as its goal to manage big game habitat to maintain the desired animal populations by using timber management techniques which would provide timber stand age diversity for cover and forage and also achieve an efficient and economical level of timber production. It addresses the wildlife/fish issue stated above in "d".

6) Wilderness Prescription

The wilderness prescription has as it's goal to protect and preserve designated and proposed wilderness areas while providing for levels of use within the wilderness carrying capacity. A high investment intensity is used to achieve wilderness use above present levels, while a low investment intensity is intended to manage for current levels of use. The wilderness prescription addresses the issue concerning best management of existing wildernesses on the Forest.

7) Minimum Level Management Prescription

The goal of this prescription was to manage the National Forest lands at a custodial level--that is, in a near natural condition that maintains current

resource potential. No controllable outputs would be produced. Minimal management activities required by law or regulation--such as minimal steps to ensure public health or safety--would be the only management applied.

8) Three Grizzly Bear Management Prescriptions: Recreation, Timber Harvest, Livestock Grazing

The goal of this group of prescriptions was to reduce grizzly bear mortality by conducting activities in grizzly Situation 1 habitat with minimal effects on the bears, while providing for the management of other resources: recreation, timber, and livestock grazing. These were not separate FORPLAN prescriptions, but were rather application of prescriptions described above in "B, D and E" within Situation 1 habitat. These prescriptions address the wildlife issue, "What will be done to maintain or improve important habitat of threatened or endangered species?"

9) Riparian Prescription

The goal of this prescription is to manage riparian areas (such as streambanks, lakeshores, springs or other areas that support mesic vegetation), emphasizing the protection of the riparian values. These values include water quality, fisheries habitat, wildlife habitat, timber and forage potential. This prescription addresses two major issues, "What will be done to protect water quality?" and "How will fish and wildlife habitats be managed to maintain viable populations?"

10) Research Natural Area Prescription

The goal is to manage research natural areas (RNA's) and is intended to meet research natural area targets assigned to the Forest. This was not a FORPLAN presciption. Research natural areas were selected outside of FORPLAN. The RNA prescription is responsive to the Regional issue that RNA's need to be systematically identified and designated.

b. Prescription Purpose, Criteria, and Assumptions

Nine of the above prescriptions were used in FORPLAN and the following were applied outside the model: Grizzly Bear Management, Riparian Management and Research Natural Areas. During the review process, several of the original prescriptions were deemed to be unnecessary when tested against the review criteria. As a result, a number of prescriptions were consolidated.

The prescriptions are described in detail below, and are compared in Table B-2.

1) Timber Prescription

a) Purpose

Timber management goals that supplied a basis for formulating the timber prescription were as follows:

Table B-2: Prescription Comparisons

Standards and Guidelines	Prescriptions													
	RNA	TIMBER	RANGE	DEV. REC.	DISP. REC. ROAD	DISP. REC. NOROAD	DISP REC. WLDLF.	BIG GAME TIMB.	GRIZ. REC.	GRIZ. TIMB.	GRIZ. LIVE-STOCK	RI-PARIAN	MIN. LEV.	WILD.
Road density * (Miles/Section)	0	2-7	0-3	0-6	2-7	0-2	0-2	2-7	0-2	2-7	0-3	0-5	0	0
Timber management														
Reforestation	NA	nat.	NA	NA	nat.	NA	NA	nat.	NA	nat.	NA	nat.	no	NA
Thinning	NA	yes	NA	NA	yes	NA	NA	yes	NA	yes	NA	yes	no	NA
Intermediate-harvest	NA	yes	NA	NA	yes	NA	NA	no	NA	no	NA	yes	no	NA
Even-age mgt.	NA	yes	NA	NA	yes	NA	NA	yes	NA	yes	NA	yes	no	NA
Uneven-age mgt.	NA	no	NA	NA	yes	NA	NA	yes	NA	yes	NA	yes	no	NA
Salvage	NA	yes	NA	yes	yes	yes	NA	yes	NA	yes	NA	yes	yes	NA
Minimum Rotation age (Years)	NA	90-120	NA	NA	90-120	NA	NA	90-120	NA	90-120	NA	90-120	NA	NA
Size of opening (Acres)	NA	<40	<40	NA	<40	NA	NA	summer 5-40 winter 5-20	NA	summer 5-40 winter 5-20	NA	<5	NA	NA
Livestock Grazing	no	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
Wildlife & Fish														
Habitat improve	NA	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	no	limited
Griz. bear emph	NA	no	no	no	no	no	no	no	yes	yes	yes	no	no	yes
Old growth (Percent)	NA	<10	<10	NA	>10	>10	>10	>10	>10	>10	>10	>10	>10	NA
Existing Visual Condition (Levels)	1,2	3-5	2-4	3,4	2-5	1-3	1-3	3-5	1-3	3-5	2-4	2-5	1-3	1
Recreation (ROS)	SMP-NM	RA-RB	SPNM-RA	RA-R	RA-RB	SPM, SPNM	SPM, SPNM	RA-RB	SPM, SPNM	RA-RB	SPNM RA	SPNM-RB	SPM, SPNM	P
Fire Mgmt. (Suppression response)	min-imum	con-trol	vari-able	con-trol	con-trol	con-tain/ con-fine	con-tain/ con-fine	con-trol	con-tain/ con-fine	con-trol	vari-able	vari-able	con-tain con-fine	con-tain/ con-fine

* Road density reflects access for timber, minerals and recreation and along with construction standards and guidelines, reflects sediment production.

- Meet Regional Plan goals for volume of timber sold.

- Determine what lands will be managed for timber production and what the long-term, sustained yield is from these lands.

- Regulate harvest from the suitable timber lands and develop a Forest-wide plan of harvest.

- Develop resistance to future insect attacks and disease by achieving a diversity of age, species, and stocking diversity.

- Specify drainage management guidelines for timber harvest to assure adequate diversity of vegetation and wildlife, to protect water quality, and to protect other important uses.

Some of these goals were attained through design of the prescriptions. Others were attained by other means, such as by imposing constraints on FORPLAN runs.

b) **Criteria and Assumptions**

The timber management prescription can be applied to any analysis areas identified as tentatively suitable for timber production.

The timber prescription includes four intensities of management. These were so designed that some combination of these prescriptions would cover the range of intensities appropriate for any suitable timber on the Forest.

c) **Intensities**

The four timber management intensities had different specific criteria and assumptions as follows:

(1) **Intensive Timber Management**

This intensity attempts to fully regulate harvest, over the long term, on lands to which it is applied. All final harvest is followed by tree planting to assure rapid restocking and optimum site stocking. Mixed species are used to reduce risks from insects and disease. One-hundred percent of the naturally regenerated stands will be precommercially thinned and 25 percent of the planted stands will require thinning. Commercial thinning takes place at 60 years and is accomplished by whole-tree skidding on less than 40 percent slopes. Stand exams occur each decade.

Generally, lodgepole pine stands will be clearcut and Douglas-fir stands will undergo shelterwood harvest. Intermediate harvest will only take place if total harvest yield is not reduced thereby. The resource product objective of this intensity is sawlogs. General rotation ages by types are: 80 years for lodgepole pine and 100 years for Douglas-fir or spruce-alpine fir. Minimum rotation ages are provided to strive for 95 percent of CMAI. Deviations to provide for other objectives are described in NFMA, section 6. Guidelines control timber harvest in sensitive soil and riparian areas. Equivalent clearcut area guidelines will keep timber harvest within the hydrologic limits of a watershed.

Intensive timber management would accomodate recreational activities of a roaded character. Wildlife species that do well in early successional stages would do well on lands to which this intensity is applied. Livestock forage is provided in the form of transitory range in the decades following harvest.

(2) **Moderate Intensity Timber Management**

This management intensity is similar in many respects to intensive timber management described above. Emphasis is the same, but intensity of management is less. Differences are as follows:

Natural regeneration is the principal reforestation method. Planting, because of the high cost, is limited to the sites where it is required to assure regeneration. It is estimated that about 40 percent of harvested sites would be planted. About two-thirds of stands naturally regenerated would be precommercially thinned. Intermediate harvests are less commonly implemented with this intensity.

Other differences are as follows: Wildlife species that favor early to mid-successional stages are favored with this prescription. There is a greater amount of suitable cover for maintaining big game populations than under intensive management. The land acquisition program is less aggressive under this intensity. Road costs are also lower because fewer roads are surfaced.

(3) **Low Intensity Timber Management (Two Variations)**

This level of timber management includes two variations which are similar except that one allows more precommercial thinning than the other. Both of these variations represent low intensity. Natural regeneration is predominant. Planting very seldom occurs. Precommercial thinning takes place on only a portion of the acreage needing treatment for one of the prescriptions, and even less with the other. Intermediate harvests are not planned. The product objective is not solely sawtimber, but also other products such as post and poles or commercial firewood.

These low intensity variations will provide wildlife habitat for animals that use early, mid-, and late successional stages. The variations also will provide cover for species requiring heterogeneous stands. Cover is suitable for maintaining greater densities of big game species than with the other timber management intensities. Surfacing of roads will occur very seldom. Permanent stream crossings are avoided as possible in road construction and a high percentage of roads will be gated after timber harvest. (These roading measures reduce cost.)

2) **Range Prescription**

a) **Purpose**

The range prescription has a domestic livestock animal unit month (AUM) production goal. Practices assigned to this prescription are intended to achieve an optimal level of livestock grazing consistent with other resource

values. This prescription when applied to suitable rangelands is used to analyze the economic and environmental consequences.

b) Criteria and Assumptions

The range prescription attempts to meet the purpose, above, with various management intensities and investment levels. Each level attempts to maximize livestock forage outputs consistent with other values and planned investment.

c) Intensities

Assumptions specific to the individual range prescription intensities are as follows:

(1) Permanent Rangeland, High Intensity

This management level is directed to produce high livestock forage outputs by incorporating the most intensive strategy and the highest amount of investment that is appropriate for the Gallatin National Forest. Emphasis is on (1) grazing unobligated range; (2) using advanced livestock management practices; (3) consolidating smaller allotments where possible; and (4) funding nonstructural and structural improvements identified in the allotment plans as necessary to carry out the grazing systems.

Timber management practices can assume a supportive roll; harvest may take place on minor inclusions of productive timberland to improve forage production. Production of livestock forage is constrained by the need to protect the following values:(1) streambanks and related fishery habitat; (2) water quality in streams as measured by a monitoring program; and (3) habitat for grizzly bear, a threatened species.

(2) Permanent Rangeland, Moderate Intensity

This management level provides for less intensive range management practices. Capital investments are applied primarily to reconstruct and maintain facilities with limited investment in new improvements. Monitoring of individual allotments occurs less frequently than high intensity level, reflecting a more limited budget.

Competition between big game and livestock on winter range would be somewhat lessened because of reduced livestock stocking levels, but there would be fewer range improvements (e.g.,fencing) to keep cattle off key winter range. Due to budget constraints, water quality monitoring would be limited to areas with continuous livestock use or areas with sensitive soils.

(3) Permanent Rangeland, Low Intensity

This intensity represents the lowest investment level and the lowest management intensity. The major differences in criteria and assumptions between this intensity and the two preceding are as follows:

Livestock use will be maintained at present stocking levels within the capacity of the range environment. Sustained management at these stocking levels will

eventually result in a reduction in alloted AUM's of use to prevent deterioration of the range resource.

Overall, wildlife-livestock competition will decrease because of lower stocking levels, but severe impacts may develop on some winter range areas and riparian habitats as a result of reduced adminstration and investment. Water quality monitoring would be severely reduced compared to the prior range prescriptions. All dispersed recreation activities would operate at a reduced service level.

3) Developed Recreation Prescription

a) Purpose

Provide developed recreation opportunities. A high investment level is designed to meet the RPA high target; and a moderate investment level is designed to approximate current conditions with no new investments.

b) Criteria and Assumptions

Two different investment levels are applied to all existing and proposed developed recreation sites. The intensities are #1, DEVELOPED RECREATION - HIGH INVESTMENT and #2, DEVELOPED RECREATION - MODERATE INVESTMENT.

The activities of these intensities include site management --both full service and reduced service management--and VIS services. Construction of new developed sites occurs only under the high intensity prescription.

The two developed recreation intensities will be applied to the 5,462 acres of developed recreational sites on the Gallatin National Forest. This includes all developed sites, administrative sites, winter ski areas, and summer residence sites.

4) Dispersed Recreation Prescriptions

a) Purpose

These prescriptions are designed to manage all recreation that takes place on the Forest other than that on developed sites.

b) Criteria and Assumptions

Three prescriptions are used to manage dispersed recreation on the Forest. They are applied in differing circumstances and will be discussed separately. Prescription 1, DISPERSED RECREATION-ROADED SETTING, is applied to roaded areas of the Forest where motorized forms of recreation are common. Prescription 2, DISPERSED RECREATION-NONROADED SETTING, is applied to nonroaded lands where nonmotorized forms of use are the norm. Lastly, the Prescription, RECREATION/WILDLIFE, is applied to unroaded areas suited to dispersed recreation where wildlife values are high.

The dispersed recreation prescriptions are not applied to the same kinds of lands by FORPLAN. The roaded prescription is applied to all the roaded lands and to NONSTOCKED areas only of the nonroaded timberlands. The two dispersed

nonroaded prescriptions are applied to all nonroaded lands except for NONSTOCKED areas.

(1) **Dispersed Recreation-Roaded Setting**

This prescription applies only to roaded areas. Both motorized and nonmotorized activities occur but the highest outputs are motorized recreation. Other outputs are wildlife and livestock forage, and also transitory livestock when timber harvest occurs. Scheduled timber harvest occurs on suitable lands. The visual quality objective is retention or partial retention.

(2) **Dispersed Recreation-Nonroaded Setting**

This prescription will be assigned only to nonroaded lands. No new roads will be built and no timber harvest scheduled. Quality recreation experiences will be achieved by trail maintenance and trail construction to disperse users. End-of-road facilities at the periphery of these areas would also be constructed to disperse users. Some cattle grazing could occur. Guidelines for riparian management would be followed.

(3) **Recreation/Wildlife**

This prescription is implemented in areas of the Forest where both recreation and wildlife have emphasis. Prescribed fire to improve livestock habitat is implemented where appropriate. The management is at low intensity. No new roads are built and no timber harvest is scheduled. Maintenance of roads and trails is at a moderate level. Recreation use of an area can be restricted if it is in conflict with critical wildlife values, such as grizzly bear Situation 1 management. Road and access closure is one means of restricting intensity of recreational use in such areas. Some livestock grazing at low intensity is permitted.

5) **Wildlife Prescription (Big Game with Timber Harvest)**

a) **Purpose**

This prescription is intended to optimize conditions for wildlife in the areas where they are applied. The BIG GAME WITH TIMBER HARVEST prescription is a prescription that maximizes wintering elk capacity where it is applied. This prescription is also well suited to optimize habitat conditions in big game summer range and grizzly bear areas designated for Situation 1 management. (Another wildlife-emphasis prescription is the RECREATION/ WILDLIFE prescription described under the Dispersed Recreation prescriptions).

b) **Criteria and Assumptions**

This is a high investment prescription in which timber harvest plays a large role. Prescribed fire is used to increase forage on winter range. Investments in structural improvements (e.g., fencing) are also made to reduce conflict with livestock use. Some livestock use can occur on lands assigned this prescription.

Timber harvest on winter range is designed to maintain an optimum cover over the long run; however, it is limited by the objective of maintaining a 40- to 60-percent cover/forage ratio. Harvest openings are generally about 15 acres in size. Harvest on summer range is selection harvest on slopes less than 40 percent. The summer range objective is to maintain diversity for maximum effective habitat.

Limits may be set on the amount of acres harvested each year in critical habitat areas. Guidelines would be written for each area. Road and trail management would aim to mimimize conflicts with big game. Seasonal or permanent closures can be implemented as needed. There is the capability of closing entire areas to public use. This prescription is suitable for optimizing grizzly bear habitat in Management Situation 1 areas and reducing man/bear conflict in all occupied habitat.

This prescription can be assigned by the FORPLAN model to productive timberlands in either roaded or roadless areas. (Wildlife values on RANGHI or RANGLO areas would be emphasized by use of the RECREATION/WILDLIFE prescription.)

6) Wilderness Prescription

a) Purpose

To protect and preserve designated or proposed wilderness areas while providing for recreation use within the wilderness carrying capacity. The wilderness prescription provides for two management intensities: High and Low.

b) Criteria and Assumptions

Criteria for application differ somewhat between the two wilderness intensities. High is applied only to designated wilderness areas. Low is applied to roadless areas recommended for wilderness in the particular FORPLAN run. Management assumptions for the wilderness prescription follows:

(1) Wilderness - High Investment

This management intensity assumes 60 percent more use in the future in Recreation Visitor Days than is assumed for Low intensity. Management emphasis would be on dispersing people to retain the quality of the wilderness recreation experience. There would be new trailhead construction and trail construction/reconstruction. More funds would be budgeted for personal contacts with users and the dissemination of information. Wilderness management plans would be updated every 5 years.

(2) Wilderness - Low Investment

This management intensity is similar to High Intensity, but with the following differences: Trail reconstruction would be concentrated on problem and heavy-use areas. No new access and trailhead facilities would be built. Management would aim to protect the wilderness resource rather than provide for high quality experience.

7) **Minimum Level Prescription**

a) **Purpose**

To manage National Forest lands in a near natural condition that maintains their current resource productive potential (custodial management).

b) **Criteria and Assumptions**

The MINLEVEL prescription is applied to all parts of the Forest and is used for the MINLEVEL benchmark run. With this prescription no controllable outputs are produced: these include timber, livestock, and developed recreation. Some costs for maintaining capital investments would be incurred, but these costs would decrease over time. No investment costs would be incurred.

8) **Research Natural Areas (RNA's)**

a) **Purpose**

Establish RNA's to provide areas for nonmanipulative research, observation, and study of undisturbed ecosystems which typify important forest, shrubland, grassland, alpine, aquatic, and geological types on the Gallatin National Forest.

b) **Criteria and Assumptions**

This prescription is assigned to all proposed RNA's. Locate quality candidate areas to satisfy targets and minimize conflict with adjacent land uses.

c. **Use of Cost Efficiency in Developing Prescriptions**

Cost efficiency was considered in developing prescriptions in the following manner. Objectives, standards, and guidelines were established for each prescription by resource element. Given the objective of the prescription, costs were estimated for resource elements to meet the standards or guidelines of the prescription. Costs of producing the outputs that would result from implementing the prescription were developed and compared to the benefit values produced. Prescriptions were carried forward if they were cost efficient in achieving prescription goals.

Four basic assumptions used in developing prescription costs were: costs experienced in implementing past practices were a reasonable basis from which to predict future costs; the funding for production of outputs would include only that necessary to meet the particular output; no significant changes in future budget levels could be predicted; and additional costs incurred with increasing timber harvest include not only sale preparation and administration, but support activities.

FORPLAN Objective Function runs 9 and 10 provide an analysis of the costs and benefits of the various management prescriptions assigned to an Analysis Area. The Forest also utilized a computer program that shows the PNV of every management prescription/analysis area combination. This program, called XMAS, lists the discounted benefits less the discounted costs for every prescription.

The timber prescriptions include several different management intensity options. Part 5 of this section discusses the range of management intensities for timber production. Prior to formulating alternatives, the costs and benefits of the various timber production intensities were compared using Objective Function 10 runs and benchmark analysis.

The Forplan model allows for flexibility in timber harvest scheduling and land allocation. This in turn allows flexibility in using the most efficient prescription for each piece of land. In some cases FORPLAN may choose a prescription with a lower PNV to provide timber volume to meet nondeclining flow requirements.

d. References

Management prescription practices, standards, and guidelines are documented in Planning Record: Management Prescriptions (1983). The prescription intensity details are documented in Planning Record: Resource Information Used in FORPLAN (1983).

5. Development of Timber Harvest Intensities

A range of silvicultural management regimes designed to achieve desired forest characteristics was considered by the timber taskforce (1981). This wide range was narrowed to regimes considered feasible and sound for the timber types which occur on the Gallatin NF. The taskforce agreed that the primary practices that management could apply to the forest were related to stocking control. The combination of practices to achieve stocking control translates into the various management intensities applied to condition classes. The Stand Growth Prognosis System - Eastern Montana, version 81.2 (Wycoff and others, 1981) was utilized to predict timber yields for various silvicultural systems and intensities within each combination of working group and condition class. Costs and benefits were developed for practices and outputs associated with each regime.

Regenerated stands and existing seedling and sapling yield tables were developed for the following regimes:

Natural regeneration, no thinning, with shelterwood at ages 110 and 150 or clearcutting ages 90 to 140.

Natural regeneration, precommercial thinning at age 20 with shelterwood at ages 110 to 150 or clearcutting at ages 90 to 140.

Planting, precommercial thinning at age 20 with shelterwood at ages 110 to 150 or clearcutting at 90 to 140.

Planting, precommercial thinning at age 20 with commercial thinning at age 60 or age 80 and shelterwood at ages 110 to 150 or clearcutting at ages 90 to 140.

Selection cutting with 20-year cycles starting at age 100 or 120 and any older age.

Existing stand yield tables were developed for the same regimes as described above except that the starting ages for selection harvest were more liberal to accomodate the beginning ages of existing condition classes.

The next step was to analyze the range of these practices and regimes both from a timber and economic standpoint to determine if there were combinations that did not contribute to the FORPLAN analysis process and could be eliminated from the range of prescriptions. For all existing condition classes only the natural regeneration - precommercial thinning regime (NA-PT) was retained after the analysis. Throughout a wide range of FORPLAN runs made with the Gallatin data set, the NA-PT was the only timber precription ever assigned to existing condition classes by the FORPLAN model. To compact the FORPLAN model size, all the other timber prescriptions for existing stands were eliminated in subsequent runs.

The assignment of silvicultural regimes to analysis areas varies by slope, species and management prescription. Selection cutting is prescribed in big game summer range and dispersed recreation roaded prescriptions only. Shelterwood cutting is not prescribed in lodgepole pine.

Detailed analysis of assignment logic is found in Planning Record: Timber file, Percentage Application of Silvicultural Systems by FORPLAN prescriptions by Analysis Area Groups (1981).

6. Development of Yield Tables and Coefficients

a. Overview

This section describes how the yields for each resource, road construction, and sediment production were developed. Some yields were developed for analysis in FORPLAN and some were analyzed outside of FORPLAN.

b. Timber

Yield tables for existing analysis areas were developed from 1975 timber inventory data using the eastern Montana growth prognosis model-version 81.2 (Wykoff and others, 1981). The timber inventory data was updated to 1977 prior to the growth projections. This growth prognosis model was calibrated to reflect Forest growth capabilities found in eastern Montana and to provide yields based on both the current utilization standards and the utilization standards projected in the Regional Guide. The Regional Guide identifies the preferred utilization standard as 6 inch d.b.h. for lodgepole pine and 7 inch d.b.h. for all other species. The current utilization standards were used in the first decade for all alternatives and benchmarks.

The results of individual stand projections were summarized by working group and condition class. The mean cubic foot and board-foot volume yields by decade were calculated for each yield group. In order to deal with mountain pine beetle mortality occuring on the Forest, a series of MPB depleted yield tables were developed also. All volume tables include live volume only. The process resulted in yield tables based on more than one stand. These gross yield tables were adjusted to net volume by applying form and defect factors developed from destructive sampling in the timber inventory. Both cubic foot and board foot tables were developed. See Planning Record: Development of

Existing Condition Class Timber Yield Tables for Use in the Gallatin NF FORPLAN Model (Gay,1981).

Timber yields vary by condition class, working group, silvicultural system,mountain pine beetle mortality and time. Assignment of existing stand yield tables is described in the planning record (Gay,1981). First decade midpoint (1985) existing stand board foot/cubic foot volumes and regenerated yields at age 120 are shown in Table B-3.

Table B-3: First Decade Timber Yield

Condition Class	LP,MPB(1) DEPLETED	LP,MPB(2) DEPLETED	DF	DF,Budworm DEPLETED
	--Thousands of Board Feet/Cubic Feet Per Acre---			
Existing timber				
Well stocked sawtimber	6.73/1.58	13.99/3.42	10.47/3.08	8.53/2.45
Poor stocked sawtimber	3.38/0.87	5.28/1.30	5.61/1.72	4.62/1.36
Immature sawtimber	0.77/0.41	10.15/2.63	6.27/2.41	2.76/1.34
Poletimber	1.73/1.11	4.04/2.01	0.94/0.65	0.73/0.54
Regenerated at age 120	14.36/3.72	14.36/3.72	11.29/3.32	11.29/3.32

Shelterwood seed cut removal volumes range from 68 to 86 percent of the above volumes depending on working group and prescription. Selection harvests vary from 17 to 33 percent of the above volumes depending on prescription.

c. **Recreation**

Recreation visitor days for developed, primitive dispersed, motorized dispersed, and non-motorized dispersed recreation by Analysis Area levels 1, 2,and 3 are in FORPLAN. The output yields are on the basis of Recreation Visitor Days (RVD's) use per acre per year. The yield coefficients considered present capacity, use, and anticipated future increases in demand for developed, dispersed and primitive recreation. The basis for the use and projection computations are the Gallatin Forest Recreation Information Management Reports, (RIM), and Region 1 letter 2310, Worf, dated 20 Oct. 1980.

d. **Elk**

Big game outputs from FORPLAN are measured as numbers of elk supportable on winter range. The yields analyzed were forage production on winter and summer ranges. The purpose in analyzing both was to determine which limited elk population. The benchmark analysis indicated that winter range was the limiting factor, so no additional analysis was conducted on summer range.

Winter range forage production was developed using procedures outlined in the Wildlife Surveys Handbook (FSH 2609.21); Gallatin Forest clipping productivity studies (USDA Forest Service 1981); Production Coefficients and Economic Guidelines for Big Game and Livestock (Reid 1981 July 1); Grazing Potential on Lodgepole Pine Clearcuts in Montana (Basile and Jensen 1981); Grassland and

Shrubland Habitat Types of Western Montana (Mueggler and Stewart, January 1980).

Forage yields on winter range vary by prescription, slope class and working group. Forage production is converted to elk carrying capacity based on the following assumptions:

- the winter use season is November 1 to April 1;
- vegetation is dormant during the winter season of use;
- 70 percent use by weight is acceptable when more than 30 percent of the use is during the dormant season;
- approximately 75% of total herbage and browse is not palatable for wildlife and livestock; therefore forage approximates 25% of total herbage and browse;
- maximum allowable use in this plan is 60% of forage on winter range with slopes less than 40% and 50% on slopes greater than 40%;
- forage use is shared by wildlife and livestock depending upon productivity of the analysis area and the emphasis of the prescription;
- forage use assigned to wildlife is converted to elk numbers supported on winter range on the basis of 360 pounds of forage per month for the 5-month period that elk are dependent on winter range.

e. **Range**

The yield analyzed in FORPLAN was forage production on suitable livestock range. Suitable livestock range is as inventoried in Gallatin Forest Range Resource Data Summary (FOREST SERVICE 1980). Range forage production was derived using procedures in Range Analysis Handbook (FSH 2209.21-R1); clipping productivity studies from the Gallatin Forest (USDA Forest Service nd); Production Coefficients and Economic Guidelines for Big Game and Livestock (Reid 1981 July 1); Grazing Potential on Lodgepole Pine Clearcuts in Montana (Basile and Jensen 1981); Grassland and Shrubland Habitat Types of Western Montana (Mueggler and Stewart January 1980).

Suitable rangeland occurs within land classes L40 and G40 (less than 40% slope and greater than 40% slope respectively). Suitable rangeland in land class G40 is only 50% suitable for livestock. Suitable rangeland is further delineated into working groups RANGLO and RANGHI and WILDERNESS. RANGLO habitats produce 50 to 500 pounds of forage per acre per year while RANGHI habitats are those producing more than 500 pounds forage per acre per year. Livestock grazing outputs from wilderness are constrained at currently permitted levels. Total forage production was apportioned between wildlife and livestock at varying levels depending on the purpose of the particular prescription and whether the analysis area is big game winter range on summer range. Transitory grazing outputs are realized from timbered areas at varying levels for 4 decades following timber harvest. Forage production is converted to livestock animal unit months (AUM's) on the basis of 720 pounds of forage per AUM.

f. **Roads**

The FORPLAN road output is miles of collector and local road construction per decade during the planning period. Roads are modeled as built during the first entry of the existing stand. An additional 1-1/2 acres are assumed to be accessed for every acre harvested until the suitable timberland is completely accessed.

The coefficients vary by land class, existing road density, and visual quality objective. The yields are assigned during the first commercial thin or selection entry if the prescription calls for commercial thinning or selection cuts and are assigned during the regeneration cut if the prescription calls for clearcutting or shelterwood with no commercial thinning.

g. **Fisheries**

Fish yields are calculated as catchable-sized (6 inches or more) trout outside of FORPLAN. The yields are based on population estimates by Montana Department of Fish, Wildlife and Parks, taken at streams within the Gallatin Forest and similar streams east of the Continental Divide (Mont. Dept. FWP, 1983).

Estimates were projected for non-inventoried streams on the basis of stream gradient, stream width, geologic parent material within each drainage and for lakes on the basis of lake acreage (Platts,1979).

The base data were adjusted for the various alternatives based on projections of habitat quality changes resulting from land management activities and expected changes in levels of fishing pressure between alternatives. The procedure used predicted sediment increases as described above, removal of large woody debris in riparian areas as inferred from the timber harvest levels and the overall theme of the alternative, and probable changes to streambank understory vegetation from livestock grazing to predict changes in stream fish populations over time.

A second fisheries model was used to predict changes in fish numbers from planned habitat improvement projects as directed by RPA, e.g., placement of large rocks or logs in streams to develop more pools. The probable number of such projects was assumed to depend upon the overall theme of the alternative, while the fish number model is based upon published scientific literature, local aquatic surveys, and input from numerous professional fishery biologists representing many agencies and universities in Montana, Idaho and the western United States.

7. **Analysis Done Outside of FORPLAN**

a. **Water**

Coefficients for projected water yield increase were developed for use outside the FORPLAN model. The Gallatin's model predicts the magnitude of forest-wide average annual water yield increase expected from logging and road construction. Each silvicultural system produces a different hydrologic response over a possible 60 year hydrologic recovery period. The planning procedure used is a local modification of the Northern Region's Equivalent

Clearcut Area (ECA) method (USDA Forest Service Northern Region.1974. Forest Hydrology, Part II: Hydrologic Effects of Vegetation Manipulation. Missoula, MT). The acres of timber harvest by silvicultural system by decade are multiplied by the appropriate ECA parameters to determine a major portion of the water yield increase expected. In addition, the miles of collector and local roads built by decade are multiplied by other ECA factors and this water yield increase added to that from logging for each alternative.

b. **Sediment**

The sediment increase prediction procedure used is generally based upon the Northern-Intermountain Regions' guidelines (USDA Forest Service, 1980) as modified by locally collected sediment data. Also, erosion from fire and skidding operations is considered to be insignificant in this area most of the time and was not included. New road construction and road reconstruction were the driving variables in the sedimentation procedure. The lack of a quantification procedure for livestock grazing is recognized as a major problem in being able to assess the full impact of each alternative on sediment yields for the responsible official.

For each alternative, the miles of road construction and reconstruction in each decade in each mountain range, a scheduled Forplan output, were multiplied by 5.5 acres to get total ground disturbance acres. These acres were then broken down to the five major geologic types found in the potentially roadable areas of each mountain range. Next, all acres of ground disturbance within the same geologic type across all mountain ranges were summed up. Each sum was then multiplied by the locally derived sedimentation increase factor. This factor ranges from a low of 2.5 tons/acre/decade up to a high of 160 tons/acre/decade, after a sediment delivery coefficient had been applied which routes the in-stream sediment to a critical reach, usually the mouth of a drainage. After the sediment increase from each geologic type was calculated, the total from all geologic types could be easily determined.

c. **Minerals**

The minerals information required as part of the Forest Plan, per 36 CFR 219.12(j), came primarily from the following sources:

1. Information on active mining claims on the Forest, which is kept current by the BLM (USDI, Bureau of Land Management). The "Recordation" information is collected under authority of Section 314 of the Federal Land Policy and Management Act. Mining claim locations and proof of annual assessment work is submitted to the BLM by the claimants. The BLM records the information and provides a synopsis to the Forest. The Forest maintains the "Recordation" information supplied by the BLM and actively uses and relies upon it in the administration of various Forest and mining projects. Also it is available to the public.

2. Forest and Regional Office land status records were reviewed to determine land status for outstanding and reserved mineral rights. Forest planning records were used to establish the locations and acreages for lands that are currently, or proposed to be withdrawn from mineral entry (i.e., wilderness, W&SR, NRA, administrative).

3. Mineral ocurrence and potential evaluations were based on evaluation of published and unpublished records, evidence of activity both past and present, and sampling data in some cases. Determination of Low, Moderate, High, and Very High potential ratings is based on guidance and direction received from the Minerals and Geology group of the Regional Office.

The availability of minerals for development was tallied for each alternative based on a review of the management area emphasis applied across the Forest. All management prescriptions were grouped into categories A, B, C, or D ranging from most restrictive to least restrictive for mineral exploration and development. The number of acres of low, moderate, high, and very high potential in each management category was tallied for each alternative and used as a relative indicator of the alternative's impact on mineral availability.

d. Utility and Transportation Rights-of-Way and Corridors

A determiniation of the general rights-of-way needed in each alternative was made based on a review of the geographic distribution of management emphasis across the Forest. Potential corridors and existing rights-of-way were considered as part of the analysis done outside of FORPLAN. Avoidance areas were identified and then examined in each alternative. These areas are places where establishment and use of corridors conflict with other management objectives such as cultural or historic sites, wilderness areas, research natural areas, and scenic areas.

e. Employment and Income Impacts

An input-output model (IMPLAN) is used to estimate the employment and income impacts of various Gallatin National Forest outputs and activities. Direct, indirect, induced, and total impacts are calculated fo each alternative and for the benchmarks.

f. Energy Consumption

Energy consumption was computed outside of FORPLAN following Regional Office direction contained in the February 5, 1981 document "Accounting for Energy Consumption in Forest Planning" by J. E. Brickell. This document is available in the Forest Planning records. The energy consumption for each alternative is based on the estimated energy use required for Forest Service administrative activities, road construction, road maintenance, timber harvest, recreation use, and grazing permittees. Energy consumption is determined based on the gallons of gasoline and diesel fuel used in each of the activities. Coefficients used in the energy consumption calculations are also documented in the forest planning records.

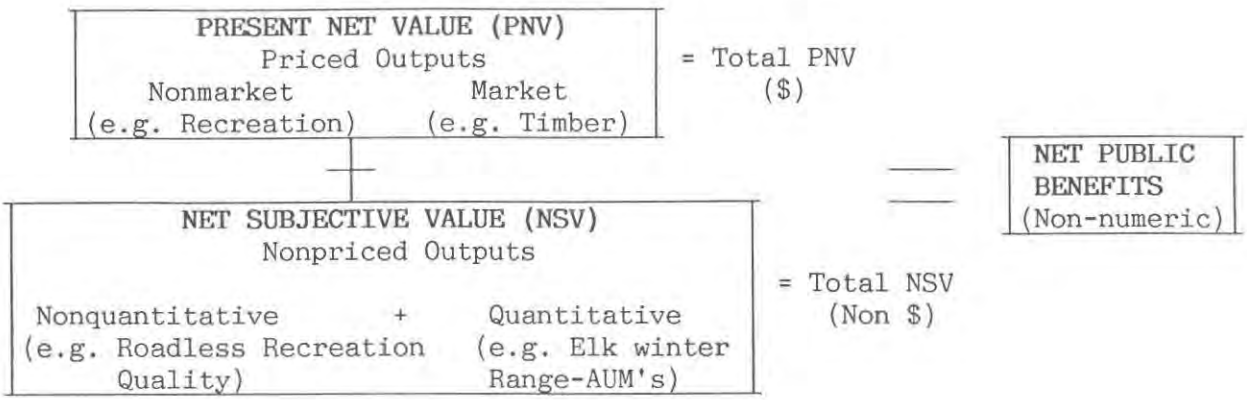
D. Cost Efficiency and Net Public Benefit

Changes Since the Draft EIS

Since the release of the draft EIS, the Forest has done additional analysis to determine the effect of using real price increases for timber benefits in the FORPLAN model. The results of this "sensitivity" analysis are discussed later in this section under Timber Benefits.

Another change involved removing the real timber price increases in the FORPLAN model beyond the fifth decade. These price increases were mistakenly used for all fifteen decades in prior runs. Removing these accounts for the slight decrease of PNV in all alternatives in the final EIS. These changes are seen in all tables throughout the text showing PNV.

This section describes cost-efficiency criteria and explains how net public benefits are derived. This analysis is required by National Forest Management Act regulations (36 CFR 219) and plays an important part in the development, comparison, and selection of Forest planning alternatives. The following diagram displays the factors included in net public benefits:



1. **Net Public Benefit**

Maximization of net public benefit is a goal of the Forest planning process. Net Public Benefit is the overall value to the nation of all outputs and positive effects (benefits) less all the associated Forest inputs and negative effects (costs) of producing priced and nonpriced outputs from National Forest lands. Thus, net public benefit represents the net value of priced outputs (PNV) plus the net value of nonpriced outputs. "Net" value is used because dollar costs of producing nonpriced benefits can also occur. Net public benefit cannot be expressed as a numeric quantity because PNV cannot be added to qualitively valued nonpriced outputs. In addition, not all resource outputs have been assigned monetary values and costs.

2. **Present Net Value (PNV)**

PNV represents the dollar difference between the discounted value of all priced outputs and all Forest costs over the 150-year planning period. Two discount rates, 4 percent and 7-1/8, percent were used to represent the cost of money over time. Priced outputs include those outputs with market values (timber, range forage, developed recreation, and special use permits) and those outputs with assigned nonmarket prices (dispersed recreation).

Each benchmark and alternative was designed to achieve its goals and objectives in a manner that produces the greatest PNV. This was accomplished by solving FORPLAN with the objective function of maximizing PNV while meeting the specified constraint of the benchmark or alternative. The PNV calculated in

FORPLAN is modified by including benefits and costs not modeled in FORPLAN. The modified values were used to evalute the benchmarks and alternatives. The benefits and costs not included in FORPLAN were those which do not influence and are not significantly influenced by land uses and output scheduling. This section describes how the prices and costs were calculated.

a. Priced Output Parameters Used in PNV

1) Discounting

Two discount rates representing the real cost of money over time were used to solve FORPLAN and to calculate the economic consequences of the benchmarks and alternatives. Both rates were used for the proposed action. The 4 percent rate approximates the return on long-range corporate investments above the rate of inflation. (Row and others, 1981). The 4 percent rate was the rate used to evaluate benchmarks and alternatives. The 7 1/8 percent rate, which is consistent with the 1980 RPA, was used to determine sensitivity of the proposed action to the 4 percent rate by solving FORPLAN at both the 4 percent and 7 1/8 percent (FSM 1971.5, R-1, ID. No. 7). The the PNV of the other benchmarks and alternatives were also recalculated using the 7-1/8 percent rate. All costs and benefits were discounted from the midpoint of the planning period (Planning Records, 1981).

2) Real Dollar Adjustments

Inflation was not included in the discount rates, benefits, and costs due to the difficulty of estimating future inflation rates and the assumption that inflation would equally affect both costs and prices. All prices and costs are expressed in first quarter 1978 dollars, consistent with the 1980 RPA. The Gross National Product (GNP) implicit price deflator index is used to inflate or deflate price and cost data to this common base (FSM 1971.32b).

b. Costs Used in PNV

All agency costs were estimated for the 150-year planning period for all benchmarks and alternatives. This section discusses how costs were developed, the major expenditure categories, funding source, and a summary of actual costs by resource.

1) Cost Development Process

Costs were developed by Forest personnel in conjunction with developing standards and guidelines for management prescriptions. The resource workgroups estimated costs for every management activity specified by management prescription. The costs were based on historical data and professional judgment, and approximate the minimum funds needed to achieve the standards and guidelines in the management prescriptions. Cost data was used in developing feasible and cost-efficient prescriptions.

Costs dependent on land use proposals and timber harvest schedule were modeled in FORPLAN by entering them in the economic tables. By solving FORPLAN to maximize PNV, the cost-efficient level of agency expenditures for each proposed land use was estimated for 150 years. Other costs which were not modeled in FORPLAN were developed by the planning team to meet the objectives of each

benchmark and alternative. Summarized cost data is discussed later in this section. More detailed information on data sources, FORPLAN modeling procedures, and costs is in the Forest planning records.

2) Cost Categories

Costs were stratified into three classes: fixed Forest Service costs, variable Forest Service costs, and co-operator costs (FSM 1971.52).

Fixed costs are the minimum expenditures necessary to meet legal requirements of ensuring public safety and environmental protection. These costs are defined by the minimum level benchmark and are $2.6 million/year for the first decade and $2.7 million/year for the remaining years. These costs do not vary by alternative and do not affect land management decisions. The costs include fixed ownership requirements (such as -- soil, fire, insect and disease protection), short-term maintenance of range allotments, timber, human and community development, and general administration.

Variable costs vary with the controlled output level specified in each benchmark or alternative. They include capital investments (the costs of creating or enhancing capital assets over time), planning and inventory, and operations costs (including annual costs of administration, management, and protection of existing resources and capital assets). Variable costs include the costs necessary to meet minimum management requirements which are in the standards and guidelines of planned activities.

Agency co-operator costs (ie. timber processing and grazing allotment cooperator costs) are reflected in the output prices and are not directly treated as a cost.

In most cases, expenditures are appropriated through normal federal budgeting procedures. Two exceptions are in-kind payments and special collections. Road construction and reconstruction which are performed by timber purchasers (in-kind payments) are deducted from timber receipts. Second, most of slash disposal, site preparation, and reforestation costs following timber harvest are financed through special collections (from timber purchasers) for brush disposal and Knudsen-Vandenburg funds.

3) Cost Increases

None of the basic unit costs are expected to increase above inflation over time. However, the average unit costs of many activities will increase through time as more expensive management activities are scheduled. For example, the average road construction cost increases in the first few decades as the more rugged land classes are accessed. Also, real price increases are considered for production costs in deriving future time stumpage costs.

4) Cost Data by Resource

Costs are associated with each resource output for timber, range, recreation/ wildlife, minerals, soil and water, and nonseparable costs. The nonseparable costs are not separated into resource, e.g., road maintenance, fire protection, and general administration.

Calculating present net value by individual resource may be misleading because the costs include expenditures required to produce, enhance, or mitigate more than one resource. For example, slash disposal costs may contain a cost to mitigate visual quality. This cost (which is currently nonseparable) appears in the timber category. Thus, the costs by resource output do not always have a direct relationship with the benefits by resource.

Costs for all management activities are displayed in Table B-4. The costs are grouped by resource program.

Table B-4: Management Activity Costs

RESOURCE AREA	ACTIVITIES	COST PER UNIT
Recreation-- Operations/ Maintenance	Planning & Inventory	$28,000/Year
	Developed Sites	402,000/Year
	VIS Services	146,800/Year
	Dispersed Rec	$.03-.07/Acre
	Trail Maintenance	$180/Mile
Recreation Investments	Site Const./Rehabil.	$3500/Family Unit
	Trail Construction	$7500/Mile
	Trail Reconstruction	$3000/Mile
Wilderness	Planning & Inventory	$31,000/Year
	Management	$.15/Acre
	Trail Maintenance	$180/Mile
	Trail Construction	$9300/Mile
	Trail Reconstruction	$3000/Mile
Wildlife/Fish	Planning & Inventory	$25,000/Year
	Program Maintenance	$101,000/Year
Habitat Improvement	Wildlife	$13-30/Acre
	T & E Species	$30/Acre
	Fisheries	$300/Structure
Range-- Operations & Maintenance	Planning & Inventory	$67,000/Year
	Resource Management	$137,800/Year
	Range Maintenance	$15,600/Year
	Trail Maintenance	$180/Year
Range Improvements	Struct. Improvements	/$5000-9000/ Structure
	Forage Improvements	$25-46/Acre
	Noxious Weed Control	$22,000/Year

Table B-4 (Cont'd)

RESOURCE AREA	ACTIVITIES	COST PER UNIT
Timber	Planning & Inventory	$47,000/Year
	Silvicultural Exams	$4.82/MBF
	Reforestation	42-199/Acre
	Timber Stand Improv.	$27-104/Acre
	Timber Sale Program	$120-188/Acre
	Timber Harvest Admin.	$6.70-11.30/Acre
	Fuel Treatment (Site Prep.)	$145-437/Acre
	Road Const.-Collector	$56,620/Mile
	Road Reconstruction	$10,400/Mile
	Road Const.-Local	$21,500/Mile
	Road Maintenance	
	Preconst.& Const. Engineering	
	--Collector	$9375/Mile
	--Local	$6440/Mile
Soil and Water	Planning & Inventory	$105,500/Year
	Improvements	$ 19,400/Year
Minerals Management		$128,000/Year
Landownership Management	Special Uses Management	$148,000/Year
	Right-of-Way Acquisition	$ 90,000/Year
	Land Exchange	$140,000/Year
	Land Line Location	$ 46,600/Year
Fire Protection		$382,000/Year
Fuels Treatment	Inventory	$ 13,800/Year
	Treatment	$ 56,900/Year
General Administration		$1,062,000/Year

5) Budget Cost Component

The budget component of the costs in Table B-4 make up the basis of the estimated appropriated costs of management for each alternative and benchmark. These costs were reported as annual averages for each of the fifteen planning periods. Budget costs were stratified into the following categories:

- Fixed costs
- Operation and maintenance costs
- Capital investments
- Purchaser road credit costs

Budget costs were calculated similarly to the method used to determine costs data by resource component. Variable costs for each budget cost category were summarized from the FORPLAN economic reports by planning period for each alternative and benchmark. Fixed costs were included to determine the total categorical costs. Following is a summary of each budget cost.

a) **Fixed Costs**

Fixed costs were broken into two classes: The first is minimum level necessary for non-deferrable activities for insuring public safety and environmental potection not associated with controllable outputs. The second is the protection and maintenance of capital assets at agreed levels of service and availalbility in the absence of controllable use. These costs were included in each alternative to determine the total Forest budget. This category includes costs for planning and inventory of the various resources or activities as well as the maintenance and protection of existing facilities. All of the developed recreation and existing wilderness area costs are included in this category. Also included are Forest Planning, Timber Planning, and General Administration.

b) **Operations and Maintenance Costs**

Operations and maintenance costs include activities required to keep capital assets at agreed levels of service and availalbility, and activitiies required to produce, or incurred as a result of producing, controllable outputs (FSM 1971.32b, R-1 ID No. 7). Operation and maintenance costs are a summation of various costs reported in FORPLAN economic reports.

c) **Capital Investments**

Capital investments were defined as the costs associated with construction and reconstruction of roads, jointly used administrative, or other facilities with benefits occuring over more than one 5-year period. Capital investment costs were calculated as a summation of periodic costs reported in the FORPLAN Economic Reports.

d) **Purchaser Road Credit Costs**

The purchaser incured costs of constructing and reconstructing local and minor collector roads required for timber harvest oprations were included in the cost analysis to provide a true cost estimate of management activities. It is assumed that while these costs are purchaser incurred, they do constitute government expenditures since timber revenues are paid to the purchaser for construction of these roads. They also constitute a portion of the costs used in assignment and scheduling within the FORPLAN linear program. Purchaser road credit costs are modeled in FORPLAN along with other road costs.

c. Benefits Used In PNV

All priced benefits were estimated for the 150-year period for all benchmarks and alternatives. Priced outputs include those resources that are or could be exchanged in the marketplace. The outputs which are assigned prices are timber, range, recreation, minerals, and special uses. This section discusses the methods used to estimate current and future values.

The prices used in the analysis reflect onsite values for all resources, i.e., the value of the resource on the Forest. The values are consistent with cost estimates for activities which produce onsite resources. Benefits are classified as market values (timber, range, developed recreation, minerals) or nonmarket values (dispersed recreation). Furthermore, some of the benefits are actual receipts or in-kind payments to the government. The receipts serve as a base for 25 percent fund payments to local governments. Finally, some of the benefits are fixed. These benefits are associated with the minimum level benchmark and are the benefits associated with no active management.

1) Timber Benefits

The value assigned to timber reflects the onsite value of stumpage to the Forest Service. With the exception of sales currently under contract, stumpage is a variable benefit (it can vary in quantity and value over time). Stumpage value is the difference between the lumber price and production costs of logging and milling. The calculation of the difference is done by the FORPLAN model after it has been provided with the necessary price and cost information.

Estimates of high bids, the first information needed for FORPLAN stumpage price calculations, were derived from regression analysis done on 80 "East Side" Forest timber sales sold during the period 1976 to 1981. (See Planning Records: Timber Valuation For FORPLAN "East Side" National Forests, September 1981). No specific stumpage valuation equation was developed because the major independent variables that affect value cannot be used in the Forest's long term planning model. For instance, 80 percent of the sale value variation is related to four market variables: 1) housing starts; 2) sale contract length; 3) volume under contract at time of sale offering; and 4) a variable measuring the rise or fall in lumber prices during the six months preceeding the sale. The influence of logging method on value could not be tested because tractor logging was prescribed for virtually all of the sample sale volumes.

The absence of an applicable stumpage valuation equation does not affect the methods by which current and future timber prices and costs are calculated in FORPLAN. These methods are explained in detail in: "The Use of Stumpage Valuation Equations In FORPLAN" (Merzenich, 1981).

The initial stumpage price for tractor logged areas, based on a weighted average of 1976 to 1981 sales, is $44.69/mbf. This price was calculated by combining the average high bid of $38.80/mbf with average brush disposal(BD) fund collections of $5.89/mbf. Since the high bid is defined as the sum of cash receipts plus in-kind road payments, average ineffective road credits of $1.47/mbf are included in the high bid value.

Historically, only tractor logging has been done on east side Forests like the Gallatin. In FORPLAN analysis areas that will require cable logging, a reduction in the initial stumpage price is made to reflect the higher logging costs. The reduction is $45.00/MBF (developed from west side Forest averages).

Using projections of real stumpage price increases also required estimates of current average lumber price, ie. end product value. On the Gallatin the value is $258.83/MBF. This value was also calculated from the Forest sample data and is used in FORPLAN stumpage value calculations. Logging systems vary by habitat type, condition class, and management prescriptions. Stumpage values vary from $3.04/MBF to $36.96/MBF in the benchmarks and alternatives in decade 1.

Projections of stumpage prices to the year 2030 were made for the 1980 RPA program (Adams and Haynes, 1980). These projections were based in turn on separate projections of lumber prices and production (logging and manufacturing) costs. Because lumber prices are projected to increase at a faster rate than production costs, stumpage prices are projected to increase. The following table displays indices showing the estimated rates of increase from the base period (base=100). For a detailed explanation of the methodology see Merzenich, 1981.

Decade	Lumber Price Index	Production Cost Index
1	114.5	111.8
2	142.5	136.5
3	165.3	150.9
4	186.3	154.7
5	207.3	158.1
6	218.8	159.5

The demand curve for timber is assumed to be horizontal; therefore, no downward sloping demand curve for timber is used in the FORPLAN computer model. None of the available techniques for developing Forest level demand functions have a strong enough theoretical basis. See Downward Sloping Demand Curves (Reid, 1981 February 12).

Receipts from timber sales include cash payments for stumpage plus in-kind credits for road construction by timber purchasers. Timber receipts are calculated as the gross stumpage value of timber.

Changes Since the Draft EIS

In the DEIS both the alternative and the benchmarks were developed with the assumption that the real price increases for timber continue to rise from the 6th through the 15th period. The rate of increase is based upon that shown above for period 6. Because of the lengthy time periods being predicted, it was decided that the price increases should not be applied beyond the sixth decade. Therefore the alternatives were reanalyzed using revised price assumptions. Both the Max PNV and the preferred alternative were rerun with the economic table change. Therefore all the alternatives are comparable benchmarks PV2 and PV5 (Max PNV) the effects of this change are evident.

Tables B-10 and B-11 show this comparison. The PNV of PV5 is 10 MM$ less than that of PV2. This is due primarily to reduced timber values in late decades.

Timber values are recognized to be ever-changing, dependent upon National demand for wood products, local timber supplies, and other factors not subject to the control of the Forest Service. The stumpage prices used in FORPLAN were based on high bid prices for the years 1976 to 1981. The average high bid price during this period was $38.80/mbf. In response to public comment that this base price was too high, stumpage prices were recalculated for the Forest based on harvest data fo the years 1975 to 1984. The recalculated average based on actual receipts for this ten year period was $37.55/mbf. Because this price is essentially the same as that used in FORPLAN it was concluded that the original prices are valid.

The following discussion describes the results of a sensitivity analysis which addresses the issue of using real price increases in the first five decades.

This analysis portrays the effects of the timber price increase assumption on these two alternatives. The tabular comparison shows the Max PNV benchmark and the Preferrred alternative with and without real price increases. This table includes alternative characteristics most sensitive to changes in timber prices.

ALTERNATIVE	PRICE INC (Yes/No)	PNV MM$	SUIT ACRES M Acres	LTSY MMBF
Max PNV	Yes	309	65	8.0
Max PNV	No	304	49	6.2
Alt. 7	Yes	276	297	26.7
Alt. 7	No	245	297	26.7

As indicated by this table PNV, suitable acres and LTSY are all affected by changing the timber price assumptions. The amount of effect is generally dependent upon the characteristics of the individual alternative. For example, Alternative 7 has a sensitive PNV but an insensitive number of suitable acres. This is because the acres allocated to timber management are fixed in this alternative. This table expresses the general trend of reduced PNV, suitable acres and LTSY in response to lowering expectations of future timber values. These reductions will be directly related to the amount of timber harvesting activities within each alternative. The timber lands most affected by price assumptions are those with steep slopes and those non roaded areas.

2) **Range Benefits**

The value assigned to range forage reflects potential dollar returns from the range resource to the taxpayers even though only part of the price is actually collected by the National Forest. The price is the net value to the rancher above the cash costs for grazing on the Forest. Price components include livestock productivity, production costs, season of grazing, and livestock market prices. The 1979 value for the Forest is $8.66/AUM (Gee, 1981). This price is expected to increase in the future as red meat consumption increases. The real value increase for range was initially projected along a nonlinear path which increased at first, tapering off over time. Since FORPLAN is a linear programming model and cannot be used with a nonlinear curve, a linear

approximation of the curve was devised. First the base value of $8.66 was used to project the real price increases along the different points of the growth curve. Then the present value of one AUM per year was calculated by discounting the real price increases from the curve back to the present. When the real price increases are applied to the $8.66/AUM value and discounted at 4% over 150 years, the present value turns out to be $239.33 for one AUM per year for a total of 150 years. To find a linear expression an annuities table was used to determine a constant value which, when discounted at 4% over 150 years, would have a present net value of $239.33. The single linear value, incorporating all real price increases, used in FORPLAN was $9.60/AUM.

Because all forage outputs from the Forest are expected to be consumed, all forage outputs are priced. Actual receipts from the grazing program are derived from fees paid by the permittee. The assumed actual receipt value on the Forest is $1.73/AUM which is an average value for 1977-1982.

The value of the range program associated with the minimum level benchmark is the value of the current program until allotments expire. The value in other benchmarks and alternatives is calculated by applying $9.60/AUM to the livestock forage schedule in FORPLAN.

3) Recreation/Wildlife Benefits

The value assigned to recreation reflects potential dollar returns from recreation to society even though most dollar values are not actually collected by the National Forest. The value (willingness to pay) is the difference between the total value of a recreation experience to the recreation user and the cost of participating. The prices vary by type of experience and are expected to increase in the future. Future real price increases are included as constant value annuity payments determined in the same way as range values (see section b above- Range Benefits).

The National RPA analysis of recreation values was used as the basis for the values assigned to projected volumes of recreation. To meet computational limitations within FORPLAN, the many types of recreation were aggregated into four basic groups: Primitive, Nonmotorized, Motorized, and Developed. Then a weighted mean value was derived from historic use distributions. The values for the Forest are displayed in Table B-5:

Table B-5: Base and Annuity Prices for Recreation
(1978 Dollars, $/Recreation Visitor Day)

Recreation Type	Base Value	Annuity Value
Primitive	$8.00	$9.45
Nonmotorized	9.34	11.50
Motorized	3.00	3.39
Developed	3.00	3.39

Source: FSM 1970 R-1, 1981.--as aggregated.

Recreation use is projected to increase on the Forest as the population in Montana increases. Since recreation capacity exceeds use projections,

recreation use rather than capacity is valued, i.e., the value of the recreation resource is based on expected use rather than capacity.

Receipts from developed recreation and special use programs consist of fees paid at campgrounds and fees paid for special uses. Fees are projected to continue at $115,000/year, which was the value for 1982.

The value of recreation was calculated in the FORPLAN model. A trend of increasing dispersed and wilderness recreation is expected for all benchmarks and alternatives. (Min Level developed recreation drops to zero after the first decade).

Much of the recreation value is fixed, i.e., it is not a result of active management.

4) Minerals Benefits

Receipts from the mineral program are fees paid for mineral leases and royalties. The value is $600,000/year in the first decade and $850,000/year in later decades. These are actual receipts. They are calculated outside FORPLAN. They are associated with minimum level and are assumed to be constant for all benchmarks and alternatives. They are not affected by land management activities, and they assume a moderate level of mineral activity.

5) Water

No monetary value was assigned to water because most increase in water yield will run off in the spring when no excess storage capacity exists.

3. Net Subjective Value (NSV)

a. Definition

Net subjective value is the total qualitative value of all resources or outputs whose value cannot be measured in dollars. Market values or satisfactory nonmarket values are not available for these outputs and therefore no basis exists for making direct comparisons with priced outputs. Nonpriced outputs are valued subjectively. In general, as the subjective value of nonpriced outputs increases, the monetary value of priced outputs as measured by PNV decreases. For example, protecting elk habitat may reduce PNV because timber harvesting activities are often more restricted. The Net subjective value of elk habitat needs to be considered along with the magnitude of the timber value forgone (a tradeoff or opportunity cost). "Net" implies that both nonpriced benefits and costs can occur.

The most important nonpriced outputs in this analysis are summarized in six general areas: recreation, wildlife/fish, watershed, minerals, protection and other. Different levels of nonpriced outputs are produced in different alternatives by applying management prescriptions to specific areas and/or by applying output and inventory constraints. Any dollar costs associated with nonpriced outputs are included in PNV calculations. How well an alternative addresses issues is a general measure of its net subjective value.

b. Nonpriced Outputs

This section summarizes major nonpriced outputs, the affects of changes in output levels, what indicators were used to measure output changes, and how the changes in the output levels affect present net value. The nonpriced outputs described below do not identify all the non-dollar benefits of forest management. However, these were factors the interdisciplinary team felt were important to the development and evaluation of the alternatives, based on the public issues and management concerns. More discussion of nonpriced outputs is presented in Chapter II and in Table B-16 of this appendix.

1) Recreation Related

a) Recreation Quality

Within the alternatives , the assigned recreation values do not reflect such quality aspects as the dispersal of users, the minimization of conflicts between user groups, and the desirable spatial distribution of the recreational settings, including developed sites.

b) Recreation Diversity

The opportunity for a diverse number of types of recreation such as wilderness, motorized, nonmotorized, or roadless recreation cannot be adequately portrayed in the in the assigned values used for PNV calculations. A measurement of recreational quality and diversity can be found in the number of acres delegated to recreation emphasis and in the amount of investment in trail construction and maintenance.

c) Free and Low Cost Consumptive Goods

Benefits such as fuel wood, wild game, fish, christmas trees, or posts and poles, often of both recreational and more direct economic value to many people, are not assigned a dollar value in the FORPLAN analysis.

d) Visual Quality

The benefit of visual quality is not included in the recreation values. The alternatives vary on their sensitivity to visual quality and each was evaluated according to how well it met visual standards.

The alternatives were designed to explore the tradeoffs of providing different levels of visual quality by changing the mix of visual quality objectives and the amount of undeveloped area. Visual quality is maintained as more of the Forest is retained in the current visual condition. Visual quality increases or is maintained as timber harvesting and livestock grazing decrease, and the populations of wildlife, fish, water quality, roadless, and wilderness increase.

e) Access

Access to the Forest boundary is valued by most recreationists and the benefit of providing adequate access is not included in PNV. Each alternative was evaluated for the trail and road access it provides.

2) **Wilderness and Roadless**

The amount of wilderness and roadless lands of each alternative is a value that has not been calculated in the FORPLAN analysis and therefore, is not a part of the PNV calculation for each alternative. Indicators of the value is the amount of acres each alternative contains of roadless and wilderness lands.

3) **Wildlife and Fish**

a) **Quality Hunting and Fishing**

The quantity of hunting and fishing visitor days valued in FORPLAN varies by alternative. However, differences in the quality of these recreation experiences are not reflected in the PNV calculation. A measurement of hunting opportunities are the hunting opportunity index.

b) **Threatened and Endangered Species**

The value of maintaining or restoring viable populations of these species is not included in PNV. On the Gallatin the bald eagle is an endangered species and the grizzly bear is a threatened species. Bald eagle habitat is extremely limited on the Forest and is protected in all alternatives. Providing secure habitat for the grizzly to help recover the population is a nonpriced output which is evaluated for each alternative. A quantitative measurement, however, is the amount of land assigned to grizzly bear emphasis.

c) **Habitat Diversity**

Maintaining habitat diversity over the long term is also considered a nonpriced component of net public benefit. The vegetative diversity such as old growth, grass, forbs, riparian, is evaluated for the alternatives. Animal species diversity is often dependent on plant diversity (horizontal diversity). Horizontal diversity refers to the successional vegetative stages, e.g. shrubs, saplings, immature timber, or old growth. This is also referred to as age class distribution. The expected distribution of these age classes was calculated for each alternative and does provide a quantitative measurement for evaluating each alternative. PNV will usually decrease as timber harvest is restricted to provide thermal cover, old growth, and diversity.

4) **Watershed**

a) **Water Quality**

Water quality is a nonpriced benefit tied to the watershed and wildlife/fish issues. Fishermen, other riparian area recreationists, farmers and ranchers who irrigate with water from the Forest, municipalities supplied with Forest

water, and adjacent landowners are directly concerned with water quality and streamflow.

The indicators of water quality are the amount of sediment in streams and the number of catchable trout. Alternatives are designed to maintain a range of water quality from the minimum management requirement level to a level that includes additional mitigating measures to control erosion and sedimentation.

Water quality can be adversely affected by road construction, timber harvest, and other management activities. In some watersheds, development is shown to cause an increase in sediment production and a corresponding decrease in fish habitat and stream channel stability. Watershed values were not included in the calculation of PNV but are evaluated as nonpriced outputs of each alternative.

PNV generally decreases as water quality increases since cost efficient timber management is restricted in riparian areas. Logging and roading costs rise.

Water quality decreases as timber harvest, road construction, and livestock increase; but increases with higher visual quality, more unroaded recreation, wilderness, wildlife, fisheries, elk security, and thermal cover.

b) **Riparian Protection**

Yhe riparian vegetation zone is an integral part of the watershed value because it provides habitat for several animal species, protection to important stream fisheries, and forage for big game and livestock.

5) **Minerals**
(Availability of Minerals, Oil, and Gas)

These potential resources were not given monetary values in FORPLAN. As a proxy for the unknown quantities, it was necessary to value in a subjective manner the approximate availability for exploration and development that the land assignments of the various alternatives provided. This availability for exploration was considered for each alternative in the evaluation of net public benefit and is displayed later in this appendix.

6) **Protection**
Reduction of Insect, Disease, and Fire Hazard

The potential for insect infestation and fire hazard is high over the long term. This is because the Gallatin has large areas of mature and over-mature stands of timber which are highly susceptible to insects and wildfire. Timber harvest and fire management are the primary means of improving the age class distribution and thus reducing the hazards. These activities are evaluated for each alternative.

7) **Other Benefits**

a) **Coordination and Cooperation with Other Landowners**

Because of the large number of adjacent and intermingled landowners, the Gallatin Forest can both affect and be affected by their management.

Coordinating Forest land uses with other landowners is viewed as an additional nonpriced output.

b) Local Lifestyles

Local lifestyles are affected by jobs and income generated by resource-related industries, individual use of Forest resources, and access to public lands. These factors were considered for each alternative.

c) Amount of Change

The amount of change from the present is discussed for each alternative. Of value to many people is a knowledge that the resource uses and outputs on the Gallatin will not change markedly, that the way the land has been used traditionally can be expected to continue for some time. Some alternatives present a major change from the current direction while some propose only minor changes. Changes can be measured in terms of acres proposed for different uses and also by changes in the mix of resource outputs such as timber, range, and recreation.

d) Employment

The amount of employment each alternative provides is not priced as a part of the PNV calculation. However, employment does vary between alternatives and is measured by the number of jobs associated with each alternative.

E. Social and Economic Impact Analysis

1. Overview

Social and economic impact analysis estimates the relationships of National Forest activities to people. Short-term impacts are of primary concern, with consideration given to longer term effects (over 10 years) occurring within the impact area of the Forest.

Social and economic information provides insight into the planning issues and concerns. The Forest provides timber, livestock forage, and recreation opportunities which cause economic impacts in the local area, generating issues of concern to local people.

Forest related economic impacts on employment, income, and state and local government revenues are directly related to the social well-being of people in the impact area. Additionally, the population's lifestyles, attitudes, beliefs, values, and social organization are closely linked to Forest Service activities.

Prior to the development of alternatives, information was gathered on the existing social and economic situation of the impact area (Section II, Appendix B).

2. Impact Analysis Area

An area of "primary impact" was defined for the Gallatin National Forest as the multi-county area recieving the broad majority for resource flows from the Forest. Resource flows are defined here as the movement of forest goods and services to consumers or primary manufacters.

The selected impact area includes Gallatin, Park and Sweetgrass Counties in Montana. More than 85 percent of all the resource flows from the Gallatin National Forest are consumed or processed for later consumption in these counties.

3. Economic Impact Model

An input-output model (IMPLAN) is used to estimate the employment and income impacts of Forest outputs and activities. Direct, indirect, induced, and total impacts are calculated.

Economic input-output (I-O) analysis is a procedure for describing the structural interdependencies of a regional economy or impact area and serves as a short-term predictive model for evaluating the impacts of shifts in Forest outputs and activities.

I-O analysis is based upon the interdependence of production and consumption sectors in the impact area. Industries must purchase inputs from other industries, as well as primary sources like natural resources, for use in the production of outputs which are sold either to other industries or to final consumers.

Flows of industrial inputs can be traced via the I-O accounts to show linkage among the industries in the economy. The accounts are also transformed into a set of simultaneous equations that permit the prediction of economic effects resulting from changes in Forest outputs and activities.

a. IMPLAN Data Base

This I-O model has a data base consisting of (1) a national level technology matrix and (2) a county-by-county file of estimated activity levels for total gross output, six components of final demand, three components of final payments, and employment for 466 industrial/business sectors.(see IMPLAN Users Manual for detailed information on the I-O model).

The national technology matrix is based on a 1972 Commerce Department I-O model that was converted to an industry by industry basis and updated to 1977 using the RAS procedure (Clopper and others, 1974). The county level information is based on a 1977 data set constructed by Engineering Economics Associates of Berkeley, California.

b. National Data Base Reduction to Impact Area

Utilizing the national technology matrix and the regional control totals for the local, multi-county impact area, a data reduction method is employed to develop a regional input-output table. The method uses the property of

"openness" displayed by regional economies compared with the national economy (Richardson, 1972). Smaller regional economies exhibit much greater tendencies or are more open to import and export than is observed at the national level. Based on the assumption that trade balances are the principal difference between national and regional purchase patterns, the supply-demand pool technique for data reduction was adopted (Schaffer and Chu, 1969).

c. **Final Demand Expenditures**

The I-O model translates Forest outputs and activities into employment and income impacts. An intermediate step in this process is the translation of outputs into final demand dollars. Final demand expenditures are different from the values used in the efficiency analysis. Final demand expenditures represent the dollars spent by the final consumers of the finished products derived from Forest outputs. For instance, timber is processed into lumber which has a sale value at the mill. The sale value represents the amount of new money that will be directly generated for the local impact area. Assuming that most is sold outside the impact area, this causes the local impact. In contrast the efficiency analysis, in part, examines stumpage or the market value of the raw material that leaves the Forest.

This modeling step is accomplished by applying a final demand expenditure per unit of output to total outputs and linking the resulting dollar amount to the sectors in which the direct expenditure takes place. This process determines the change that takes place in the existing economy. Expenditure information is contained in the planning records.

4. **Base Year Employment and Income Information**

Forest outputs for 1980 were determined and run through the I-O model to provide a base situation from which employment and income changes could be measured. Table B-6 contains 1980 output levels, employment and income amounts associated with 1980 outputs, and the jobs and income associated with each unit of output. Alternative comparisons are contained in Chapter II and in Table B-7.

5. **Returns to Federal and State Government**

The returns to the U.S. Treasury are significant because of the contribution to the U.S. Treasury and because 25 percent of the returns are paid back to local governments (Figure II-33). The returns result from the sale of timber, livestock grazing fees, campground fees, mineral leases, and special use fees. Returns include cash payments and credit for roads built by timber purchasers. Receipts from mineral leases and special uses are estimated to be constant. The estimates for timber receipts are significantly dependent upon projected real stumpage price increases which are based upon the assumption of future increased demand.

Twenty-five percent of National Forest revenues are returned to the States in which the National Forest lies. These distributions are further appropriated to the various counties which contain National Forest lands. Counties which have major portions of the Gallatin Forest include Madison, Gallatin, Park, and Sweet Grass counties of Montana. Like returns to the U.S. Treasury, the

Table B-6: Forest Outputs and Impacts in 1980

Output	1980 Production	Employment Direct Jobs	Employment Total Jobs	Employment Jobs/ Unit	Income Direct M$	Income Total M$	Income $/ Unit
Softwood Sawtimber	19.2 MMBF	65	189	9.8	1681	4209	$234
Picknicking	139.0 MRVD	56	97	.7	592	1138	$ 10
Camping	554.2 MRVD	10	18	.2	156	350	$ 3
Skiing	125.0 MRVD	334	563	4.5	2760	7017	$ 56
Water-based recreation	35.0 MRVD	9	15	.4	81	195	$ 6
Dispersed nonmotorized recreation	211.0 MRVD	138	238	1.1	1170	3043	$ 14
Dispersed motorized recreation	621.0 MRVD	421	725	1.2	3352	9054	$ 15
Big-game hunting	119.0 MRVD	106	184	1.6	1204	2650	$ 22
Small-game hunting	24.0 MRVD	9	16	.7	101	224	$ 9
Nonhunting wildlife	23.0 MRVD	15	25	1.1	94	283	$ 12
Fishing	174.0 MRVD	73	111	.6	734	1451	$ 8
Cattle Grazing	30.9 MAUM	5	25	.2	121	600	$ 19
Sheep Grazing	12.5 MAUM	6	33	2.6	145	764	$ 61
Common minerals	274.0 MTON	11	16	.1	82	548	$ 2
Forest operations, maintenance, and capital investment	2.5 MM$	43	84	33.6	734	1478	M$591
Forest salaries	5.4 MM$	167	300	55.5	2886	5373	M$995
Total		1468	2503		15893	38377	

projected returns to the counties are dependent on real stumpage price increases as well as the volume and quality of timber harvest. Returns are projected to increase through the fifth decade in all alterntives because of the real stumpage price and timber harvest increases.

6. Social Measures

Social impact analysis estimates how Forest policies and actions affect the quality of life or social well-being. Future social conditions in an area influenced by Forest actions under current management are compared to the likely results of implementing management alternatives.

Social impacts are measured by social variables and social groups. Social groups are those affected by Forest Service activities, and social variables define how people are affected and the relationship between people and the natural environment.

A social assessment was done on the Forest to examine social group reactions to three Forest management alternatives (current direction, moderate amenity, and moderate commodity). The social variables and groups used in the assessment are described below.

Table B-7: Forest-Related Employment and Income for Alternatives and Benchmarks

	Jobs		Income (MM$)	
	Decade 1	Decade 2	Decade 1	Decade 2
- - - - - - - - - - - - Alternatives - - - - - - - - - -				
1	2506	2745	37	40
2	2766	3089	42	46
3	2247	2626	31	36
4	2501	2897	36	42
5	2563	2954	36	41
6	2444	2784	35	40
7	2685	3099	39	44
8	2458	2846	35	39
9	2427	2809	34	39
10	2685	3099	39	44
- - - - - - - - - - - - -Benchmarks - - - - - - - - - -				
PU1	2517	2953	34	40
PV1	2510	2948	34	40
PV2	2574	3003	39	41
PB1	2578	3007	36	41
PM2	2503	2856	35	39
CM8	2506	2746	37	40
MTP	3687	3585	62	57
MT1	3005	3339	45	49
MW2	2384	2784	33	38
ML4	2009	2292	27	30

a. **Social Variables Considered**

1) **Lifestyles**

Lifestyles are the characteristic ways different segments of a population live. People use Forest resources to maintain a way of living that is financially dependent upon a particular resource-related occupation. Logging, log homes, recreational businesses, ranching, and guides and outfitters are examples. Without Forest resources, these people would have a difficult time maintaining their preferred lifestyle.

Another aspect of lifestyles is the more amenity-oriented activities in which people participate, such as hunting, fishing, backpacking, picknicking, berrypicking, and gathering wood. These activities are also dependent upon

Forest resources, although the impact may be more subtle and less quantifiable than jobs or income. However, these activities are important to the lifestyle of many local, regional, and national people.

2) Attitudes, Beliefs, and Values

Attitudes, beliefs, and values are reflected in people's likes, dislikes, perceptions, hopes, aspirations, and fears. Changes in Forest Service policy may result in practices that affect people's feelings about and understandings of the Forest.

First, this variable refers to the symbolic meaning people attach to the places and resources on, or from, the Forest. Although people may not be economically dependent upon the Forest, they receive rational psychological benefit or symbolic meaning from resources.

A second component is a sense of freedom or the belief that one is not controlled by others, such as by outside or government interference. People often view the lack of local control over resource decisions as a problem. Local control over programs or proposals is often perceived as limited or nonexistent because policies come from Washington.

Third is self-sufficiency or the ability to live one's life in one's own way and use whatever resources are necessary to get along without any, or a minimum of, outside help. Certain quantities and qualities of Forest resources may be necessary for people to be independent.

Certainty and uncertainty, a fourth component, refers to the probability that certain things can be counted on in living a desired way. It refers to the lack of confidence (uncertainty) or confidence (certainty) people may have about being able to stay in a community because of the changes in use of resources, or because the resources are in limited supply. Loggers, guides and outfitters, ranchers, and recreational businesses are often quite dependent upon the natural resources for their livelihood.

3) Social Organization

Social organization is the way society and its subunits are structured. Major components considered here include community cohesion and stability.

Community cohesion is the degree of unity and cooperation among various segments of a community in realizing shared goals or solving problems. Changes in community cohesion can occur with an influx of people with different life philosophies. Issues can partition communities into factions and decrease community unification.

Community stability is the rate of change that people can accept without exceeding their capacity to deal with it. The rate of social change and the institutional structure of a community are key variables in the analysis of the effects of Forest Service actions.

Social stability and economic stability may not be the same, but both relate to community stability. Economic stability might be retained through full employment; but if there is a rapid change in the composition of the

employment, social instability might result. Yet stability is not stagnation. Stable communities are usually going through relatively gradual and constant change and people adapt to new conditions.

b. **Social Groups and Communities**

Across all the communities which are directly affected by Forest Service management, there are groups of people either formally or informally banded together to express their views on the managmeent of Forest resources and on the uses that can come from the Forest. People in these groups have a vested and legitimate interest in Forest management. Some of the things they are often concerned about are: being able to maintain their patterns of use on the Forest, the way the Forest may change, the increasing scarcity of the resources they value, how the resources are protected, being able to use the Forest, and others.

There is often a conflict between the ways different user groups percieve of the Forest and the resources and how the resources should be used. There is also often conflict between the user groups and the Forest Service over the way the Forest should be managed. These conflicts also arise from differences in perception of the Forest. Some of the groups of people that could be affected and will have different levels of acceptance of varous alternative management schemes are:

1. Hunting and fishing groups - They want continued quality hunting and fishing with activities which would protect these resources. Hunters would like more access into the Forest.

2. Wildife Organizations - They are concerned with the maintenance of good habitat for all wildlife. Often they define good habitat as being those lands which are undeveloped or managed in near natural conditions.

3. Hikers and Skiers - People in this group want a quality experience when they go into the Forest. For them, this means good trails and enough access points to disperse people. A quality experience for some is being in an area which is undeveloped.

4. Landowners - This group incorporates the use of the National Forest lands into the use of their own adjacent or intermingled land. They want compatible use, which means--for some--management of National Forst lands with the same objectives they have for their land. For others it means eliminating the effects of National Forest management by keeping roads and trails from crossing their land.

5. Snowmobilers/ORVs - Their main desire is to keep areas of the Forest from being restricted to their use. More roads and timber harvest increase their opportunities for use.

6. Wilderness groups - They want major portions of the unroaded lands on the Forest either designated as wilderness or managed in a near natural condition. Using the presently roaded portions of the Forest as they are currently used is acceptable to them.

7. Timber Industry - They want the productive timber lands to be available for harvest with the Forest Service responding to the local industry needs. They do not like to see what they consider unnecesary restrictions placed on timber harvest.

8. Grazing Industry - They would like to see more National Forest lands available for livestock grazing. They are concerned that grazing not be restricted because of possible conflict with other users and resources such as wildlife and recreation.

9. Resort and Tourism Industry - They want to see the qualities which now attract tourists and recreationists protected. Forest management which emphasizes recreation uses is desired.

10. Outfitting Industry - They are concerned with restrictions which limit their use of the Forest. Decisions which change the management of large ares now in near natural condition to a more developed state would affect them.

11. Mining, Oil/Gas Industries - They are concerned with land use proposals and management which would put restrictions on or increase the costs of exploration and development of minerals or oil and gas.

12. Others - No other groups or categories of people are known to have special needs or concerns about the management of the resources of the Gallatin National Forest. No issues, geographical areas, resources, or resource groups are known to have special concerns for minority or civil rights groups at this time. It is possible certain areas or resources of significance may become important if identified by Native Americans as being an integral part of their heritage. Known resources (cultural) are being protected under the auspices of the Antiquity Act of 1906 and the American Indian Religious Freedom Act of 1978.

F. Analysis Prior to Dvelopment of Alternatives

Changes Since the Draft EIS

A new PNV benchmark was run without real price increases in timber values beyond the fifth decade. This benchmark is called PV5 and is explained later in the section entitled Benchmarks. The purpose of this benchmark is to test the effects of keeping real price increases in the other benchmark runs for the entire planning horizon.

1. Introduction

The primary analysis prior to developing alternatives was the analysis of the management situation (AMS)--a determination of the ability of the Forest to supply goods and services in response to society's demands. This analysis provided a basis for formulating a broad range of reasonable alternatives by examining the following:

- Benchmark Analyses

  + the minimum level of management with associated costs and benefits.
  + the maximum physical and biological production potentials of single resources as well as sets of resources together with their associated costs and benefits.
  + the maximum present net value of resources with an established market value or an assigned value (a cost efficiency measure).

- A point of reference was also defined from which the costs and effects of constraints are measured.

- Analysis of the current and expected future level of goods and services if current management direction continued.

- Projections of demand for goods and services.

- Analysis of the potential to resolve issues and concerns.

- Analysis of the need to change management direction.

The results of this analysis form the framework within which alternatives were developed.

2. **Development of Minimum Management Requirements (MMR)**

The minimum management requirements in 36 CFR 219.27 are as follows:

1. Conserve soil and water resources.
2. Minimize hazards from flood, wind, wildlife, erosion, and other natural physical forces.
3. Reduce hazards from pest organisms.
4. Protect riparian zones.
5. Provide diversity.
6. Provide fish and wildlife habitat to maintain viable populations.
7. Adhere to multiple use laws.
8. Protect threatened and endangered species habitat.
9. Provide for rights-of-way and corridors.
10. Develop road construction standards.
11. Revegetate temporary roads.
12. Maintain air quality.
13. Reforest in 5 years.
14. Limit openings to 40 acres.

The methods used to meet these minimum management requirements include:

- Developing standards and guidelines and appropriate practices for mangement prescriptions.

- Assignment of management prescriptions and intensities to analysis area in FORPLAN.

- Applying access, scheduled output, and inventory constraints to analysis areas or groups of analysis areas in FORPLAN.

a. **Conservation of Soil and Water Resources**

This minimum requirement was met by providing for standards in management prescriptions and constraining the amount of development activity that could occur on a group of analysis areas. First, the standards developed for the prescriptions were designed to meet the State of Montana water quality standards by assuring "best management practices." Best management practices are standard accepted practices determined by the State to be the most effective means of preventing or reducing the amount of water pollution to a level compatible with water quality goals. Second, the amount of timber harvest that could occur on any group of watersheds was constrained so that the hydrologic limitations of the watersheds would not be exceeded. This was estimated using the Northern Region's "equivalent clearcut area" (ECA) methodology (USDA Forest Service, 1974).

The ECA procedure balances the water yield increases that follow from timber harvesting with the stability of the stream channels and their ability to handle increased streamflows without accelerated erosion or sedimentation. After an area has been clearcut, it is assumed that hydrologic recovery will be complete in 60 years. There is a limit to the amount of land in any watershed that can be opened up in a clearcut condition. The maximum ECA acreage on the Gallatin National Forest that would be available over time was estimated to be 329,000 acres (Forest Hydrologist's Planning Notes, 1982). This established the constraint placed on the FORPLAN model so the ECA amount would not be exceeded. In the most highly developed benchmark--Maximum Timber--the amount of ECA's used by the end of the first decade approximated135,000 acres. This is the sum of the 37,000 acres currently used plus an additional 98,000 acres that would be harvested in the first decade of this benchmark run.

b. **Minimize Hazards from Natural Forces**

The measures discussed above which conserve soil and water resources will also help in minimizing other natural hazards. All the prescriptions contain standards and guidelines and cover the costs of minimizing hazards.

c. **Reduce Hazards from Pest Organisms**

Trees on the Forest are susceptible to mountain pine beetle, spruce budworm, dwarf mistletoe and other pest organisms. In prescriptions where we choose to reduce the hazards from these pests rather than let natural process prevail, silviculture and prescribed fire are our most effective tools.

For example, the clearcut silvicultural system is prescribed to help prevent the spread of diseases such as dwarf mistletoe in lodgepole pine. Also this system is used to help develop a distribution of age classes between stands over the planning horizon. Where root rots occur in Douglas-fir, clearcutting is the only known method of slowing the rate of spread of this disease.

Stocking control is another silvicultural practice which is useful to reduce losses to forest pests. Precommercial thinning is most commonly prescribed to achieve stocking control. Pest management objectives may be to: (1) reduce risk

of mountain pine beetle epidemics, (2) minimize the spread of dwarf mistletoe, and (3) reduce western spruce budworm defoliation.

In regeneration of stands both by artificial and natural methods, maintenance of a species mix is recommended in the standards and guidelines to reduce the risk of attack by insects or diseases to a single tree species.

Prescribed fire is planned in some management prescriptions where vegetative manipulation is desirable, but timber harvest is precluded as a management tool.

d. **Protect Riparian Zones**

Management standards and guidelines in all prescriptions would provide for a level of protection of riparian areas compatible with the adjacent uses. These uses include: timber harvest, livestock grazing, road and trail use, wildlife habitat and many forms of recreation. Regardless of the type of use, the integrity and natural functioning of riparian areas would be preserved.

Some of the guidelines followed are:

1. Utilization standards for livestock grazing of riparian vegetation.
2. Special logging practices to minimize soil disturbance.
3. Avoidance of piling harvest debris in riparian areas.
4. No surface occupancy for the exploration or development of oil and gas.
5. Withdrawal from mineral entry.
6. Location of roads and trails outside of riparian areas.
7. Perpendicular crossing of streams where road construction is necessary.

In general, the riparian-dependent resources of water, fisheries, vegetation, and wildlife would be favored over other uses if there is a conflict.

e. **Diversity**

The minimum management requirement for old growth-dependent species was determined (Shaw/Johnson 12/15/83) to be the retention of 10 percent of the potentially suitable and biologically valuable acres in an old growth condition. Old growth condition is land having approximately 15 trees/acre of greater than 14-inch dbh class, at least 2 snags/acre and 70 percent crown closure.

To comply with these provisions within the FORPLAN modeling process the following assumptions were developed:

1. Only those timber stands (i.e., analysis areas) with ages greater than 130 years qualify as old growth.
2. The most valuable old growth habitat generally occurs on slopes less than 40 percent. To prevent the reservation of only steep, nonroaded areas the desired 10 percent should come from the less than 40 percent class.

Therefore, FORPLAN inventory constraints were developed to depict the proportion of all less than 40 percent slope analysis area acres greater than age 130 needed to meet 10 percent of all potentially suitable analysis area acres.

f. Adequate Fish and Wildlife Habitat

Four indicator species of fish and wildlife were used to represent other species which have similar biological requirements. These four species are cutthroat trout, elk, goshawk, and grizzly bear. The minimum requirement of maintaining habitat for viable populations of all species was met by building sufficient standards and guidelines into all prescriptions or by constraining the FORPLAN model.

Cutthroat Trout -- In order to maintain habitat for viable populations of trout, studies (Platts, 1979) indicate that sediment fines in stream bottoms should not exceed 17.5 percent of total bottom composition. Survey data taken on Gallatin National Forest streams of 5 percent gradient or less show that currently stream bottoms have an average of 10 percent sediment fines. A 56-percent annual increase in sediment delivery would cause most streams to exceed 17.5 percent sediment composition of bottom material and threaten the viability of the trout population. This recognizes that a Forest-wide average increase in sedimentation of 56 percent would be more hazardous to fisheries in some drainages than to others. This could probably threaten the viability of some streams before an overall increase of 56 percent would be reached.

Previous analysis had shown that the standards and guidelines in the timber prescriptions had kept the annual sedimentation increase to 18 percent in the unconstrained, maximum-timber benchmark. Therefore, it was felt that for benchmark and alternative analysis no model constraints were necessary to maintain viable cutthroat populations.

Elk -- Elk is used as an indicator species for several big game species. To maintain viable populations of elk in approximately the current distribution, the Forest, in consultation with the Montana Fish and Game biologists, estimated a habitat capacity level of 1975 animals on National Forest winter range (Minutes of Interagency Consultations, Planning Records). This includes both native populations and capacity of 725 migrating animals from the Northern Yellowstone elk herd. A FORPLAN-scheduled output constraint was used in all benchmarks to ensure adequate forage on winter range to sustain at least this level of elk population.

Goshawk -- The goshawk is the indicator species used to track the needs of old-growth forest users. The minimum needs of these species are covered through the "old growth" constraint discussed above in Sec. 5, Diversity.

Grizzly Bear -- The grizzly bear is a threatened species and, as a minimum, the National Forest and National Parks that comprise the Yellowstone Ecosystem have a goal of recovering the population. The Gallatin National Forest shares this goal. This is achieved in all benchmark analysis in two ways. First, occupied habitat was stratified into Management Situations 1, 2, and 3. The area for each is: Situation 1, 413,209 acres; Situation 2, 339,979 acres; and Situation 3, 1,100 acres. Total occupied habitat on the Gallatin is 754,288 acres. The habitat supplied by this area has been judged sufficient to provide the Gallatin's share for a recovered population. (Planning Records Analysis). Secondly, the risk of man-caused mortality of bears is reduced by emphasizing habitat security within occupied habitat. This is accomplished by following

guidelines for management published by the U.S Fish and Wildlife Service in the Grizzly Bear Recovery Plan (USDI, 1982).

Each FORPLAN prescription that could be applied to occupied habitat provides at least minimal requirements for secure habitat. This was done by including in the prescriptions the costs of activities prescribed in the Yellowstone Guidelines (USDA & USDI, 1980). These include coordination activities, constact with Forest users, and possible closure of areas during critical times of the season. In the benchmarks, then, no other constraints were placed on the model for grizzly bear. In the alternatives, however, varying amounts of prescriptions with grizzly emphasis were constrained into the solution.

g. Consistency with Multiple Use Laws

The Secretary of Agriculture under various laws is directed to administer National Forests for multiple uses such as outdoor recreation, range, timber, watershed, wildlife, fish, and minerals. The Secretary is also directed to develop and administer the renewable surface resources.

For Forest planning and environmental analysis process used requires, as a minimum, that processes formerly used to make individual resource decisions must be combined into integrated management decisions.

The riparian zone, diversity, and fish and wildlife MMR's address how multiples use and sustained yield is achieved. The reforestation MMR provides for maintenance of a sustained yield of timber without impairment to the productivity of the land.

h. Protecting Threatened and Endangered Species Habitat

Besides the grizzly bear, the only other threatened or endangered species on the Gallatin NF is the bald eagle. Three nesting pairs are known to inhabit the Forest year around. Standards and guidelines used to manage their habitat were developed in 1982 as part of the Hebgen Lake Bald Eagle Management Plan. In 1983, a plan was written for the entire Greater Yellowstone Ecosystem. Potential habitat exists for the peregrine falcon and gray wolf also. Preliminary studies indicate that these species could be reintroduced. As a minimum, the potential habitat that now exists for these species, will not be altered to the extent that reintroduction could not occur in the future.

i. Providing for Utility and Transportation Rights-of-Way and Corridors

Land-disturbing activities such as timber harvest, land clearing, road construction, pipeline trenches, and holes for power poles occur when providing rights-of-way. An analysis outside FORPLAN and prescriptions defined the kinds of land which should be excluded or avoided in permitting or constructing linear corridor facilities. Avoidance areas are areas where establishment and use of corridors conflict with land use or management objectives such as cultural or historic sites, wilderness areas, research natural areas, and scenic areas. Potential corridors and existing rights-of-way were mapped and considered in the alternatives and benchmarks. Established wilderness areas preclude corridors in large portions of mountain ranges on the Forest (Absaroka and Madison ranges).

j. Road Construction Standards

It is essential for the administration and management of the National Forest that an effective transportation system be developed. The primary form of that transportation system will be the network of Forest development roads. The construction and maintenance of these roads is one of the most expensive tasks undertaken on National Forest land. It is also potentially one of the most land disturbing activities. Therefore, the development of this road system must ensure that any roads constructed through contracts, permits, or leases are designed according to standards appropriate to the planned uses, considering safety, cost of transportation, and effect upon lands and resources.

The most effective means to ensure these considerations is through the application of the processes identified in the National Environmental Policy Act. This Act, the supporting regulations, and the Forest Service Manual provide an orderly process for the development of National Forest Land while giving the necessary considerations to the effects upon the lands and resources. The 7710 section of the Forest Service Manual will be followed in the planning for the transportation system. This process uses the identified management objectives (from the Management Area descriptions) and develops the planned transportation system to achieve these objectives. The planning prior to development will keep the amount of road construction on the National Forest to a minimum. The costs, the land use needs and the effects will be considered at the planning stages of any development to optimize the utility of the roads while minimizing their adverse impacts.

In addition to the proper planning of the road system, mitigating measures will be applied during road construction and maintenance to maintain water quality and reduce damage to stream fisheries. The primary objective will be to limit the amount of sediment that enters the stream systems. Some of the mitigating measures will be applied to all roads, while others will be identified for particuliarly sensitive areas such as riparian zones. These mitigating guidelines are provided from the Forest Planning Records, interaction with the state water quality bureau, and project specific information provided by the Forest hydrologist and soil scientist.

Roads will be designed for construction and evaluated for reconstruction based on the standards and guidelines for roads as detailed in the Forest Service Manual 7700 and the accompanying handbooks. These guides provide detailed information on the safe, effective design and maintenance standards for Forest development roads. The design of roads will be tailored to the expected type and amount of traffic that will use the road over its expected life. Following these practices and procedures will ensure that the development of the road system on National Forest land is conducted with adequate consideration for the costs, safety, and resource impacts.

k. Revegetating Temporary Roads

Short, temporary roads are sometimes needed to efficiently transport logs; however, they can affect soil and water resources. The road density for the Forest's transportation system and log skid distances were designed to preclude the use of temporary roads in most cases. The minimum requirement is to

re-establish forage or grass cover by seeding. Revegetation is included in the logging practices for prescriptions that harvest timber.

l. Maintaining Air Quality

This requirement was handled outside of FORPLAN. The Regional Guide directs the Forest to work through cooperative agreements with the States to manage smoke emissions. Scheduling the time and number of prescribed burns is done outside the FORPLAN model and in cooperation with the State of Montana.

m. Reforestation

To assure that lands can be adequately restocked within 5 years following final harvest, research, and experience are applied by silviculturists to establish the harvest and regeneration practices. On the Gallatin, clearcut,seedtree, and shelterwood regeneration harvest systems are the most common harvest systems. A minor amount of individual tree and group selection regeneration harvest systems is used. The selection harvest systems are more expensive and complex to use in our coniferous types than the evenaged systems, i.e.,clearcut, seedtree, and shelterwood.

Minimum stocking standards are established at 300 trees per acre on dry to warm sites and 600 trees per acre on moist to cool sites. Natural regeneration is the preferred method. Harsh habitat types and Douglas-fir sites will be planted most frequently. A natural mix of species is desirable. Artificial regeneration will be scheduled if stocking requirements aren't met after the third-year reforestation examination.

n. Forty-Acre Maximum Size for Even-Aged Silviculture (Clearcutting)

The Regional Guide establishes that the openings created by evenaged silviculture normally will be 40 acres or less. Costs and practices used are based on evenaged cutting unit of 40 acres or less and are included in the management prescriptions. The FORPLAN model harvests on the basis of analysis areas rather than stands, therefore it is nearly impossible to assess the achievement of this MMR from FORPLAN output directly. However, by maintaining flexibility in the timber land base available for harvest,spacial placement of individual sale offerings should be possible and still meet this MMR. Attainment of this MMR will be tracked in the monitoring phase of the Plan.

o. Timber Harvest Floor

The base harvest schedules for the Gallatin differ from the typical pattern for most other Forests. When the objective function of a FORPLAN run is set to maximize present net value using the Gallatin data set, the unconstrained model will produce no timber volume in the first four decades. This is because yield tables of mountain pine beetle depleted timber and real price increases used to value timber in the model cause timber harvest to have greater net value in later decades.

Because of this situation, it is always necessary to establish a lower bound constraint (floor) for each run made with this data set if a harvest greater than zero is desired in the initial decades. Based on the objectives of a given run, the ID team established the beginning level of harvest for each run.

p.) Timber Policy Requirements

1) NDY (Non-Declining Yield)

NDY is a constraint on timber outputs which limits the per-period harvest to levels greater than or equal to the preceding period level. This constraint was used to ensure a non-declining flow of timber harvest throughout the planning period and to establish the base harvest schedule for all alternatives. The constraint was removed from Alternative 10 to examine the effect of the constraint on Alternative 7.

2) Sequential Upper and Lower Bounds

Sequential upper and lower bounds constraints restrict each period's harvest to a specified range around the previous period's harvest. This range is defined by lower and upper bounds expressed as percentages. An intent of this constraint is to assure that rapid changes or fluctuations in timber outputs would not adversely affect other forest resources or local economies. A sequential upper and lower bound of $\pm$ 25 percent was used in many of the benchmark runs.

3) Rotation Based on 95 Percent CMAI

Timber rotation lengths based on 95 percent of the CMAI (culmination of mean annual increment) for existing and regenerated stands is required by 36 CFR 219.16(2)(iii). The Forest Service is directed to analyze timber rotation lengths based on the time required for stands to reach the culmination of net growth. CMAI was used to constrain the period of first harvest for timber prescriptions in the FORPLAN model.

3. Benchmarks

Ten benchmarks were developed to define the production potentials and economic relationships of Forest resources. The efficient schedule of management activities, resource outputs, environmental effects, economic consequences, and land use proposals to meet the purpose of each benchmark are estimated. This section describes the purpose of each benchmark. The major objectives and constraints are displayed in Table B-8.

Table B-8: Benchmark Objectives and Constraints

Bench mark	Objectives	Objective Function	Timber Harvest Constraints: Harvest Flow	Timber Harvest Constraints: Tentatively Suitable Timberlands (M acres)	Timber Harvest Constraints: Timber Harvest Floor (MMCF/Dec)	Minimum Management Req.: Soil & Water	Minimum Management Req.: Old Growth	Minimum Management Req.: Minimum Winter Elk Forage (AUMS/Dec)	Other
PU1-1	Define PNV of market and nonmarket values with no constraints.	Maximize PNV using market and non-market values.	NDY	440.3	None	No	No	No	
PV1-2	Determine PNV of market and nonmarket values while meeting MMR's.	Maximize PNV using market and non-market values.	NDY	440.3	None	Yes	10%	50	
PV2-5	Determine PNV of market while meeting MMRS with a harvest floor of 14.7 MMCF in Dec 1-3	Maximize PNV using market and non-market values.	NDY	440.3	14.7	Yes	10%	50	Real price increases through 5 decades only
PB1-4	Define PNV of market and nonmarket values while meeting MMR's and departing from NDY.	Maximize PNV using market and non-market values.	Depart. ±25%/Dec	440.3	14.7	Yes	10%	50	
PM2-5	Determine PNV of market values while meeting MMR's.	Maximize PNV using market values.	NDY	440.3	14.7	Yes	10%	50	
CM8-6	Identify outputs and economic tradeoffs of meeting current direction Program Targets.	Maximize PNV using market and non-market values.	NDY	435.9	65.0	Yes	10%	140	Current prgm. incl. targets and budget.
MTP-7	Identify the maximum timber and livestock forage potential.	Maximize PNV using market and non-market values.	Departure (± 25%)	462.7	**	No	No		Floor on range forage for 15 decades.
MT1-8	Provide the maximum amount of timber for all decades under NDY	Maximize timber volume.	NDY	440.3	None	Yes	10%	50	
MW2-9	Define maximum wilderness potential and economic tradeoffs.	Maximize PNV using market and non-market values.	NDY	194.5	14.7	Yes	10%	50	
ML4 -10	Identify fixed costs of public landownership and incidental outputs.	Maximize PNV using both market and nonmarket values.	None	0.0	None	Yes	10%	50	minimum level prescriptions were applied to to all areas.

** A FORPLAN analysis was done prior to this benchmark to determine the maximum amount of both timber and livestock forage. These maximum volumes were then used in this run as minimum constraints in order to compute the maximum PNV.

Changes Since the Draft EIS

A new PNV benchmark was run without real price increases in timber values beyond the fifth decade. This benchmark is called PV5 and is explained later in this section. The purpose of this benchmark is to test the effects of keeping real price increases in the other benchmark runs for the entire planning horizon.

Three types of benchmarks were developed for the Forest:

1. **Maximize Present Net Value Benchmarks.** Maximize present net value for the Forest and display the efficient levels of resource outputs.

2. **Resource Benchmarks.** Define the maximum potentials for timber production, range, elk, and wilderness.

3. **Minimum Level Benchmark.** Defines the minimum outputs associated with custodial management of the Forest and the unavoidable costs and benefits of public ownership.

The following procedures apply to all benchmarks:

- Developed using FORPLAN.

- Developed using an objective function of maximizing PNV (except for the maximum timber benchmark

- Not constrained by budget levels except for the Current Management benchmark which uses a budget constraint in the first decade to depict current program limitations.

- Complies with minimum management requirements except for benchmarks PU1 and MTP which were used to examine the effects of the MMR's.

- Are legally implementable. The only exceptions were benchmarks ML4, PU1, and MTP, which were used to examine tradoffs of legal constraints.

- Timber management constraints were used to preclude harvest from 715,674 acres of existing wilderness and 36,759 acres of the Cabin Creek Special Management Area.

- Regulated timber management was constrained to preclude it from all unsuitable timberland.

- Timber harvest rotations were constrained to be greater than or equal to 95 percent CMAI.

- A constraint was used so timber inventory in 150 years will equal to or exceed the volume that would occur on a regulated Forest.

Several variations of the Present Net Value and Resource Benchmarks were also run to determine the opportunity cost and resource tradoffs of meeting specific constraints, objectives, regulations, and policies.

Both market and assigned values for resource outputs were used in all benchmarks except PM2 which evaluates only market goods.

Following are descriptions of the benchmarks developed and considered in the Forest planning process. Table B-8 summarizes the constraints used. Benchmarks will be discussed in three groups: (1) the PNV benchmarks; (2) the maximum resource benchmarks; and (3) the minimum level benchmark.

a. **The PNV Benchmarks**

1) **Benchmark PU1 (Nondeclining Yield, Maximum PNV Without Minimum Management Constraints)**

This benchmark maximizes PNV for all resources with market and assigned values. It serves as a "Maximum PNV Unconstrained" benchmark to establish an upper limit PNV value that does not meet minimum management standards. The next two runs listed here (PV1 and PV2) are similar to PU1 but with added constraints to meet minimum management requirements.

This benchmark run provides the basis for evaluating the economic tradeoffs of minimum management requirements when compared to benchmark PV1. PU1, together with PV1, also provides the basis for analyzing the sensitivity of the model to nonmarket recreation values and to timber price increases. These runs also provide the basis for determining the opportunity cost of maximizing first decade timber harvest, wilderness recommendations, and minimizing management costs. Finally, because PU1 and PV1 have the highest PNV, they provide the basis for determining the opportunity cost of implementing more constrained alternatives.

2) **Benchmark PV1 (Maximum PNV Benchmark With Minimum Management Constraints)**

Similar to benchmark PU1 except that minimum management constraints are in place. This run, when compared with PU1, shows opportunity costs of the minimum management requirements.

3) **Benchmark PV2 (Maximum PNV Benchmark with Minimum Management Constraints and Harvest Floor)**

This is the MAX PNV-MARKET/ASSIGNED Benchmark used for harvest floor.

PV2 is similar to benchmark PV1 except that a harvest floor was added. The average annual harvest floor was set at 1.47 MMCF. To insure some level of local timber supply, timber harvest cannot be below this floor in any year. Without the harvest floor the model would cut no timber in the first three decades. This is because deferring harvest in the initial decades increases total PNV.

Runs which defer harvest for several decades are probably not implementable because of the disruption they would cause to the local timber industry. PV2 provides a version of PV1 with timber harvest in every decade. Timber floors are used in most benchmark and all alternative runs; the PV1 and PV2 runs can be used to evaluate the economic tradeoffs of incorporating the harvest floor.

This benchmark defines the "mix of resource uses, combined with a schedule of outputs that have an established market price or are assigned a monetary value" as required by CFR 219.12(e) and Chief's letter of May 31, 1983.

4) **Benchmark PV5 (Maximum PNV Benchmark With Minimum Management Constraints, Harvest Floor and no increase in timber prices beyond the 5th decade):**

This is the Max PNV Benchmark used for opportunity cost calculations and alternative comparisons.

PV5 is like PV2 except that the real price increases for timber do not continue to increase beyond the fifth decade. This benchmark, when compared with PV2 illustrates the effects of limiting this change in timber values.

5) **Benchmark PB1 (Maximum PNV Benchmark With Minimum Management Constraints, Timber Harvest Floor, and Sequential Bounds on Timber Harvest)**

This run allows timber harvest to increase above the annual average harvest floor level of 1.47 MMCF to a level of local mill capacity, through the fourth decade. Thereafter, timber harvest can fluctuate as much as 25 percent up or down in succeeding decades. This benchmark does not incorporate nondeclining yield. The economic tradeoffs of incorporating nondeclining yield can be identified by comparing PB1 and PV2.

6) **Benchmark PM2 (Nondeclining Yield, Minimum Management Constraints, Timber Floor, Management Emphasis Constraints). This is the Max-Market Benchmark.**

This benchmark run is similar to PV2 except that it does not value outputs other than market commodity outputs when maximizing PNV. PM1 explores the opportunity to maximize the monetary value (cost efficiency) of those resources that have an established market price (timber, range, developed recreation, and mineral leases).

7) **Benchmark CM8 (Nondeclining Yield, Minimum Management Constraints, Resource Volume Constraints,and Budget Bounds)**

This benchmark was eventually carried forward as Alternative 1: Current Management. It maximizes PNV assuming "the current level of goods and services provided by the unit and the most likely amount of goods and services expected to be provided in the future if current management direction continues" (36 CFR 219.12 e). The CM8 run allows comparison of maximum PNV attainable if current management direction continues versus the other scenarios modeled in the PNV benchmark runs.

b. **The Maximum Resource Benchmarks**

1) **Benchmark MTP (Maximize Timber and Range)**

This run maximized timber and range outputs with no other constraints applied except sequential bounds. In order to construct this benchmark, preliminary runs were used to establish attainable high levels of timber and livestock

forage. These were then set as minimums for benchmark MTP. Sequential bounds of greater or less than 25 percent change from the previous decade were applied to timber harvest, because with no nondeclining yield constraint harvest volumes varied significantly over the planning period. In a preliminary run it had been established that the Forest could produce greater than 70,000 AUMs/year over the 150-year planning horizon, and this output total was applied to the run as a constraint. Local livestock and timber industry capability to process various output levels was not considered in this benchmark. Essentially, this run established maximum biological potential for producing timber and livestock forage without regard to cost or consequences.

2) **Benchmark MT1 (Maximum Timber, Nondeclining Yield, Minimum Management Constraints)**

This benchmark differed from the Max Timber and Range MTP in that it added the nondeclining yield constraint, and also added minimum management constraints to protect soils and water and to ensure a minimum level of old growth. It, therefore, measures the maximum amount of timber that could reasonably produced without using an economic efficiency objective of maximizing PNV.

3) **Benchmark MW2 (Maximum Wilderness, Nondeclining Yield, Minimum Management Constraints, Timber Floor)**

This run assigns all roadless areas to wilderness. Comparison of this run to PV2 shows the economic tradeoffs of the all wilderness designation

4) **Wildlife Analysis -- Benchmark Equivalent.**

In lieu of a PNV benchmark run maximizing numbers of resident elk, an equivalent analysis was done which established the biological potential for resident elk on the Forest. The critical factor for maximizing elk numbers is winter range. The analysis thus calculated maximum forage on winter range where all winter range is given to elk. The National Forest lands could support 8,400 elk.

c. **Minimum Management Level Benchmark**

1) **Benchmark ML4 (All Lands Proposed for Developed Recreation, Minimum Level, or Low Wilderness Prescriptions)**

This benchmark displays the minimum outputs associated with custodial management of the Forest and the unavoidable costs and benefits of public ownership. No timber is harvested, and range outputs decline to zero at the end of the first decade. Developed recreation sites are maintained at an absolute minimum level that is consistent with public health and safety (for example, maintaining sanitation, posting warning signs.) Developed rec facilities (e.g., picnic tables) will not be replaced as they wear out. This is not a viable alternative but is provided for comparison to the benchmarks and alternatives. It represents an absolute minimum level of management costs.

4. **Comparisons of Benchmarks**

The monetary tradeoffs of the management opportunities explored during the AMS can be determined by comparing the benchmarks described in Section C. Monetary

tradeoffs are limited to priced benefits. In this section, the tradeoffs of minimum management requirements, nondeclining yield, and providing resource outputs are described. Second, the costs of implementing current direction and minimum level are discussed. Finally, the sensitivity of land use assignments and output schedules to timber price trends and nonmarket resources values is discussed. Table B-9 shows selected outputs of the benchmarks.

a. **Minimum Management Requirements**

The tradeoffs of the watershed and habitat diversity minimum management requirements (MMR's) are analyzed by comparing benchmarks PU1 and PV1. In PV1, constraints were applied to limit timber harvest in groups of watersheds to the level at which the "equivalent clearcut area" would not be exceeded. Second, constraints were applied to provide at least 10 percent old growth on tentatively suitable timberlands to provide diversity.

The MMR's were found to have an insignificant effect on PNV. Benchmark PU1 has a PNV of $323 million vs. $322 million for Benchmark PV1. The only other noticeable effect of the MMR constraints was an 8% reduction in long-term sustained yield and suitable timber acres. The habitat diversity constraint was not binding in any decade. It was the watershed constraint that caused the minor reductions in PNV and long-term sustained yield.

b. **First Decade Timber Harvest**

The tradeoffs of varying timber harvest in the first decade under nondeclining yield are determined by comparing benchmarks PV1 and PV2. The only difference between these benchmarks is the first decade timber harvest floor. Benchmark PV1 has no floor and PV2 has a floor of 14.7 MMCF (6 MMBF/Year).

A harvest level of zero in the first three decades would produce the highest PNV, but the ID team established 6 MMBF as a minimum the Forest should provide to the local industry. The rationale for this level rather than zero was that this could be provided without any additional road construction, it would help keep the small operations open, and it would maintain some timber program on the Forest. It could be achieved with only a slight reduction in PNV. As a result of timber yield tables reflecting depleted stands due to the mountain pine beetle epidemic and due to future timber price increases, the FORPLAN model chooses to delay any harvest for the first three decades. The result of constraining at least a 6 MMBF harvest in the first three decades is a decrease in PNV of $3 million. This also results in a 5% decrease in suitable timberlands and long-term, sustained yield.

Table B-9: Resource Outputs and Effects by Benchmark Level

Output	Unit of Measure	Benchmark										
		PU1	PV1	PV2	PB1	PM2	CM8	MTP	MT1	MW2	ML4	PV5
Roadless area	M acre	640.0	661.0	672.7	677.5	691.4	767.5	459.9	569.6	250.1	1019.7	637.7
Roaded area	M acre	379.7	358.7	347.0	342.2	328.3	252.2	559.8	450.1	281.2	0	278.0
Additional wilderness	M acre	0	0	0	0	0	0	0	0	488.4	0	0
Elk population	M elk											
Decade 1		4.1	4.1	4.1	4.1	4.1	5.6	4.6	6.7	5.1	6.4	4.1
5		4.1	4.1	4.1	4.1	4.1	5.6	4.6	6.7	5.1	6.4	4.1
10		4.1	4.1	4.1	4.1	4.1	5.6	4.6	6.7	5.1	6.4	4.1
Old growth tentively suitable timberlands in 100 years	M acre	204.2	227.9	232.1	202.0	181.1	217.3	59.3	129.0	277.4	448.1	384.0
Livestock forage	M AUM											
Decade 1		54.5	54.5	54.5	54.5	37.1	40.0	70.0	70.0	37.8	0	54.5
5		54.5	54.5	54.5	54.5	37.1	40.0	70.0	70.0	37.8	0	54.5
10		54.5	54.5	54.5	54.5	37.1	40.0	70.0	70.0	37.8	0	54.5
Suitable timberland	M acre	275.3	254.3	242.5	237.8	322.8	246.7	462.7	440.0	176.8	0	64.5
LTSY	MMBF	33.6	31.0	29.5	24.8	36.4	30.0	63.9	56.5	20.2	0	8.0
Base harvest schedule	MMBF											
Decade 1		0	0	6.0	6.0	6.0	24.7	94.0	35.5	6.0	0	6.0
5		33.6	31.0	29.5	30.3	36.4	24.7	31.5	35.5	20.2	0	8.0
10		33.6	31.0	29.5	21.4	36.4	27.2	41.2	56.5	20.2	0	8.0
Sediment(1st Five Dec)	Percent											
Low decade	increase	0	0.8	0.2	0.2	0.3	3.1	5.2	5.1	0	0	0.2
High decade		4.7	3.8	4.6	4.2	5.9	6.4	18.3	16.5	4.0	0	4.6
Road construction	Miles											
Decade 1		9.8	9.5	10.9	10.8	12.2	16.7	83.2	48.6	7.5	0	4.7
3		9.8	9.5	12.0	11.9	13.3	25.9	60.9	34.4	8.6	0	5.8
5			22.3	20.0	22.3	21.2	25.9	23.6	17.7	18.6	10.9	0 6.3
Total miles	M miles	2640	2369	1846	2062	2071	2416	3691	2838	1614	0	1811
Discounted Benefits	MM $	470	467	468	472	160	401	481	466	414	275	436
Discounted Costs	MM $	147	145	149	150	134	150	308	236	135	67	127
PNV	MM $	323	322	319	322	27	251	173	230	279	208	309

c. **Nondeclining Yield**

The tradeoffs of nondeclining timber harvest flow are determined by comparing benchmarks PV2 and PV1. In benchmark PB1, timber harvest flow could fluctuate up to 25 percent between decades after it was allowed to find its most efficient level in the 4th decade. Benchmark PV2 had a nondeclining yield constraint.

Nondeclining yield only slightly reduces PNV, by $3 million, while it would stabilize the flow of timber in the later decades. In Benchmark PB1, which shows the most efficient flow of timber, a departure downward in the 7th through 11th decades of 25% in each decade would significantly destabilize the industry while not significantly increasing efficiency. Departing from nondeclining yield results in a 16% decrease in the long-term sustained yield.

d. **Wilderness Management**

The benchmark in which all 488,400 acres of available roadless land is proposed for wilderness--MW2--reduces the PNV from benchmark PV2 by $40 million. This reduction is due to a reduction in suitable timberland and harvest volume over the 150-year planning period. It causes a 27% reduction of suitable timberland and a 31% reduction in long-term, sustained yield.

e. **Current Direction**

The current management benchmark CM8 is compared to Benchmark PV2. The long-term sustained yield and suitable timber acres of these two benchmarks are nearly identical. The $68 million PNV reduction in CM8 is due largely to the differences in timber volume harvested in the first 3 decades. In CM8, 25 MMBF/Year is harvested versus 6 MMBF/Year in PV2.

f. **Sensitivity to Non-Market Values**

The sensitivity of proposed land uses and output schedules to assigned values of nonmarket resources is determined by comparing benchmarks PM2 and PV2. The only difference between these benchmarks is the value of dispersed recreation. Dispersed, wilderness, and wildlife recreation were assigned monetary values in Benchmark PM2.

The land use assignment is sensitive to nonmarket values. Prescriptions which have higher dispersed recreation outputs and slightly higher costs are not selected in Benchmark PM2 because they add nothing to PNV. Consequently, PM2 has the largest amount of minimum level management prescriptions of all benchmarks. PM2 can also maximize PNV by selecting more timber prescriptions than PV2. Benchmark PM2 assigns 25% more tentatively suitable timberland to timber prescriptions than PV2 and has a 19% greater long-term sustained yield. This is because some of the non-timber recreation prescriptions have a higher PNV on some tentatively suitable analysis areas than the timber prescriptions.

Table B-9 shows outputs and effects of the benchmarks and Table B-10 shows the proposed land uses of the benchmarks.

Table B-10: Proposed Land Uses by Managment Area for Benchmarks (Thousands of Acres)

Benchmark	Management Emphasis								
	Minimum Level	Developed Recreation	Dispersed Roaded Recreation	Dispersed Recreation Wildlife	Dispersed Recreation non-roaded	Big game	Timber	Range	Wilderness
PU1	93.9	5.4	112.4	201.7	212.5	20.4	241.5	131.9	715.7
PV1	96.0	5.4	117.2	220.6	212.5	25.0	211.1	131.9	715.7
PV2	96.0	5.4	106.3	232.4	212.5	26.5	208.6	131.9	715.7
PB1	96.0	5.4	119.4	237.1	212.5	24.8	192.5	131.9	715.7
PM2	586.2	5.4	0	36.7	0	58.6	264.2	68.5	715.7
CM8	595.4	5.4	0	79.4	0	1.7	245.1	91.7	715.7
MTP	40.6	5.4	106.1	0	213.1	85.7	362.7	206.2	715.7
MT1	147.2	5.4	33.2	104.1	51.5	91.9	319.6	266.9	715.7
MW2	13.6	5.4	102.0	134.6	45.2	25.4	148.4	56.7	1204.1
ML4	1014.3	5.4	0	0	0	0	0	0	715.7
PV5	96.0	5.4	98.9	410.3	212.5	3.4	61.2	131.9	715.7

5. Resource Relationships

a. Timber Harvest and Wilderness/Roadless Assignments

When the entire roadless resource is proposed for wilderness so that the timber on the lands becomes unavailable, the efficient level of long term sustained yield is 68 percent of the maximum PNV benchmark PV2.

The maximum PNV benchmark PV5 assigns only 1,900 acres of nonroaded lands to suitable timberland of the total 64,500 acres suitable. No additional wilderness is recommended in this benchmark.

The remainder of the nonroaded lands are given roadless prescriptions.

b. Timber Harvest and Livestock Forage

Timber and livestock forage can both be maximized at the same time. Timber harvest does not reduce livestock forage, and grazing at maximum level would not reduce timber harvest. In fact, a potential increase of 10,000 AUMS per year might be created by timber harvest. This would occur in the fourth decade and then quickly diminish.

When livestock forage is given its market values of $2.50/AUM rather than its "willingness to pay" value of $9.60/AUM it drops from its most efficient production rate of 54,500 AUM/year to 37,100 AUM/year.

c. Livestock Forage and Wilderness Assignments

When the entire roadless resource is proposed for wilderness, the efficient level of forage production drops to 69% of that of the most efficient level. This represents a reduction of 16,700 AUMs/year. It is due to two factors. First, increased outputs on allotments in wilderness cannot occur. Second, because of decreased elk forage production in wilderness, some of the loss is due to assignment of forage to elk to keep their reduction to acceptable limits.

d. Livestock and Elk Forage

Livestock and elk forage cannot be maximized at the same time because they both depend on the same forage resource. The resource mix which maximizes PNV produces only 49% of elk potential and 78% of livestock potential.

e. Timber Harvest and Elk

The maximum timber benchmark (MTI) could also produce 6700 elk on National Forest lands. This is about 9 percent above current population levels. However, this is only 80% elk potential. This potential could not be reached because of the reduction of elk habitat security and the reduction of elk cover/forage ratios on key winter range.

Although more forage would be produced on summer range under this scenario, sufficient forage would not be available on NF winter range to sustain a population of more than 8400 elk.

f. Recreation and Other Resources

In the maximum PNV benchmark (PV2) which assigns values to both market and nonmarket resources, recreation values make up 68 percent of the total discounted value. Recreation prescriptions which produce the most RVDs are selected over prescriptions which produce fewer. For example, 445,000 acres are given to dispersed recreation prescriptions. Only 96,000 acres are assigned to minimum level. In the PNV benchmark (PM2) which assigns only market resource values, developed recreation is the only type which contributes to the PNV. In this benchmark, only 36,000 acres are awarded to dispersed recreation. However, 586,000 acres are prescribed to minimum level because of its low cost.

Table B-11 shows the economic effects of the benchmarks.

Table B-11: Present Value Benefits and Costs for Resource Groups by Benchmark (Millions of Dollars)

Benchmark	Present Net Value	Present Value Benefits				Present Value Costs				
		Timber	Recreation	Range	Other	Timber	Roads	Recreation	Range	Other
PU1	323	61	393	14	3	54	10	18	7	60
PV1	322	56	394	14	3	53	10	17	7	59
PB1	322	61	394	14	3	55	11	18	8	61
PV2	319	59	393	13	3	54	10	18	7	61
PV5 (MAX PNV)	309	17	403	13	3	46	5	16	7	53
MW2	279	42	360	10	3	49	8	17	5	56
CM8	251	67	321	11	3	55	18	18	6	59
MT1	230	91	363	9	3	86	32	29	5	96
ML4	208	0	272	0	3	25	0	10	0	33
MTP	173	110	349	18	3	113	46	36	10	122
PM2	27	71	77	9	3	49	13	16	5	54

6. Production Potential

The benchmark analysis provided information about the economic and production potentials of the Forest.

a. Economic Potential (Benchmark PV5 and PM2)

Benchmark PV5 gives us the measure of maximum present net value with constraints for minimum management requirements and non-declining yield. The PNV of this benchmark is $309 million. Both market and nonmarket resources were assigned values in this benchmark. Only 14 percent of tentatively suitable timberland is awarded to timber prescriptions. The harvest schedule begins at 6.0 MMBF in the first decade and increases to 8.0 MMBF in the fourth decade when real timber price increases have peaked. Elk production is below current levels and livestock forage production is 11,000 AUMs above current levels.

Benchmark PM2 gives a measure of the economic potential of the Forest when only market resources are assigned values. The PNV of this benchmark is $27 million. Here 73% of tentatively suitable timberland is economically suitable. Long term sustained yield of 36.4 MMBF is reached in the fourth decade. Elk production is below current levels and, because livestock AUM market values are lower than willingness to pay values, livestock production drops 6300 AUMs below current level.

b. Maximum Resource Potential

Maximum resource output constraints were used to determine the physical or biological potential of achieveing specific resource outputs for the Forest, and the resulting impact on other resources or programs. The outputs chosen for this analysis were timber, livestock, elk, and wilderness. The resource outputs were maximized by assigning FORPLAN an objective function to maximize the particular output, locking in the resulting scheduled output.

1) **Timber Potential (Benchmark MT1)**

The maximum longterm sustained timber yield with contraints for minimum management requirements and nondeclining yield is 56.5 MMBF/year. The first decade harvest is 35.5 MMBF/year and this remains until the ninth decade when the harvest increases to the long term sustained yield. The objective function used in the FORPLAN run was to maximize timber. No economic efficiency objective was used so all 440,000 acres of tentatively suitable timberland was scheduled to be entered during the planning horizon.

2) **Livestock Forage Potential (Benchmark MTP)**

The maximum livestock potential is 70,000 AUMs/year. The most efficient level of grazing would result from a range prescription of 131,000 acres. Benchmark MTP assigns 206,000 acres to range prescriptions.

3) **Wilderness Potential (Benchmark MW2).**

Maximum wilderness designation is 1,204,000 acres or 69% of the Forest. This includes two designated areas: the Absaroka-Beartooth (580,562 acres) and the Lee Metcalf (135,112 acres), plus an additional 488,400 acres of available roadless lands assigned to wilderness. This benchmark has a long term sustained timber yield of 20.2 MMBF/year on 40 percent of the tentatively suitable timberland. Elk would stay at current levels and livestock grazing would be reduced by 5600 AUMs. The PNV of this benchmark is $279 million.

4) **Elk Potential**

An actual benchmark run was not used to estimate elk population potentials. In cooperation with the Montana Department of Fish, Wildlife, and Parks we arrived at a potential of 8400 elk wintering on National Forest land. This compares to the current estimate of 5600 animals. On private adjacent and intermingled winter range the current elk population is 4200 animals. It was assumed that this figure would stay constant, that the capacity of these lands has been reached.

Table B-12 shows the resource supply potentials.

Table B-12: Resource Supply Potential

Resource---	Range of Outputs---
Roadless Area (Roadless Management) (M acres)	0 – 637
Stream Trout (M trout)	4 – 543
Additional Wilderness (M acres)	0 – 488
Elk Population (Wintering on National Forest) (M elk)	4.1 – 8.4
Livestock Forage (M AUM)	0 – 70
First Decade Timber Harvest (MMBF)	0 – 35.5
LTSY (MMBF)	0 – 56.5
Suitable Timberlands (M acres)	0 – 440
Present Net Value (MM $)	27 – 323

G. Formulation of Alternatives

1. Introduction

A forest planning alternative is a mix of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. To be viable, the alternative must:

1. Exist within the capability of the Forest to supply various resources as determined by establishing minimum and maximum production levels for single resources.

2. Facilitate analysis of opportunity costs and of resource use and enviornmental tradeoffs among alternatives.

3. Facilitate evaluation of present net value, benefits, and costs of achieving various outputs as well as elements that are not assigned monetary values.

4. Show a different way to address and respond to major public issues, management concerns, and resource opportunities (ICO'S).

5. Represent the most cost efficient combination of management prescriptions that can meet the objectives of the alternative.

6. State the condition and uses that will result from implementation.

7. State what goods and services will be produced, including timing and flow of outputs and the costs and benefits generated.

8. State the resource management standards and guidelines used.

9. State the purpose of the management direction used.

Formulating alternatives in the Forest planning process followed the analysis of the management situation (AMS). During the analysis of the situation, a determination was made of the ability of the Forest to supply goods and services. Maximum and minimum output levels were established. These levels form the range within which the alternatives were developed. Two specific alternatives are required. One alternative was developed to respond to and incorporate the RPA program tentative resource objective. Another alternative was developed to reflect the current and expected level of goods and services produced if current management were to be was continued (the "no-action" alternative). The alternative formulation process is best explained as a series of steps.

Step 1 - Major public issues were identified through public involvement. Internal management concerns were added to the list of issues. (Further explained in Appendix A.) These issues and concerns were reviewed by an interdisciplinary team and consolidated into a set of planning questions to be answered in the planning process.

Step 2 - A comprehensive multi-resource data base was formed based on the identified issues and concerns and stored in a computer retrieval system.

Step 3 - Land analysis areas with similar physical and biological attributes were identified. The capability, suitability, and management opportunities of specific areas of the Forest were considered in this step.

Step 4 - A set of management prescriptions were prepared to represent a variety of possible ways and intensities to manage the Forest.

Step 5 - The 543 analysis areas identified in Step 4 were assigned management prescriptions. Some analysis areas were assigned only one prescription while others were assigned a variety of prescriptions that could be applied. Varying intensities within prescriptions were also developed.

Step 6 - Resource outputs and the associated costs and dollar values that would result when a prescription was implemented were calculated and entered into the computer model FORPLAN.

Step 7 - Demand was estimated with an emphasis on goods and services highlighted in the planning questions. Then demand was compared with supply potential in the context of the planning questions to identify opportunities for adjusting outputs to better satisfy public issues and management concerns.

Step 8 - Supply potentials were determined using the FORPLAN computer model. Various assumptions, constraints, and objectives were used to establish benchmarks for supply potentials of each resource. (See Section VI.) Benchmarks were established for the minimum, maximum, and constraint resource levels, and maximum present net value. Existing resources and projected use were compared to supply potentials of each benchmark. Opportunities to resolve issues and management concerns were identified for each resource by comparing existing and projected use to potential production levels. These potentials, when compared to the Current Direction, indicate opportunities and/or need for change.

Production potentials and costs were derived by giving specific objectives to the model such as maximizing elk production on winter range. Variations were made within a specific objective by applying a single or series of constraints designed to accomplish a second objective. For example, using the primary objective of maximizing present net value, a constraint may be added to limit the amount of sediment produced with the objective of providing soil and watershed protection. A point of reference was also defined from which the costs and effects of applying regulation and policy constraints were measured.

Production capabilities were determined for single resources as well as for a set of multiple resource outputs that maximize present net value. This analysis established the benchmark levels required by national planning direction. Benchmarks serve as a reference from which the costs and effects of various objectives and constraints used in developing alternatives were evaluated. This concluded the analysis of the management situation.

Step 9 - Alternative objectives were established to provide a broad range of options for future management of the Forest. Selected benchmarks were used to define upper and lower limits for the production of each resource. These upper and lower limits outlined the decision space boundaries for the resources involved. The interdisciplinary team considered expected use, supply potential

(upper and lower limits), and evaluated public input to establish the range of alternatives within the decision spaces. Descriptions were written to define the resource management intent for each alternative.

Step 10 - The FORPLAN model was again used to estimate the outputs and costs for each alternative by reflecting the objective of the alternative through a given set of constraints.

Step 11 - The results of the FORPLAN analysis for each alternative were evaluated to assure conformance with laws, policies, and guidelines. Refinements were made to insure that each alternative could be achieved. Further information on the FORPLAN model is presented in Section III of this appendix.

The interdisciplinary team incorporated cost efficiency into the planning process. First a comparative analysis was performed to identify the most cost efficient prescriptions. For the timber resource, an additional analysis was done to identify the most cost efficient management intensity of the timber prescription. Second, the interdisciplinary team developed different alternatives and identified the necessary constraints to address specific objectives, issues, and concerns. Third, prescriptions meeting the cost efficiency test were combined with the necessary constraints and incorporated into FORPLAN to form different alternatives.

Each alternative produces a different combination of priced and nonpriced outputs. The feasibility of each alternative is analyzed with FORPLAN. All constraints must be satisfied or an infeasibility will result. The methodology used to account for both priced and nonpriced resources in alternative formulation and evaluation is discussed in Section IV of this appendix.

2. Common Constraints

Common constraints are those which were used in all benchmark runs except the Maximum Timber-Range (MTP) and Minimum Level (ML4) benchmarks and then were carried forward into all alternatives. Common benchmark constraints were developed, examined, and tested to see how well they addressed their stated purpose. They also represent the most cost efficient approach to meeting the intended purpose.

The constraints applied to all alternatives resulted from NFMA regulations (36 CFR 219); Administration policy identified in a letter to the Regional Office, code 1920, dated May 31,1983; and suitability criteria identified in Forest Plan documentation.

The benchmark constraints common to all alternatives are as follows:

1. **Constraint:** Ensure a minimum volume of 1.47 MMCF of timber per year in the first decade in each alternative.

Purpose: Establish an absolute minimum amount of timber which can be harvested each year of the first decade.

Rationale: The timber industry must be able to depend on a minimum volume of timber available from NFS lands. This volume will be met without the need for constraints after the first decade due to NDY (see Constraint #3, below).

Tradeoffs-Opportunity Costs: Results in a minor reduction in PNV and alters the timber harvest schedule.

2. **Constraint:** Ensure an appropriate timber inventory at the end of the planning horizon.

Purpose: To assure that harvestable timber will be available in the decades immediately following the end of the planning horizon, and in an amount expected from a regulated forest.

Rationale: The forested land should be retained in productive condition throughout and beyond the planning horizon.

Tradeoffs-Opportunity Costs: Probably a minor amount of opportunity cost.

3. **Constraint:** Assure nondeclining sustained yield in the Forest's timber harvest. (Used in all alternatives except for Alternative 10 (Departure).

Purpose: This assures that the timber industry will attain a steady supply of sawtimber from the Forest.

Rationale: Required by NFMA legislation with a few exceptions.

Tradeoffs-Opportunity Costs: Minor change in PNV, change in timber harvest schedule.

4. **Constraint:** Maintain watershed condition. (Related to ECA's and other water and soil considerations.)

Purpose: To assure that seasonal runoff levels are not excessive. This limits excessive soil erosion and protects stream channels.

Rationale: Soils and water are basic resources which, if destroyed or degraded, would significantly reduce the productive capacity of the land.

Tradeoffs-Opportunity Costs: May result in near term increases in roading costs since less timber can be harvested in drainages that have already undergone initial entry.

5. **Constraint:** Minimum rotation ages are set at the age where 95 percent of the CMAI timber volume occurs.

Purpose: To assure that timber is not harvested while still growing at its maximum rate.

Rationale: Maintain high productivity and abide by FSM direction.

Tradeoffs-Opportunity Costs: Shorter rotations not meeting CMAI may meet economic objectives more effectively (ie., where industry is utilizing smaller diameter material, waiting for CMAI may not be economically productive).

6. **Constraint:** Nonforest lands, noncommercial forest lands, and other lands not suitable for timber production were not assigned prescriptions that included regulated timber harvest.

Purpose: Assure that any lands receiving timber harvest prescriptions are suitable for timber harvest. This would exclude lands that are incapable of or unavailable for timber harvest.

Rationale: Timber harvest is not possible on such lands.

Tradeoffs-Opportunity Costs: PNV is generally increased by excluding timber harvest from these lands.

7. **Constraint:** Only the Wilderness Prescriptions are available for the Absaroka-Beartooth and Lee Metcalf Wildernesses.

Purpose: These prescriptions are the only ones which meet legal and regulatory requirements for managing designated wilderness areas.

Rationale: Wilderness Act of 1964 (PL. 88-577).

Tradeoffs-Opportunity Costs: None.

8. **Constraint:** Only the Recreation/Wildlife Prescription is available for the Cabin Creek Wildlife Area.

Purpose: To bring management of this area into compliance with the law as defined in the Lee Metcalf wilderness legislation.

Rationale: Lee Metcalf Wilderness and Management Act of 1983 (PL. 98-140).

Tradeoffs-Opportunity Costs: None.

9. **Constraint:** The Roaded Recreation prescription is only available to roaded lands with slope less than 40 percent.

Purpose: To assure that this prescription is only applied to lands that are suitable for roaded recreation activities.

Rationale: It is not practical to operate motorized vehicles to any extent on lands greater than 40 percent slope.

Tradeoffs-Opportunity Costs: None.

10. **Constraint:** The Nonroaded Recreation prescription is only available for nonroaded lands.

Purpose: Limits use of this prescription to lands included in the Forest's roadless inventory.

Rationale: Ensures that this prescription is not applied to roaded lands or to small isolated parcels of nonroaded lands.

Tradeoffs-Opportunity Costs: None.

11. **Constraint:** The Developed Recreation prescription is only available on developed recreational sites.

Purpose: Limits use of this prescription to the lands in the DEVREC condition class.

Rationale: Ensures that this prescription is applied to developed recreational areas as identified in the analysis areas.

Tradeoffs-Opportunity Costs: None.

12. **Constraint:** Range prescriptions are only applied to the High and Low range condition classes.

Purpose: To optimize range management on permanent rangelands. Also avoids assigning unsuitable range to grazing.

Rationale: An analysis of suitable rangelands was one basis of the analysis area selection. This prescription limits the range prescriptions to these suitable lands.

Tradeoffs-Opportunity Costs: None.

13. **Constraint:** Apply only the MINLVL prescription to the ROCK condition class.

Purpose: Limit costs in managing the ROCK condition class since priced outputs are not expected from this CC.

Rationale: The ROCK condition class includes lands that are not appropriate for investment, such as rocklands and lake acres. Minimum management and investment levels are appropriate for such areas.

Tradeoffs-Opportunity Costs: May result in a minor increase in PNV.

14. **Constraint:** One objective function will always be to maximize Present Net Value.

Purpose: Include economic efficiency as a criterion in all benchmarks and alternatives, except for the following benchmark runs: Maximum Timber; Maximum Range; Maximum Timber with NDSY; and Minimum Level

Rationale: Complies with direction in the National Forest Management Act of 1979.

Tradeoffs-Opportunity Costs: None.

15. **Constraint:** Retain 10 percent of the potentially suitable and biologically valuable acres in an old growth condition.

Purpose: Maintain habitat for old growth dependent species.

Rationale: NFMA requires that Forest planning provides for and maintains diversity of plant and animal communities.

Tradeoffs and Opportunity Costs: If it is a binding constraint in a solution, then it could reduce the level of timber harvest.

3. Development of Alternatives

a. Alternative 1: Current Management

The purpose of Alternative 1 is to provide a mix of goods and services at levels most likely to occur in the future under the same general land use prescriptions existing today. Since this alternative reflects current management under the Multiple Use Plan, it was not developed specifically to address points raised by the ICO s and benchmarks. A number of constraints were identified which were associated with the goal of this alternative. These constraints were applied in the FORPLAN model in order to predict the results of continuing current management during the planning period. These constraints, in addition to the common constraints, were:

Constraint A: Maintain livestock outputs greater than 400 MAUMs in Decade 1.

Purpose: This constraint, similar to the Decade 1 timber minimum listed in the Common Constraints section, was intended to assure livestock forage production consistent with present outputs. Otherwise, FORPLAN selects irregular output levels for the initial decades based on maximizing PNV.

Rationale: Preliminary runs indicated that range outputs would have been too low in terms of current outputs if this constraint were not applied.

Constraint B: Maintain winter range elk forage at greater than 140 MAUMs for Period 1.

Purpose: It was necessary to assure sufficient elk winter range to model elk numbers at levels consistent with current management.

Rationale: Preliminary runs indicated that elk forage would be too low in the first period when this constraint is not applied.

Constraint C: Manage all SEED/SAP and NONSTOCKED condition classes with a timber emphasis.

Purpose: To assure that these condition classes continue to be included in the regulated timber base.

Rationale: In the preliminary runs it was discovered that in these condition classes, the most recently harvested were not being kept in the regulated timber base because of the near-term costs and deferred benefits.

Constraint D: No DISPERSED REC ROADED prescription assigned to timber lands.

Purpose: To keep management practices and associated costs consistent with current management, which is appropriate to this alternative`s theme.

Rationale: It was found that without this constraint greater amounts of selection harvest were taking place than would be expected following current practice.

Constraint E: Impose a forestwide timber harvest minimum for Period 1 at greater than 65 MMCF.

Purpose: To assure that the model harvests some level of timber in the first two periods.

Rationale: If this constraint were not applied, the model would harvest no timber in the first two decades. This would be disruptive of the area's timber industry and the local economy.

Constraint F: Set timber harvest maximum levels by Level 1 areas for the first five decades.

Purpose: Assures that timber harvest in the first 5 decades will not be disproportionately high from a few mountain ranges, with light harvest or no harvest elsewhere.

Rationale: Because of differing average stand densities in different Level 1 areas, caused chiefly by the mountain pine beetle epidemic, the model tends to overharvest some areas in the initial decades while deferring harvest in other areas. Hebgen, the Crazy Mountains, and the Absaroka-Bearooth areas would be harvested heavily while other areas would be deferred. This would be disruptive to the timber industry and would also concentrate adverse effects of harvest--such as effects on visuals, wildlife or watersheds--in a few areas. The constraint smoothes out harvest from the Forest's Level 1 areas.

Constraint G: Keep total budget to less than $55 million per decade.

Purpose: To assure that budgeting for this alternative is consistent with what would be expected if current management direction were projected into the future.

Rationale: Preliminary runs showed the budget rising to levels inconsistent with the theme of this alternative.

Constraint H: The following areas will be modeled as wilderness in addition to designated wilderness areas on the Forest: 427 acres of Reef, 480 acres of Republic, and 24,584 acres of Lionhead.

Purpose: The Forest Plan alternatives taken as a whole present a number of options as to the amount of additional wilderness that might be designated on the Forest, ranging from 0 percent to 100 percent. This selection of roadless areas for wilderness management is consistent with the alternative's theme of projecting current management direction, since these areas were recently recommended for wilderness by Forest management.

Rationale: Present an array of choices throughout the alternatives as to the disposition of the Forest's lands for either wilderness or other uses.

All the above constraints, in addition to those common to all alternatives, were necessary to manage consistent with current management direction projected into the future. Two preliminary versions of the alternative revealed failure of the model to fully accomodate the current management theme, thereby making the constraints advisable.

b. Alternative 2: High Timber, Range, and Minerals

Emphasis of this alternative is on increasing timber, range, minerals, and other outputs that have the potential to produce an income to the Government. Management for other resources is at economically acceptable and environmentally feasible levels that are consistent with the emphasis on market oriented outputs.

This alternative went through three preliminary drafts before the modeling was found to be acceptable. Problems in the early drafts included unreasonably high harvest in the first decade from the east side of the Forest and the Hebgen plateau. Costs had to be adjusted also. For instance, selection cutting was found to be incompatible with the theme of this alternative in terms of productivity and cost efficiency. Shortcomings in the preliminary drafts of this alternative were corrected by use of constraints in the fourth (acceptable) version of the alternative.

The final and acceptable version contained the common restraints listed in an earlier section plus the following:

Constraint A: Timber harvest must be greater than 8 MMCF/year during Period 1 and greater than 9 MMCF/year in Period 2.

Purpose: Without these constraints, it was found that the model would defer harvest into the third and subsequent decades to maximize PNV. This would have proved disruptive to the commercial timber industry and would be inconsistent with NDY.

Rationale: Establish an initial harvest level for the first two decades which is consistent with harvest levels anticipated over the planning period.

Constraint B: Impose timber harvest maximum levels by mountain range for the first 5 decades to assure that timber harvest in the initial decades will not be disproportionately from a few areas of the Forest, with light harvest or no harvest elsewhere.

Purpose and Rationale: (Same as for Alt. 1, Constraint [e]).

Constraint C: Impose minimum range output at 650 MAUM's in Perion 1.

Purpose: Bring range forage production to levels consistent with known productivity of allotments,thereby assuring a moderate increase in livestock outputs.

Rationale: Scale increase in range outputs to the capacity of the local ranching community to accomodate increased forage outputs.

Constraint D: Apportion livestock forage production by mountain range at certain maximum values.

Purpose: To assure that livestock grazing is proportioned to the location of presently used livestock grazing lands. The constraint also limits increases in forage production by mountain ranges to within projected demand limits, while still assuring moderate increases in production.

Rationale: Lands presently used for grazing will continue to be so assigned to avoid disrupting the livelihood of present permittees. Also, some levels of increase in the preliminary versions of the alternative --particularly for certain mountain ranges--were in excess of what the local ranching community could accomodate during the first decade.

Constraint E: Assure that 90 percent of all SEEDLING/SAPLING and NONSTOCKED condition classes are prescribed to regulated harvest.

Purpose: To assure that most timberlands which presently do not contain harvestable sawtimber are retained in the regulated timber base.

Rationale: This constraint keeps most of the recently harvested lands in the timber base. It also requires FORPLAN to budget for investments in timberland improvements that the model would not otherwise make. (This constraint is somewhat similar to Constraint [c] for Alternative 1.)

In Alternative 2, no areas of the Forest other than the designated wilderness areas were recommended for wilderness use.

c. Alternative 3: Low Cost

The objective of this alternative is to maintain low costs while at the same time maximizing PNV. Low investment levels for this alternative will decrease timber harvest compared to Alterative 1, but will show increases in outputs for dispersed recreation and some wildlife species, although these are not objectives of the alternative. Characteristics of this alternative that show up in the FORPLAN modeling include substantial reductions in roading over the planning period, as well as elimination of certain higher-cost prescriptions such as the two most intensive timber management prescriptions.

Tradeoffs include lower commodity outputs versus improvements in diversed recreation categories such as hunting and stream fishing. The alternative would result in a lowering of the employment base and economic base for the area as compared to current management and higher investment alternatives.

In this alternative, 64,000 acres of the Hyalite-Porcupine-Buffalo Horn MWSA area are modeled as wilderness in addition to the Forest's designated wilderness areas.

This alternative underwent three drafts before the ID team was satisfied that the objectives of the alternative were being achieved in a feasible manner. The early drafts limited timber harvest in the later decades with a harvest ceiling, but the final draft attained this more efficiently with a roading constraint. A greater emphasis on developed recreation in early drafts of the alternative was finally eliminated as somewhat inconsistent with the alternative's low-cost theme. Constraints in the final draft of Alternative 3 are as follows:

Constraint A: Timber harvest must be greater than 14.7 MMCF in Period 1.

Purpose: Assures that some timber harvest takes place in the Period 1, even though at a low level.

Rationale: If this constraint were not applied, FORPLAN would harvest no timber in the first two decades in order to maximize PNV. This would be disruptive of the local timber industry.(This constraint is similar to constraint [e] for Alt. 1.)

Constraint B: Timber harvest is apportioned for the level 1 areas (mountain ranges) through the first 5 decades.

Purpose and rationale: Regulating the distribution of harvest among Level 1 areas affords the opportunity to capture an additional 13.5 MMCF of dead material in decade 1 with the same number of acres harvested by Level 1 areas. (For further explanation refer to constraint [f] for Alt. 1.)

Constraint C: Livestock total output held to greater than 300 MAUM in Period 1.

Purpose: Given the low budget emphasis of the alternative, without this constraint FORPLAN would reduce the Forest's range program unacceptably.

Rationale: Keep the range outputs at a level that prevents severe dislocation of the local livestock industry. (Similar to constraint (c) for Alt. 2 but set at a different level.)

Constraint D: Apportion livestock forage outputs among the Level 1 areas at certain maximum values.

Purpose and rationale: (Same as constraint [d] for Alt. 2.)

Constraint E: Maintain elk winter range at at least 185 MAUM in Period 1.

Purpose: Because of low intensity management, it appeared possible to attain high elk numbers consistent with the commodity outputs expected.

Rationale: Assure ample winter range to allow for some increase in the Forest's elk herd. The effect of setting this constraint for the first decade was to profile elk winter range throughout the planning period. (Similar to constraint [e] for Alt. 1, but set at a different level.)

Constraint F: Allow no more than 42 miles of local road construction in any period.

Purpose: Essentially, this constraint served to curb levels of timber harvest consistent with the low budget theme of the alternative.

Rationale: Initially, timber harvest was limited directly. But limiting roading served to indirectly limit harvest levels while allowing the model more freedom in providing for timber harvest consistent with maximizing PNV.

Constraint G: The P-PT-T or NA-PTT FORPLAN timber harvest regimes will not be used.

Purpose: Elimination of the two high cost, intensive timber prescriptions tends to lower timber investment and hence to lower budget levels. This is consistent with the alternative's low budget theme.

Constraint H: Greater than 15,000 acres to big game emphasis and greater than 15,000 acres to roaded recreation emphasis.

Purpose: Identify land for non-commodity emphasis to attain good wildlife and roaded rec outputs.

Rationale: Given the low commodity levels produced by the budget constraints, there is no difficulty in this alternative in elevating levels of non-commodity outputs.

Constraint I: In this alternative, 64,000 acres of the HPBH roadless area were assigned to the wilderness prescriptions in addition to the designated wilderness on the Forest.

Purpose: To display the consequences of additional wilderness on the Forest.

Rationale: In this and other alternatives, various portions of the Forest's existing roadless areas are displayed as wilderness. This suggests costs and benefits of various amounts of wilderness on the Forest.

Constraint J: Assure that 50 percent of all SEEDLING/SAPLING and NONSTOCKED condition classes are assigned to timber harvesting prescriptions.

Purpose: To assure that some of the lands which are managed currently for timber production will be given to timber harvesting prescriptions.

Rationale: This constraint keeps FORPLAN from awarding all these "higher cost" condition classes to lower cost prescriptions. It is assumed that lands which are already harvested are the most likely sites for future harvest also.

d. Alternative 4: RPA Program Emphasis

This alternative was designed to meet the RPA program targets for the Gallatin National Forest as efficiently as possible.It was learned in developing and running this alternative that RPA targets for livestock grazing and State goals for elk couldn't be met, although outputs could be increased over current levels.

In addition to designated wildernesses, the Lionhead, Reef, and Republic roadless areas were recommended for wilderness in this alternative.

Constraints were set to achieve the RPA targets while complying with all legal and regulatory requirements for management of the Forest. As with several other alternatives, the FORPLAN run which finally met the alternative's themein an efficient and feasible manner was only attained after unsatisfactory preliminary runs. Constraints adopted in the final, acceptable FORPLAN run of the model, in addition to the common constraints listed earlier, were as follows:

Constraint A: Require timber harvest greater than 39.1 MMCF in Period 1, 54.6 in 2, 60.3 in 3, 66.1 in 4, and 74.7 in 5.

Purpose: To bring timber harvest up to RPA targets.

Rationale: Without this constraint the model failed to reach the RPA timber target because of the objective function of maximizing PNV.

Constraint B: Set timber harvest ceilings for all Level 1 areas through the first 5 decades.

Purpose and rationale: (Same as for constraint (e), Alt. 1.)

Constraint C: Require greater than 550 MAUM's of livestock grazing in Period 1 while setting ceilings on forage production for individual Level 1 areas.

Purpose and rationale: To achieve as high as possible levels of livestock use consistent with the objectives of the alternative.

Constraint D: Elk winter range forage production set at greater than 185 MAUM in Period 1.

Purpose: Setting this constraint in the first period effectively profiles winter range outputs at 185 MAUM/Decade over the entire planning period.

Rationale: Maintain a high level of elk forage in an effort to come as close to State goals as is feasible.

Constraint E: Ninety percent of all SEEDLING/SAPLING and NONSTOCKED condition classes to be managed for timber harvest.

Purpose and rationale: (Same as constraint [e], Alt. 2.)

Constraint F: No DISERSED REC ROADED prescriptions awarded to timber lands.

Purpose: To keep modeled regeneration systems in a more realistic balance.

Rationale: It was found in early runs of the Gallatin FORPLAN model that without this constraint greater amounts of selection harvest were designated than could be implemented.

e. Alternative 5: Wilderness Plus Moderate Commodity Outputs

The objective of this alternative was to recommend a large portion of existing roadless lands as wilderness with an emphasis on economic efficiency for nonwilderness lands. About 52 percent of the roadless lands would be recommended for wilderness in this alternative. A listing of the lands in the roadless inventory that would be recommended for wilderness in this alternative can be found in Constraint F, below.

Constraints applied to develop the alternative besides the common constraints listed earlier, were as follows:

Constraint A: Timber harvest maintained at greater than 30 MMCF in Period 1.

Purpose and Rationale: (Similar to Constraint E for Alternative 1.)

Constraint B: Timber harvest ceiling set by mountain range for the first 4 decades. This prevents very intensive harvest in some mountain ranges with others not entered.

Purpose and Rationale: (Similar to Constraint F for Alternative 1.)

Constraint C: Ninety percent of SEEDLING/SAPLING and NONSTOCKED timber classes will be assigned a timber prescription.

Purpose and Rationale: (Same as for Constraint E for Alternative 2.)

Constraint D: Maintain elk winter range forage at greater than 140 MAUM per decade.

Purpose: This constraint serves to sustain elk numbers at current levels on the Forest. This amount of winter forage will overwinter about 5600 head of elk.

Rationale: (Similar to Constraint B for Alternative 1.)

Constraint E: Maintain livestock forage outputs greater than 450 MAUM in every decade.

Purpose: This constraint sustains forage outputs about 10 percent higher than at present and prevents irregular outputs in the initial decades.

Rationale: (Similar to as for Constraint A for Alternative 1.)

Constraint F: The following areas will be modeled as wilderness in addition to designated wilderness areas on the Forest: 24,584 acres of Area #1963 (Lionhead); 910 acres of #1914 (Reef) and #1912 (Republic); 70,498 acres of #1541 (Crazy Mt's); 51,910 acres of #1371 (North Absaroka); and all 105,561 acres of the HPBH Study Area (consisting of areas #G1548 and #H1548).

Purpose: The designation of these "high interest"roadless areas to wilderness will help in the analysis of the effects of these going to wilderness. This Alternative's recommendation places about 52 percent of the Forest's roadless inventory in wilderness.

Rationale: (Similar to Constraint H for Alternative 1.)

f. Alternative 6: Amenity/Commodity Mix, High Roadless

The goal of this alternative is to maximize present net value while concentrating timber harvest and other road related activities principally in currently roaded areas. This alternative develops resources on currently roaded areas plus 23,000 acres of the more productive and cost efficient roadless areas. Unroaded areas that would be developed for timber management would be Cherry Creek near the Spanish Peaks, Teepee Creek by West Yellowstone, Bozeman Creek, and East Boulder. Dispersed recreation and wildlife would receive management emphasis on the remaining roadless areas. Grizzly bear management is stressed. Livestock grazing investments will be greatest in the roaded parts of the Forest.

In Alternative 6, no lands are prescribed for wilderness except the Forest's presently designated wilderness areas.

Constraints used in modeling this alternative in addition to the common constraints for all alternatives, are as follows:

Constraint A: Maintain timber harvest at not less than 40.8 MMCF in Period 1.

Purpose and rationale: (Same as Constraint E for Alternative 1.)

Constraint B: Impose a ceiling on timber harvest by mountain range over the first 5 decades.

Purpose and rationale: (Same as Constraint F for Alternative 1.)

Constraint C: Produce greater than 165 MAUMs of elk forage on winter range in the first period.

Purpose: To produce sufficient forage on elk winter range to somewhat increase present elk populations.

Rationale: Without this constraint the model only provided 115 MAUM's in a preliminary run. This would have reduced present elk numbers to unacceptable levels. The other parameters of this alternative precluded raising the elk forage figures higher without driving the run infeasible. (This constraint is somewhat similar to Constraint B for Alternative 1.)

Constraint D: No timber harvested on nonroaded lands except for Cherry Creek (12.9 MAC), Teepee Creek (2.9 MAC), Bozeman Creek (3.5 MAC), and East Fork Boulder (4.3 MAC).

Purpose: Contain development and intensive management to parts of the Forest already developed.

Rationale: The theme of this alternative was to investigate the outcome if unroaded lands were left undeveloped and roaded lands were managed intensively.

Constraint E: Assure that 90 percent of all SEEDLING/SAPLING and NONSTOCKED condition classes on roaded lands be managed with timber emphasis.

Purpose and rationale: (Same as Constraint E for Alternative 2.)

Constraint F: Prescribe livestock forage outputs at greater than 460 MAUM's in Period 1 while setting ceilings on forage production by individual mountain ranges.

Purpose: Distributes forage production by mountain range to be consist with the location of existing allotments. The forestwide floor maintains outputs despite the Level 1 ceilings.

Rationale: Total grazing outputs from the Forest should be apportioned to coincide, at least roughly, with the location of existing grazing allotments. This avoids dislocation of the local livestock industry and proportions grazing use more evenly among the mountain range than would be the case without the constraint. The livestock forage level from permanent range is somewhat lower than in other alternatives such as Alt.1, Current Management, but this is offset by comparatively high transitory range outputs from this alternative. (Compare Constraint A for Alternative 1.)

g. Alternative 7: Proposed Action

The goal of this alternative is to provide moderate outputs for timber and range while placing high values on water quality, recreation, wildlife and recovery of the grizzly bear. Alternative 7 attempts to achieve its goal --a balancing of market and nonmarket values-- through a combination of management strategies best suited to the different parts of the Forest. Environmental effects of timber, range, and minerals activities would be mitigated to assure water quality, elk/deer winter ranges in good condition, and a broad diverity of recreational opportunities. A policy to reduce grizzly bear mortality on the Forest requires some regulation of human activities in grizzly areas.

Alternative 7 recommends 21,461 acres of Lionhead plus 910 acres of Reef and Republic roadless areas to wilderness in addition to the designated wildernesses on the Forest. Also, 22,500 acres of the Hyalite-Porcupine-Buffalo Horn MWSA area will be managed as a scenic-recreational area, and 26,055 acres in

the Porcupine-Buffalo Horn Creeks area will be given special management for elk and grizzly bear.

Contraints applied to the FORPLAN model in developing Alternative 7, in addition to the common constraints, are as follows.

Constraint A: Maintain timber harvest at greater than 39.5 MMCF in Period 1, 49.5 in 2, 54.5 in 3, 59.5 in 4, and 64.5 in 5.

Purpose: This constraint prevented the model from deferring timber harvest through the first three decades, and tended to smooth out the increase in harvest as the Forest moved to the long-term sustained yield level.

Rationale: Prevents sharp breaks in harvest levels that would be disruptive of the area's timber industry and economy.

Constraint B: Impose timber harvest maximum levels by mountain range for the first five decades to assure that timber harvest in the initial decades will not be disproportionately from a few mountain ranges, with light harvest or no harvest elsewhere.

Purpose and Rationale: (Same as Constraint B for Alternative 2.)

Constraint C: Harvest in Decades 1 and 2 will be greater than 19,000 acres.

Purpose: To require the model to harvest lower quality timber condition classes.

Rationale: The planning team wanted the model to harvest some of the stands decimated by the mountain pine beetle. To reach the 19,000 acre minimum in this constraint, the model was forced to harvest low volume stands as well as the high volume stands it would otherwise have sought.

Constraint D: Livestock forage determined by land suitability.

Purpose: To limit livestock grazing to management areas identified for livestock grazing purposes.

Rationale: The ID and management teams mapped grazing areas on the Forest for this alternative. Limiting range use to these areas presents a more realistic model.

Constraint E: There should be less than 65,950 acres assigned to the timber high regeneration FORPLAN prescription.

Purpose: To limit this high-cost prescription to timberlands that warrant its use.

Rationale: This acreage is the sum of HT and LMT condition classes at less than 40 percent slope. The prescription is only economically efficient when applied to these lands. The constraint prevents FORPLAN from applying the prescription to other than prime timberlands.

Constraint F: Assign 21,461 acres of Lionhead, 910 acres of Republic, and Reef roadless areas to wilderness prescriptions.

Purpose and Rationale: (Same as Constraint H for Alternative 1.)

Constraint G: Limit all 22,500 acres of the roadless area H1548 to the DISPERSED RECREATION prescription.

Purpose: Manage the Hyalite Peaks area as a scenic-recreation area.

Rationale: The guidelines and practices of this prescription are appropriate for roadless management with emphasis on dispersed recreation and visuals.

h. Alternative 8: Extensive Wilderness

The objective of this alternative is to explore the benefits and costs of recommending a large segment of the roadless resource to wilderness. A high degree of economic efficiency is attempted on the lands not proposed as wilderness. In this alternative, approximately 78 percent of roadless lands are assigned a wilderness prescription.

This alternative differs from Alternatives 5 and 9 chiefly in the amount of wilderness prescribed. Otherwise, the themes of Alternatives 5, 8, and 9 are similar.

The constraints used in developing this alternative, in addition to the common constraints, are as follows:

Constraint A: Impose a forestwide timber harvest minimum for Period 1 at greater than 20.4 MMCF.

Purpose: To assure that an amount of harvest takes place in the initial decades sufficient to provide continuity to the area's timber industry.

Rationale: (Same as for Constraint E for Alternative 1.)

Constraint B: Set timber harvest maximum levels by Level 1 areas for the first five decades.

Purpose and Rationale: (Same as for Constraint F for Alternative 1.)

Constraint C: Maintain livestock forage outputs greater than 450 MAUMs in each decade.

Purpose: To maintain the Forest's livestock forage production at slightly above the current levels.

Rationale: Ensure continuity of current grazing programs and sustain the forage levels available to the local livestock grazing industry.

Constraint D: Maintain winter range elk forage at greater than 140 MAUM for all decades.

Purpose: Ensure wintering capabilities slightly above current levels.

Rationale: If this minimum level were not set for forage, the FORPLAN model, in striving to maximize economic efficiency, would prescribe much lower levels.

Constraint E: Assure that 90 percent of all SEEDLING/SAPLING and NONSTOCKED timberlands are assigned to regulated harvest.

Purpose and Rationale: (Same as for Constraint E for Alternative 2.)

Constraint F: All of the Forest's roadless inventory will be recommended for wilderness except the following: #1742, Box Canyon; #1371, North Absaroka (East Boulder, Deer Creeks, and Jardine portions); and #1912, Beartooth. This places about 78 percent of all the Forest's roadless lands in wilderness.

Purpose: This wilderness location corresponds to the alternative's "high wilderness" theme. Generally, wilderness areas recommended by this alternative comprise the more suitable areas in terms of applying the wilderness criteria.

Rationale: This alternative is similar in theme to Alt's 5 and 9 excepting that differing amounts of wilderness are identified. Together, these

alternatives provide a range of choices for the roadless lands inventoried on the Forest.

i. Alternative 9: Maximum Wilderness

The objective of this alternative is to recommend 100 percent of the roadless lands to wilderness and examine the benefits and costs. Lands not proposed for wilderness are managed with an emphasis on economic efficiency.

The constraints used to develop this alternative, other than the common constraints, are as follows:

Constraint A: Impose a forestwide timber harvest minimum for Period 1 at greater than 20.4 MMCF.

Purpose and Rationale: Same as for Constraint A for Alternative 8. In this instance, the harvest floor stays the same but the timber base is smaller, suggesting more intensive management of the existing base in this alternative.

Constraint B: Set timber harvest maxium levels by Level 1 areas for the first four decades.

Purpose and Rationale: Same as for Constraint F for Alternative 1.

Constraint C: Maintain livestock forage outputs greater than 400 MAUM's in each decade.

Purpose and Rationale: As for Constraint C for Alternative 8, except that the livestock forage floor of 450 MAUMs could not be met.

Constraint D: Maintain winter range elk forage at greater than 120 MAUM for all decades.

Purpose and Rationale: Same as for Constraint D for Alternative 8, except that the elk winter forage floor of 140 MAUMs could not be met.

Constraint E: Assure that 90 percent of all SEEDLING/SAPLING and NONSTOCKED timberlands are available for regulated timber harvest.

Purpose and Rationale: Same as for Constraint E for Alternative 2.

Constraint F: All of the Forest's roadless inventory is proposed for wilderness. This results in 100 percent of the inventoried roadless lands on the Forest going to wilderness.

Purpose and Rationale: This is consistent with establishing a broad range of wilderness acreage from the Forest's roadless inventory. Similar to Constraint F for Alternative 8.

j. Alternative 10: Departure from the Proposed Action

The objective of this alternative is to test the four conditions under which NFMA regulations allow a Forest's harvest schedule to depart from nondeclining yield. Theser conditions are: the opportunity to reduce substantial losses of timber through mortality; a means of mitigating ecomomic impacts on a community; an opportunity to meet RPA targets; or a means of helping to meet other resource objectives.

This is the same alternative as Alternative 7 (Proposed Action) except that the nondeclining yield constraint was eliminated. Decade harvest level constraints

were used for the first five decades. Upper and lower sequential bounds were used; these limited possible harvest flow changes to 25% each decade.

Constraint A: Harvest level constraint for the first 5 decades are the same as Alternative 7.
Purpose: To smooth out harvest flow.

Constraint B: Sequential bounds to timber harvest volume of 25% (up or down) each decade.
Purpose: To prevent rapid fluctuations in harvest levels from decade to decade which could effect industry stability.

H. Summary of Effects of Constraints, Benchmarks, and Alternatives

1. Overview

The purpose of estimating and displaying these effects is to provide a means to compare social and economic consequences, outputs of goods and services, and overall protection and enhancement of environmental resources. This comparative analysis is the basis for evaluating alternatives and selecting a preferred alternative which maximizes net public benefit (planning steps 7 and 8). This section focuses on the economic consequences of Forest Service management for alternatives and benchmarks. The constraints are discussed in detail in Appendix B, Section VII; economic impacts are discussed in Appendix B, Section V; and social and environmental effects are discussed in Chapters II and IV.

2. Process for Evaluating Significant Constraints

Management objectives of benchmarks and alternatives were achieved by constraining FORPLAN as described in Section VII. The efficiency tradeoffs of individual objectives can be determined by comparing the PNV of a FORPLAN solution which meets the objective against one which does not. The change in PNV is a measure of efficiency for the achievement of a specific objective if both solutions have efficient prescriptions, both solutions maximize PNV, and the constraints are cost-efficient. The efficiency tradeoff of every objective within an alternative has not been determined because of the prohibitive analysis costs. But by comparing alternatives, the economic tradeoffs of the groups of objectives which have the most significant impact on PNV can be estimated. These efficiency tradeoffs can then be compared to environmental and social consequences to help identify the alternative which maximizes net public benefits.

A major factor in the economic tradeoff analysis is the order in which the objectives are analyzed. For example, the economic tradeoff of meeting management objectives A and B can be determined by comparing FORPLAN solutions with various combinations of the two objectives. The change in PNV due to meeting only A may be $5 MM, and the change due to meeting only B may be $11 MM. However, the change due to meeting both A and B will probably be less than $16 MM. In addition, the cost of meeting objective A in one alternative will not necessarily be the same as meeting the same objective in another alternative. This example depicts the importance of considering the mutual interaction of constraints within an alternative.

Another important consideration concerning the comparison of alternatives is the relative sensitivity of outputs and effects to the numerous assumtions and predictive models used in the analysis process. For example the Net Benefit calculations for the alternatives are largely derived from expected future recreational activity on the Forest. Therefore the PNV comparisons between alternatives are sensitive to the projections of use in both amount and kind. Further we find that many of our alternatives vary in PNV on the order of only ten to fifteen percent, suggesting that there is little significant difference between these alternatives for this comparative measure.

3. Tradeoffs Among Alternatives

The discussion in this part focuses on economic tradeoffs. Resource outputs and socioeconomic effects are displayed in Chapter II, and environmental effects are discussed in Chapters II and IV.

a. Response to Issues

Alternatives were designed to address the fourteen major issues. A single alternative cannot fully resolve all issues because of the conflicts among issues. Table B-13 compares the response of each alternative to the major issues. A detailed discussion of issues is in Appendix A.

b. Economic Tradeoffs

This discussion identifies the economic consequences of implementing the alternatives by comparing each alternative to the Max PNV benchmark and to at least two other alternatives: the next lower cost alternative in terms of discounted costs and the next lower alternative in terms of PNV. In some cases, alternatives with similar objectives are also compared. The comparisons form the basis for balancing economic tradeoffs with nonpriced resource outputs in selecting the preferred alternative. In this discussion, economic efficiency only considers the monetary value of the Forest as measured by PNV. In Chapter II, comparisons are made for nonpriced values of the alternatives.

One measure of the cost of an alternative is the discounted cost which represents the equivalent payment required by the Government to implement an alternative throughout the planning horizon. The minimum cost for federal ownership is defined by the Min Level benchmark as $67 million. Table B-14 displays the discounted costs, discounted benefits, and PNV in order of increasing costs. In general, the costs of alternatives increase with the size of the timber and road construction programs. These costs range from $122 million for Alternative 3 to $202 million for Alternative 10.

Another measure of the cost of an alternative is the change in PNV between alternatives. The maximum net value of the Forest is defined by the Max PNV benchmark as $309 million. The difference between $309 million and the PNV of an alternative represents the forgone investment opportunity to the Government for implementing that alternative. Table B-14 displays the discounted costs and benefits by resource and the PNV in order of decreasing PNV.

In general, the PNV of alternatives increases comensurate with several factors including: low development costs in the first few decades, great amounts and diversity of recreational opportunities especially dispersed

primitive, and low levels of timber harvest in decades one through three. By comparing each alternative with the alternative having the next highest PNV, the incremental economic tradeoffs can be compared to the nonpriced benefits. This comparison is made in Table B-15.

Table B-13: Response of Alternatives to Major Issues

	ALTERNATIVE									
ISSUE INDICATOR	1	2	3	4	5	6	7	8	9	10
Timber										
Annual Average MMBF Decade 1 ASQ	25	31	12	16	11	17	21	12	12	21
Percent change from baseline	+32	+63	-68	-16	-42	-10	0	-58	-58	+10
Suitable timberland (M-Acres)	247	368	85	310	239	229	305	216	199	314
Long Term Sustained Yield (MMBF)	30	43	10	35	30	25	27	25	23	33
Wildlife										
Elk winter range capacity (M elk)	5.6	4.6	6.4	6.4	5.6	6.5	6.1	5.1	6.6	6.1
Percent of old growth on tentatively suitable timberlands in 100 years	47	21	84	43	53	59	38	57	61	38
Stream habitat for trout in thousands of catchable fish										
Decade 1	504	493	517	511	494	511	509	516	516	508
Decade 5	493	491	471	491	516	516	509	516	517	514
Watershed										
Percent water yield increase										
Decade 5	0.7	1.0	0.2	0.7	0.4	0.5	0.6	0.3	0.3	0.6
Decade 10	0.7	0.8	0.2	0.8	0.6	0.5	0.7	0.5	0.5	0.7
Roadless										
Percent of current roadless proposed for:										
Roadless	73	77	85	74	52	96	81	36	21	79
Wilderness	5	0	13	10	52	0	5	78	100	5
Percent of Hyalite-Porcupine-Buffalo Horn MWSA area proposed for:										
Roadless	83	80	39	63	0	100	92	0	0	87
Wilderness	0	0	61	22	100	0	0	100	100	0

Table B-13 (Cont'd)

ISSUE INDICATOR	ALTERNATIVE 1	2	3	4	5	6	7	8	9	10
Recreation										
Developed										
Percent increase above baseline in 50 years	35	35	35	82	82	35	82	71	82	82
Motorized										
Percent increase above baseline in 50 years	41	49	38	48	34	41	34	30	28	34
Non-motorized										
Percent increase above baseline in 50 years	-4	10	41	20	7	31	20	-6	-16	20
Primitive										
Percent increase above baseline in 50 years	263	377	399	380	488	395	426	517	542	426
Range										
Thousands AUMs										
Decade 1	43	45	32	45	45	45	45	45	44	45
Decade 5	45	67	29	60	49	50	45	47	42	50
Minerals (Energy)										
Category A										
Total high potential (%)	31	31	31	31	31	31	31	43	43	31
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category B--										
Total high potential (%)	24	24	24	24	24	35	28	28	28	28
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category C--										
Total high potential (%)	0	0	0	0	0	0	0	0	0	0
Total v. high potential (%)	10	10	37	16	16	18	18	39	9	18
Category D--										
Total high potential (%)	44	44	44	44	44	34	41	29	29	41
Total v. high potential (%)	90	90	61	84	84	82	82	61	91	82

Table B-13 (Cont'd)

ISSUE INDICATOR	ALTERNATIVE 1	2	3	4	5	6	7	8	9	10
Minerals (Non-Energy)										
Category A--										
Total high potential (%)	10	10	10	10	16	10	10	21	47	10
Total v. high potential (%)	22	22	25	22	44	22	22	47	59	25
Category B--										
Total high potential (%)	74	74	84	74	68	79	73	63	37	73
Total v. high potential (%)	16	16	13	16	12	25	19	12	9	19
Category C--										
Total high potential (%)	0	0	0	0	0	0	0	0	0	0
Total v. high potential (%)	0	0	0	0	0	0	0	0	0	0
Category D--										
Total high potential (%)	16	16	5	16	11	15	16	16	15	16
Total v. high potential (%)	66	66	63	63	44	53	59	41	31	56
Quantified Costs and Benefits										
Present Net Values MM$	236	249	292	289	272	278	276	270	259	272
Net Returns MM$										
Decade 1	-4.4	-6.1	-4.4	-5.4	-5.3	-5.1	-5.5	-5.2	-5.1	-5.5
Decade 5 (Projected)	-2.0	-2.3	-3.1	-1.2	-1.1	-3.0	-2.4	-1.3	-1.5	-2.7
Non-Cash Benefits MM$										
Decade 1	11.0	12.0	11.9	12.6	12.2	11.9	12.1	12.0	11.3	12.2
Decade 5 (Projected)	14.8	17.3	18.6	18.7	18.5	18.2	18.9	18.0	18.0	18.8
Community Effects Issues										
Total Forest Related Jobs										
Decade 1	2506	2766	2247	2501	2563	2444	2665	2458	2427	2685
Decade 5 (Projected)	2745	3089	2626	2897	2954	2784	3079	2846	2809	3099
Total Forest Related Income MM$										
Decade 1	37	42	31	36	36	35	39	35	34	39
Decade 5 (Projected)	40	46	36	42	41	450	44	39	39	44

Table B-14: Alternatives in Order of Increasing Discounted Costs

Alternative/ Benchmark	Present Value Costs		Present Value Benefits		Present Net Value	
	Million $	Change	Million $	Change	Million $	Change
MIN LVL	67		275		208	
		>55		>138		>84
3	122		413		292	
		>5		>-23		>-17
MAX PNV	127		436		309	
		>14		>-36		-50
9	141		400		259	
		>4		>15		>11
8	145		415		270	
		>4		>-38		>-34
1	150		386		236	
		>3		>45		>42
6	153		431		278	
		>2		>-4		>-6
5	155		427		272	
		>17		>18		>4
7	168		445		276	
		>-4		>-1		>-4
10	172		444		272	
		>0		>18		>17
4	172		462		289	
		>30		>-11		>-40
2	202		451		249	

Table B-15: Present Net Value and Nonpriced Benefits by Alternative

	Unit of Measure	MAX PNV	Alternative 1	2	3	4	5	6	7	8	9	10	MIN LVL
Present net value	MM$	309	236	249	292	289	272	278	276	270	259	272	208
Nonpriced benefit													
Roadless Management	M acres roadless	638	467	488	570	469	332	615	512	229	136	501	638
Wilderness management	M acres	716	741	716	780	763	968	716	738	1096	1204	716	716
Elk habitat potential in 50 years (NF lands only)	M elk	4.6	5.6	4.5	6.4	6.4	5.6	6.5	6.1	6.6	6.6	6.1	6.4
Diversity-	Percent in 100 years												
Seedlings		22	9	12	3	11	10	9	13	10	9	14	0
Poletimber		11	20	34	8	26	21	16	26	19	17	25	0
Sawtimber		2	24	33	4	20	16	16	23	14	13	23	9
Old growth		65	47	21	84	43	53	59	38	57	61	38	91
Stream fish habitat in 50 years	M catchable trout	494	493	491	471	491	516	51	509	516	517	514	523
Hunting quality index in 50 years	Percent	*	69	65	74	68	70	70	71	72	73	71	*
Water yield increase in 50 years	M acre ft.	11	15	20	4	14	9	11	13	7	7	13	0
Sediment increase above base in 50 years	M tons	5	6	7	1	6	2	2	3	2	1	3	0
Available firewood per year Decade 1	M cords	1.8	10.8	14.3	1.7	4.5	3.5	3.9	7.4	1.4	1.4	7.4	1.4
Total trail system	Miles	2198	1454	2007	2318	2079	2342	2222	2104	2321	2388	2104	1300
Total road system	Miles	1811	2416	3041	1214	2259	1794	1711	2310	1601	1535	2247	807
Local employment in first decade	Change in jobs from base	71	3	263	-256	-2	60	-59	162	-45	-76	182	-494

The potential to increase efficiency toward the Max PNV benchmark is traded off to some degree in all alternatives for higher levels of road construction and maintenance, fire protection, general administration, timber sale preparation, administration and offerings. These costs reflect objectives to manage the Forest to resolve issues and concerns and to reduce the risk of resource damage and loss of investment.

1) **Alternative 1**

Alternative 1 emphasizes current production levels with little increase in financing. This alternative has the lowest recreational benefit of all the alternatives, a relatively high level of timber harvest and a large amount of road development in early decades. Therefore it has the lowest total PNV of $249 MM and an opportunity cost of $60 MM.

2) **Alternative 2**

Alternative 2 is the alternative which provides a relatively high level of market outputs, the highest of the alternatives. Like Alternative 1 this one also depicts a high level of timber production in the first five decades, thus increasing costs for road development and timber activities in the short term. It has the highest discounted costs of all the alternatives at $202 MM. In addition this alternative also has one of the highest levels of discounted benefits at $451 MM. The extensive planned access would facilitate a large amount of developed and dispersed-roaded types of recreation. The net effect of the increasing costs is a somewhat low PNV of $249 MM and an opportunity cost of $60 MM.

3) **Alternative 3**

In contrast to the above alternatives this one has the lowest discounted cost together with a low level of market commodity production both in the short term and throughout the planning horizon. Additional access and timber stand treatment is very limited under this management regime, although there would be extensive areas of undeveloped terrain available for possible increases in demand for backcountry use. The PNV is $292 MM with an opportunity cost of $17 MM.

4) **Alternative 4**

This alternative portrays the most efficient scheme for accomplishing the 1980 RPA goals with little consideration to other planning issues. The discounted costs are comparatively high at $172 MM and discounted benefits are the highest of the alternatives at $462 MM, producing a net value of $289 MM, the greatest of the ten alternatives. While the timber harvest level in the first decade is a moderate 16 MMBF, the harvest rate increases rapidly to meet RPA targets, capturing expected increases in timber market value in later decades. In addition, this alternative also provides a high level of recreational use both in developed and motorized classes.

5) **Alternative 5**

A significant amount of additional wilderness is proposed within this alternative. This does not, however, appear to effect discounted costs to a

great degree. Instead this alternative has moderate levels of most outputs, requiring moderate levels of expenditure and therefore moderate costs, benefits, and PNV ($272 MM).

6) **Alternative 6**

Much like alternative 5, this alternative has a moderate level of outputs and therefore moderate costs, benefits and PNV ($278 MM). Development is restricted to currently roaded areas, although this does not effect the relative efficiency of the management program.

7) **Alternative 7**

This alternative emphasizes the achievement of a broad range of issues and concerns. Balancing the wide array of resource issues creates a need for moderately high discounted costs and produces relatively high discounted benefits and a moderate PNV ($276 MM). This alternative suggests that PNV is not highly sensitive to the achievement of many nonpriced benefits, providing priced benefits are not produced at extreme levels.

8) **Alternative 8**

Wilderness is emphasized in this alternative to include an additional 380 thousand acres in the Wilderness System. Other resources are to be managed at economically efficient levels. Discounted costs required to implement this alternative are comparatively low at $145 MM, with discounted benefits also lower than most alternatives at $415 MM. Net discounted value is in the moderate range, accounting for low development expenditures and little increase in benefits derived from additional access. Like Alternative 5, this alternative suggests that economic efficiency is not highly sensitive to wilderness proposals at low to moderate levels of market commodity production.

9) **Alternative 9**

Like Alternative 8, this alternative also emphasizes wilderness expansion with other resources being guided by efficiency. Wilderness System additions amount to 488 thousand acres. Discounted costs for this alternative are $141 MM, lower than Alternative 8, and discounted benefits are $400 MM, also lower than Alternative 8. The PNV is $259 MM, lower than most alternatives, indicating that even at these low levels of commodity resource production the PNV is markedly affected by the specific additions to wilderness.

10) **Alternative 10**

This alternative is a harvest flow departure version of Alternative 7. There are few economic differences in terms of discounted costs or discounted benefits. This analysis demonstrates that PNV is not sensitive to a nondeclining yield constraint within the overall management design of Alternative 7.

4. Timber Supply and Demand

In response to timber industry concerns, the Forest Service completed a study of various timber supply scenarios for the state of Montana 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 Central Montana indicated that the timber supply is adequate for the next 10 years (1988-1997). This based on the planned harvest levels of the Preferred Alternatives in the market area served by the Beaverhead, Custer, Deerlodge, Gallatin, Helena, and Lewis and Clark 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.

A supply and demand analysis for the Gallatin National Forest was completed using information developed from the report: "Montana's Timber Supply: An Inquiry into Possible Futures," and demand projections based on work done for the 1980 Resource Planning Act Assessment (Adams and Haynes, 1980).

The Montana Timber Supply was subdivided into three sub-state Regions using the historical share of timber processed in the area. A fourth area, Eastern Montana was allocated a constant volume over time and was not a dynamic part of the Model. The Counties and National Forests in each region are listed below. Note that a National Forest may include lands in more than one region.

REGION	COUNTIES	NATIONAL FOREST (all or part)
Northwest	Flathead, Lake, Lincoln, Sanders	Flathead, Kootenai, Lolo
Southwest	Deerlodge, Granite, Mineral, Missoula, Powell, Ravalli, Silverbow	Beaverhead, Bitterroot, Deerlodge, Flathead, Helena, Lolo
Central	Beaverhead, Broadwater, Gallatin, Jefferson, Lewis & Clark, Madison, Meagher, Park	Beaverhead, Custer, Deerlodge, Gallatin, Helena, Lewis & Clark
East	All other Montana Counties	Custer, Gallatin, Lewis & Clark

A range of potential demand for the Gallatin 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 this National Forest. The Gallatin National Forest is located in part of both the Central and Eastern sub-state regions. The Range of potential demand for these two regions and a range of possible supplies from other owners is shown in Table B-16.

Table B-16: Range of Potential Demand and Range of Supplies (MMBF/Year)

	Planned	Projected			
	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037
Central and Eastern Regions Potential Demand	182	184	185	203	235
Range of Potential Supply from other Owners	103	103	99	100	101
	121	122	116	116	117

From the abvove information, an implied range of potential demand for National Forest Timber in the Central and Eastern Regions can be obtained and is shown in Table B-17.

Table B-17: Range of Potential Demand (MMBF/Year)

	Planned	Projected			
	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037
Range of Potential National Forest Demand	61	62	69	87	118
	79	81	86	103	134

It is significant to note that as regional and national markets imply an increase in the quantity demanded for Central and Eastern 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 Central and Eastern 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 Central and Eastern Montana. This is based on the total planned harvest levels of the National Forests within this market area. The range of potential demand for the Gallatin National Forest using this disaggregation method is shown in Table B-18.

Table B-18: Range of Potential Demand and Forest Plan Harvest Level (MMBF/Year)

	Planned	Projected			
	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037
Range of Potential Demand for Gallatin National Forest	16 21	17 23	19 24	25 30	35 41
Gallatin National Forest Plan Harvest Level	21	21	21	24	27

By comparing planned harvest levels from the Gallatin National Forest with the Range of Potential Demand for this National Forest, it can be seen that the planned harvest for the next two or three decades is approximately within the Range of Potential Demand. 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, 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.

5. Timber Resource Land Suitability

Further analysis was done to address the Chief's concern about the tentatively suitable land base and the suitable land base of the Preferred Alternative. The purpose of the analysis was to depict three categories of suitable lands; lands where direct benefits exceed direct costs, lands needed to meet nontimber multiple resource objectives, and lands needed to provide for local jobs. The acres for each of these categories are shown in Table B-19. The definitions for these categories are in Table B-20. The analysis also helped identify any additional lands in the tentatively not appropriate lands which could be made available for production if economic conditions were to change drastically in the next ten years.

The analysis indicates that of the 21 MMBF ASQ for the first decade of the Preferred Alternative, about 5.9 MMBF would occur on lands in which direct benefits exceed direct costs. About 10.1 MMBF would come from lands where benefits do not exceed costs. Also, timber sales within these two categories of land will provide an additional "noninterchangeable" volume of 5 MMBF. This is principally dead salvage material that will be harvested along with the green sawtimber. See Table B-20 for the definition of this category.

Approximately 83,000 acres of tentatively not appropriate timber lands were identified as having future timber production possibility. These are highly inefficient lands because of high access costs and high logging costs. They would also have lower than average production potential. Because of the large suitable land base of the Preferred Alternative, it is highly unlikely that these lands would be brought into production. An opportunity that was identified through this analysis was the opportunity to capture additional dead sawtimber in our timber sale areas provided the timber industry can utilize it within area standards and provided there is a need. An additional 4 MMBF of dead material could come from those areas of the Forest that have had the greatest amount of mountain pine beetle mortality and are already accessed.

Figure B-1 shows the historic and projected volume from the Gallatin NF for the next five decades. Figure B-2 compares the commercial forest land classification of the old Timber Management Plan with the land suitability classification of the Preferred Alternative.

Table B-19

TIMBER RESOURCE LAND SUITABILITY

GALLATIN NATIONAL FOREST

FORESTED and NON FORESTED

NOT SUITED	ACRES
Not Capable & Non Forest	1,143,341
Irreversible Soil and Watershed Damage	0
No Assurance of Adequate Restocking	0
Withdrawn from Timber Production	152,071
Subtotal of Above	1,295,412

Definitions:

(See Attached Sheet)

Note:
* Volume figures include:
~Chargeable Volume Only
~Non-Interchangeable Components to meet management objectives

TENTATIVELY SUITABLE

SUITABLE

*LANDS COST EFFICIENT		EFFECTS 1st Decade Acres	EFFECTS 1st Decade MMBF	EFFECTS LTSY MMBF
Direct Benefits Exceed Direct Costs	95,000	700	7.4	
Direct Costs Exceed Direct Benefits				
Meet Non Timber M.U. Objective	134,000	967	10.2	
Local Jobs/Income	76,000	333	3.4	
Subtotal of Above	305,000	2,000	21	27

TENTATIVELY NOT SUITED

		RESOURCE OPPORTUNITY 1st Decade Acres	RESOURCE OPPORTUNITY 1st Decade MMBF	RESOURCE OPPORTUNITY LTSY MMBF
Lands Not Cost Efficient to Meet Objectives-Future Timber Production Possible	83,000	-	-	-
Multiple-Use Objectives Preclude Timber Production				
Other Uses	51,100	-	-	-
Proposed Wilderness	900	-	-	-
Subtotal of Above	135,000	-	-	-
TOTAL NATIONAL FOREST LANDS	1,735,412			

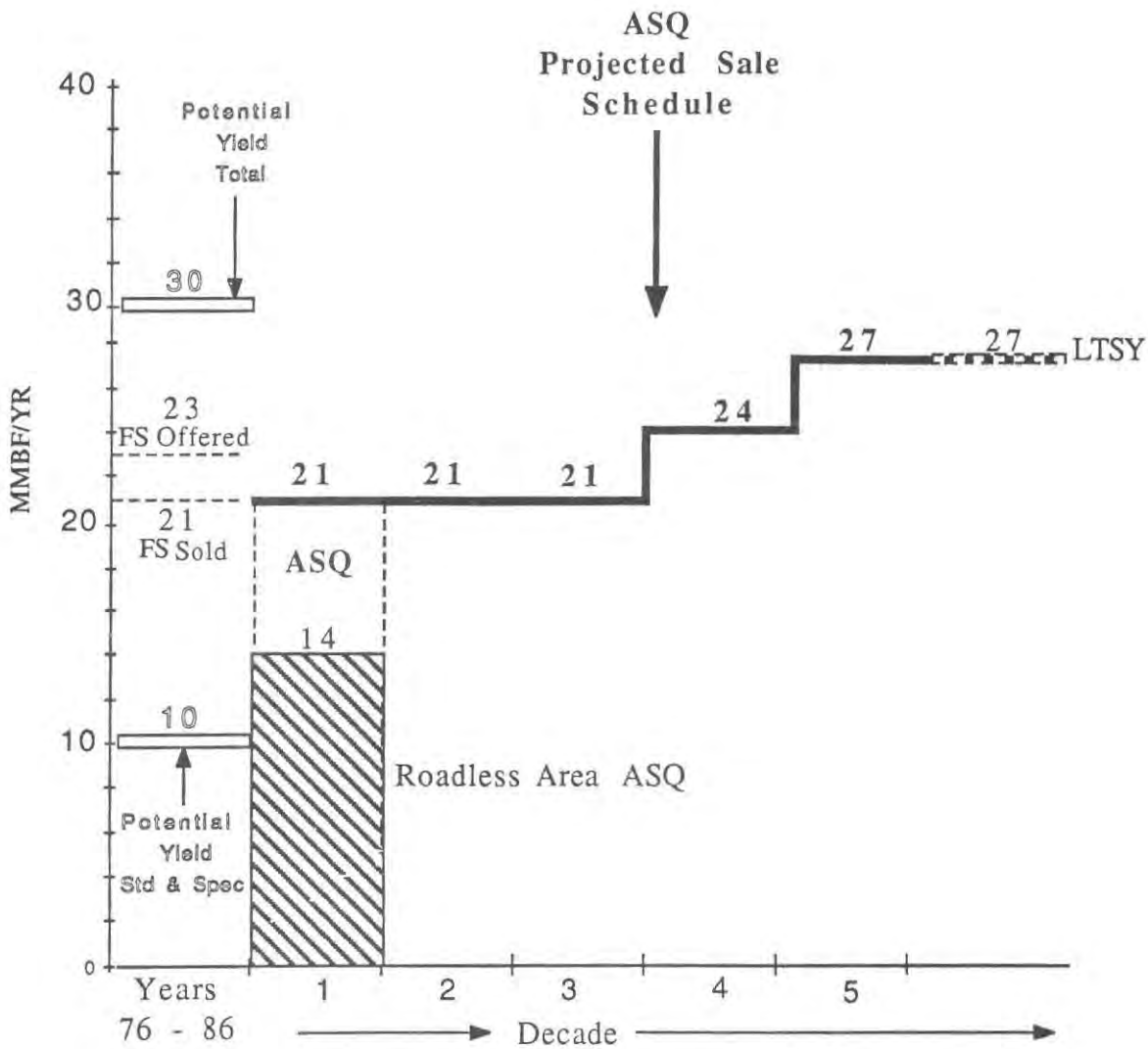
Effective Period: from 1987 thru 1996

Table B-20

TIMBER RESOURCE LAND SUITABILITY DEFINITIONS

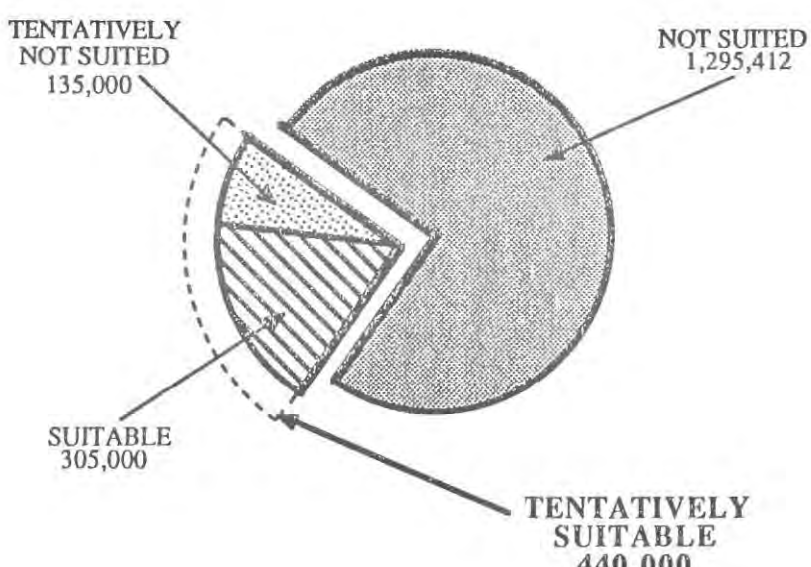
NOT SUITED LANDS	
Not Capable	Forest land not capable of producing industrial wood. Quantitatively defined as lands not capable of producing 20 cubic feet of wood per acre per year.
Non-Forest	Land that is not at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and currently developed for non-forest use. 36 CFR 219.14(a)(1).
Irreversible Soil & Watershed Damage	36 CFR 219.14(a)(2).
No Assurance of Adequate Restocking	36 CFR 219.14(a)(3).
Withdrawn from Timber Production	36 CFR 219.14(a)(4).
TENTATIVELY SUITABLE LANDS	
SUITABLE PORTION	
Direct Benefits Exceed Direct Costs	Direct benefits expressed as expected gross receipts to the government. Expected receipts are based upon expected stumpage prices and payments-in-kind from timber harvest considering future supply and demand situation for timber and upon timber production goals of the Regional Guide. 36 CFR 219.14(b)(1). Direct costs include the anticipated investments, maintenance, operating, management, and planning costs attributable to timber production activities, including mitigation measures necessitated by the impacts of timber production. 36 CFR 219.14(b)(2).
Meet Non-timber, Multiple-Use Objectives	Lands where timber production is necessary to achieve non-timber, multiple-use objectives even though direct timber production costs exceed expected gross receipts to the government. These objectives are not assigned monetary values but are achieved at specified levels in the least cost manner. See 36 CFR 219.14(c) and 36 CFR 219.3 (definition of cost efficiency)
Local Jobs/Income	Lands necessary for timber production in order to maintain an appropriate level of local employment and income. (No direct basis in the planning regulations; See 36 CFR 221.3(a)(3).
Non-Interchangeable Component	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.
NOT SUITED PORTION	
Lands Not Cost Efficient to Meet Objectives-Future Timber Production Possible	Lands not currently cost efficient for timber production but which could be brought into production if conditions change. These lands represent additional opportunities within the preferred alternative.
Multiple-Use Objectives Preclude Timber Production	Based upon a consideration of multiple-use objectives for the aternative, the land is proposed for resource uses that preclude timber production. 36 CFR 219.14(c)(1).

HISTORIC & PROJECTED VOLUME FROM GALLATIN NATIONAL FOREST LANDS

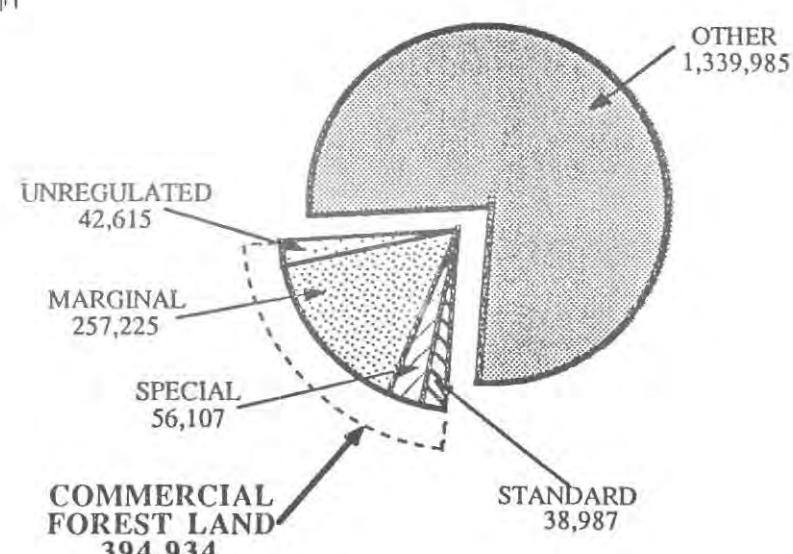


CURRENT AND PREVIOUS CLASSIFICATION OF GALLATIN NATIONAL FOREST LANDS

FOREST PLAN TIMBER RESOURCE
LAND SUITABILITY
Total Acres: 1,735,412



PREVIOUS COMMERCIAL FOREST
LAND CLASSIFICATION
Total Acres: 1,734,919



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APPENDIX C: ROADLESS AREA EVALUATION

A. Introduction

This appendix presents the evaluation of the Gallatin National Forest roadless areas, all of which are eligible for wilderness recommendation. It is intended to supplement the descriptions in Chapter III and the analysis in Chapters II and IV.

In all, 12 areas totaling 488,400 acres are being re-evaluated for wilderness suitability on the Gallatin National Forest. The Forest's roadless inventory was revised in 1983 as a part of the re-evaluation of roadless areas in Forest Planning (36 CFR 219.17). The 1983 revision was consistent with RARE II, but reflected changes such as the creation of the Lee Metcalf Wilderness, development of portions of roadless areas, the inclusion of unit plan roadless areas, as well as acreage recalculations. The updated inventory shows an increase of 18,154 acres. Table II-4 in Chapter II shows the roadless inventory changes and the reasons for the change.

Each roadless area is discussed as follows: (1) an overview of the characteristics of the area is given; (2) the area's capability for wilderness is described; (3) other resource potentials are listed; (4) the need for the area in the National Wilderness Preservation System is discussed; and (5) alternatives and environmental consequences are displayed.

The proximity of existing wilderness to the roadless areas on the Gallatin is relevant to evaluating the need for more wilderness. The following is a summary of the number and size of existing wilderness areas that are at varying distances from the roadless areas on the Gallatin National Forest.

The following identifies the number and size of existing wilderness areas in the proximity of the Billings, Bozeman, and Butte, Montana population centers.

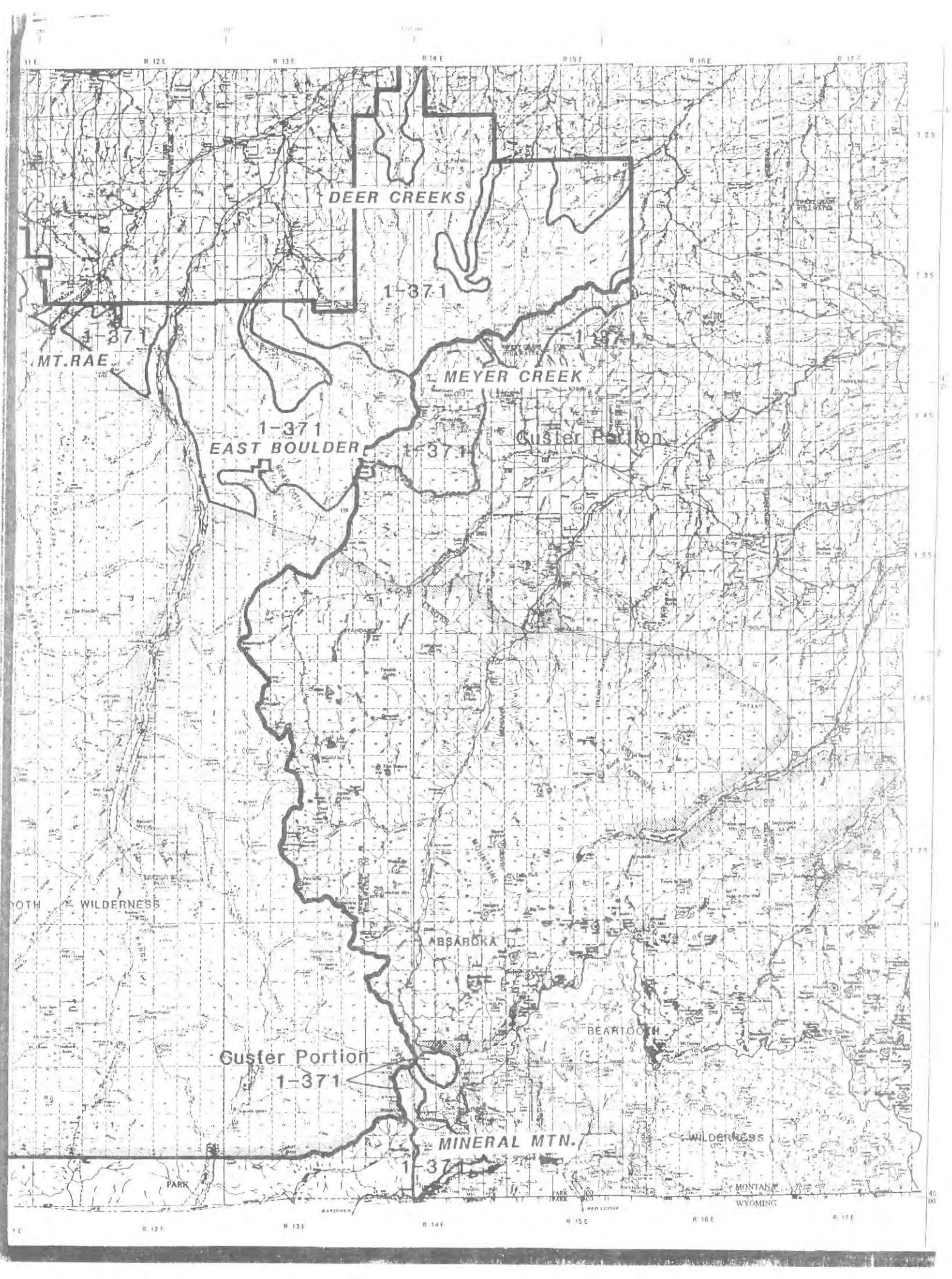
POPULATION CENTERS	EXISTING WILDERNESS									
	Less than 50 Miles		51 to 100 Miles		101 to 200 Miles		201 to 300 Miles		Total Under 300 Miles	
	Areas	Acres	Areas	Acres	Areas	Acres	Areas	Acres	Areas	Acres
Bozeman	2	1,161,500	4	1,098,500	13	6,570,500	4	601,500	23	9,432,000
Billings	0	0	3	1,959,200	9	1,908,100	3	1,300,300	15	5,167,600
Butte	1	158,500	7	2,919,500	9	5,294,500	4	821,200	21	9,193,700

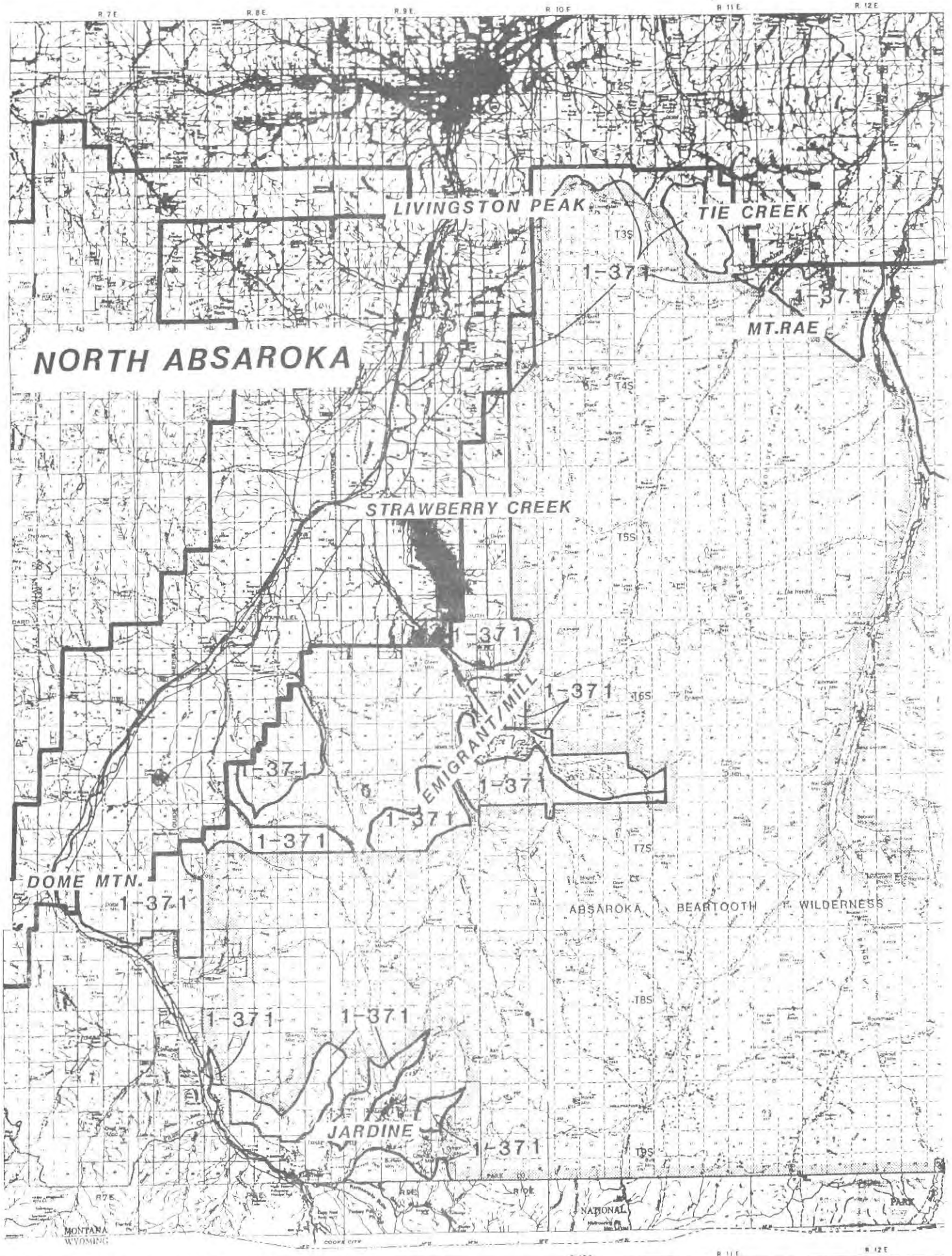
The above does not include the 2,138,000 acres within Yellowstone and Grand Teton National Parks which have been recommended for wilderness classification by the Department of Interior.

The following table identifies the distance in miles from roadless areas on the Gallatin National Forest to existing classified wilderness areas in the region.

EXISTING WILDERNESS AND PROXIMITY TO ROADLESS LANDS
GALLATIN NATIONAL FOREST

Wilderness Name and Acreage	ROADLESS AREAS - MILES TO WILDERNESS												
	Gallatin Divide	Hyalite	Gallatin Fringe	North Absaroka	Crazy Mountains	Bridger Mountains	Republic Mountains	Chico Peak	Dry Canyon	Box Canyon	Beartooth	Reef	Lionhead
Absaroka-Beartooth 921,500	9	11	11	0	24	24	4	3	38	57	0	0	32
Lee Metcalf 240,600	1	8	1	16	54	24	55	24	21	54	54	58	2
North Absaroka 351,100	50	50	42	1	65	68	0	35	46	81	2	0	66
Red Rocks 32,300	35	55	44	52	110	80	86	65	25	122	90	88	10
Washakie 686,600	65	76	56	35	100	100	78	60	52	125	35	35	65
Teton 557,300	70	75	65	50	100	110	48	72	55	135	50	48	50
Fitzpatrick 191,100	130	145	123	130	170	168	115	135	100	200	105	115	190
Bridger 392,100	135	150	128	135	175	173	120	140	100	205	110	120	195
U.L. Bend 20,900	195	200	195	165	140	180	195	195	255	145	195	195	245
Gates of Mountains 28,500	100	105	95	110	80	72	155	120	165	70	150	155	145
Bob Marshall 1,009,300	160	160	155	170	140	130	215	155	210	135	210	210	180
Mission Mtns. 73,900	190	190	185	200	170	160	245	185	240	165	240	240	210
Cabinet Mtns. 94,300	280	280	275	290	260	250	355	275	340	255	330	340	300
Great Bear 286,700	195	195	185	205	175	170	260	215	265	165	250	260	230
Welcome Ck. 28,100	150	155	145	170	155	130	210	170	190	150	210	210	165
Anaconda-Pintler 158,500	110	115	115	135	130	105	170	130	140	125	170	170	120
Selway-Bitterroot 1,340,700	155	155	160	170	180	155	220	175	180	175	220	220	160
Gospel Hump 206,000	210	220	210	235	250	220	275	235	225	245	275	280	210
Sawtooth 217,100	195	210	195	210	255	220	250	225	185	260	255	250	175
Hells Canyon 84,100	255	265	255	275	295	265	320	280	270	220	320	325	255


DEER CREEKS
1-371
1-371
MT.RAE
1-371
MEYER CREEK
1-371
EAST BOULDER
1-371
Custer Portion
WILDERNESS
ABSAROKA
BEARTOOTH
Custer Portion
1-371
MINERAL MTN.
1-371
WILDERNESS
PARK
MONTANA
WYOMING
R 12 E
R 13 E
R 14 E
R 15 E
R 16 E
R 17 E


NORTH ABSAROKA
LIVINGSTON PEAK
TIE CREEK
MT.RAE
STRAWBERRY CREEK
EMIGRANT/MILL
DOME MTN.
JARDINE
1-371
ABSAROKA BEARTOOTH WILDERNESS
NATIONAL PARK
MONTANA
WYOMING
R 7 E
R 8 E
R 9 E
R 10 E
R 11 E
R 12 E
T 3 S
T 4 S
T 5 S
T 6 S
T 7 S
T 8 S
T 9 S

NORTH ABSAROKA ROADLESS AREA (1371)

Acreage:

	Gross Acres	Net Acres
Gallatin NF	170,684	159,259
Custer NF	22,700	22,500
	193,384	181,759

I. DESCRIPTION

The North Absaroka Roadless Area is located on the perimeter of the Absaroka-Beartooth Wilderness Area in southwestern Montana. Some parts of 1371 are near Yellowstone National Park. The area is composed of 12 separate units, of which 10 lie on the Gallatin National Forest and 2 on the Custer National Forest. Most parts of 1371 consist of foothills, canyons, and lower slopes that mark a transition between the high rugged peaks of the Absarokas and the valley floors or plains on the north and west. The 1371 areas are generally more vegetated and less rugged than the high rock and alpine terrain of the Absaroka-Beartooth Wilderness that they border.

The Gallatin National Forest is the lead Forest for the evaluation of this roadless area. The 12 units lie in Park, Sweetgrass, and Stillwater counties.

Topography in this roadless area is highly variable, including steep river breaks, rocky peaks, alpine plateaus, glaciated valleys, and some gentler rolling mountains. Elevations range from 5,000 to 10,921 feet at Emigrant Peak. Average yearly precipitation ranges from about 20 to 50 inches depending on elevation and location. Climate is a cold continental type with short growing seasons.

Vegetation typically includes Engelmann spruce, cottonwood/alder communities along streams, Douglas-fir and lodgepole pine at mid to higher elevations, sometimes interspersed with fairly large parks of sagebrush or grass, and then subalpine fir and whitebark pine at higher elevations. Alpine meadows and turf ecosystems are also present above timberline on several thousand acres of this roadless area. Fires are usually under 100 acres in size, but large fires covering many thousands of acres occur every 300 years or so.

Generally, the 12 parts of 1371 have adequate access using State, county, and Forest roads with the exception of the Strawberry Creek unit. This 14-mile long unit has access at present only at the extreme northern and southern tips. One trail access to George Lake is under construction.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

In a number of units of area 1371, the lands "retain primeval character. . . without permanent improvements or human habitation" as stated in the Wilderness Act. Areas such as Strawberry Creek, Dome Mountain, Mt. Abundance, and Meyers Creek show little or no evidence of human development or

alternation. They also have "outstanding opportunities for solitude or a primitive and unconfined typed of recreation" (Wilderness Act).

Other parts of Area 1371 contain evidences of man that would be healed by time or that could be corrected by boundary adjustment without affecting most of the area. Such areas would include Mineral Mountain, Tie Creek, or Mt. Rae. There are some areas, also where evidence of man is more pervasive. The discussion that follows will better detail wilderness character and human impacts by areas.

Natural integrity of 1371 varies by area. The Jardine unit has been broken in 5 pieces in order to exclude 3 segments of the Eagle Creek Road and several segments of the Bear Creek and Darroch roads. The result has been to leave a number of separated parcels or peninsulas of unroaded land without any discernable core (see map).

The boundaries of the Emigrant-Mill unit have been altered to exclude several segments of new roads in Arrastra Creek, the North Fork of Sixmile Creek, and Emigrant Gulch, as well as several pieces of private land to which roaded access has been constructed or planned. This roading has divided the Emigrant-Mill area into 6 separate parcels. The area is essentially without a core. There are also evidences of intensive range management, such as jeep or pickup truck roads, along the north side of Sixmile Creek in the Emigrant-Mill unit.

In contrast, the natural integrity of the Strawberry Creek unit is unimpaired. A visitor would find the land "retaining its primeval character and influence" (Wilderness Act). The area presently has no roads or trails. One trail is presently being constructed to George Lake. Other areas with a high degree of natural integrity (i.e., little or no evidence of man's work) include Dome Mountain, Livingston Peak, Tie Creek, and Meyer Creek. A timber sale has been scheduled for 1985 within the Livingston Peak unit.

Several units of 1371 preserve a high degree of natural integrity in parts of their area, but show the "imprint of man's work" in other parts. Both the East Boulder and Deer Creeks segments have roaded corridors that penetrate to the core of the areas. However, the large size of these segments still allows sufficient remoteness to admit primitive recreation use in places.

The Mineral Mountain and Mt. Abundance pieces near Cooke City show evidence of past mining activity in places, but natural integrity is unimpaired in most of the areas. Some of these impacts of mining could be excluded by boundary change. Less extensive evidences of past and present mining affect natural integrity in parts of the Emigrant-Mill, Jardine, Deer Creeks, and East Boulder units.

Clearcutting of timber has a strong impact on the natural appearance of an area. Timber harvest has occurred in East Boulder, Emigrant-Mill, Deer Creeks, and Jardine, and is planned for Livingston Peak, Strawberry Creek, and Dome Mountain.

Generally, the natural appearance of most parts of 1371 is such that, when out of sight of localized impacts, "the imprint of man's work is substantially unnoticable" (Wilderness Act). Exceptions would be areas heavily broken up by

roaded corridors, such as Jardine or Emigrant-Mill. Most of the 1371 areas are far from cities or other built developments that would be visible or audible from within the area boundaries.

Most of the portions of 1371 meet size criteria for wilderness consideration because they are over 5,000 acres or are contiguous with the Absaroka-Beartooth Wilderness. Some segments are tangent to other roadless, such as the Meyer Creek or Mineral Mountain areas. One piece of the Jardine segment is contiguous only to Yellowstone National Park.

Opportunities for solitude vary between units. Units with good opportunities for attaining solitude in all or most of their area include Deer Creeks, East Boulder, Meyer Creek, Livingston Peak, Dome Mountain, Tie Creek, Strawberry Creek, and the Knowles Peak part of Emigrant-Mill. Areas with few or poor opportunities for solitude include the Jardine area; areas near Highway 89 and 212; areas bordering the Main Boulder, Mill Creek, and Iron Mountain roads; and the Daisy-Lulu Pass area. The rest of the area has fair potential for attaining solitude because of nearby towns, adjacent resource activity, limited size, or other factors. Solitude will diminish seasonally in some areas--for instance, hunting use is intensive in the Jardine area in fall and winter.

Primitive recreational opportunities are available in most of Area 1371 where remoteness criteria can be met. At present, recreational activities of a primitive character are ongoing in most parts of 1371. These include hunting, hiking, backpacking, horseback riding, and some fishing. Most of the units are remote or have limited access, and therefore, receive little recreational use. Exceptions are parts of Jardine during hunting season or areas such as the Mill Creek drainage with well-established trailheads and popular trails. Generally, motorized use is light or nil in much of 1371 due to lack of access and rugged topography. However, snowmobile use is heavy in the segments of 1371 near Cooke City. The Mineral Mountain unit at present has more motorized use than nonmotorized use.

Some recreational activities in Area 1371 offer an element of challenge and risk. This would include mountain climbing, winter activities in avalanche areas, and hiking in the Situation 1 grizzly habitat. The frequency and risk of grizzly encounters will vary by time of year.

A distinctive feature of the area is the presence of 32,200 acres of grizzly bear occupied habitat. About 11,300 acres of this is Situation 1 habitat, which means frequent use by the big bears. This bear habitat occurs near Cooke City and Jardine.

A notable geological feature is the so-called Stillwater Complex, a formation well-known for its reserves of platinum and palladium. Parts of the Complex are currently being explored and developed. The Stillwater Complex underlies all or part of the East Boulder, Mt. Rae, and Meyer Creek units of 1371. If a major mine is developed in one of these areas, it would impact the roadless character of the land.

B. Manageability

Most of the parts of 1371 have manageable boundaries located either on natural features or surveyed section lines. The Strawberry Creek unit is about half privately owned in a checkerboard pattern that makes for unmanageable boundaries. This unit also has a separated annex to the north of about 1,000 gross acres that is half in private ownership.

The shape of some areas would be a problem in managing them. Long slivers of land tangent to wilderness or other roadless at one end only are found at Jardine, Emigrant-Mill, and Mt. Abundance. These form so-called "peninsulas" and would not be desirable for wilderness management under the guidelines.

The presence of roaded corridors breaking up some of the units would make a unified and integral management policy difficult to implement. The Jardine unit is split in 5 pieces, the Emigrant-Mill unit is in 6 pieces, and the Deer Creek unit is almost cut in half by the Iron Mountain Road.

In the 1983 roadless area re-inventory, 10,950 acres of the original roadless area were subtracted because of timber sales and road development that had taken place. Also, 55,571 acres of contiguous roadless land in the Deer Creeks were added. These had originally been covered by a unit plan and were designated as roadless management.

C. Resource Values

Collectively, the 12 units comprising this roadless area contain a little over 56,000 National Forest acres of suitable timberland with a standing volume of 419.4 MMBF on the Gallatin National Forest and 17,600 acres of suitable timberland with a volume of 141.3 MMBF on the Custer National Forest.

The Gallatin portion also provides 6,235 AUMs of grazing on 27 allotments. There are approximately 20,700 acres of suitable rangeland in this roadless area on the Gallatin. The Custer National Forest portion provides 1,522 AUMs from 4,040 acres of suitable rangeland on 3 allotments.

Area 1371 is important for wildlife as winter range for elk, bighorn, and mule deer. The Gallatin's 10 units contain 47,500 acres of elk winter range and 49,400 acres of deer winter range. The Custer portion provides 3,150 acres of elk winter range and 5,420 acres of deer winter range. Bighorn sheep tend to summer in high sites in the following units: Jardine, Dome Mountain, Emigrant-Mill, Strawberry Creek, Tie Creek, Mineral Mountain, and Mt. Abundance. Lower elevation sites in these areas contain some bighorn winter range. Total bighorn sheep winter range in 1371 is estimated at 23,522 acres.

Grizzly bear Situation 1 habitat is found in the Jardine (6,937 acres), Mineral Mountain (2,560 acres), and Mt. Abundance (1,800 acres) units. A total of 21,600 acres of grizzly bear management Situation 2 lands are also found in the Jardine (5,016), Dome Mountain (8,576 acres), Emigrant-Mill (6,476 acres), Mineral Mountain (921 acres), and Mt. Abundance (600 acres) units. Situation 2 lands are used occasionally by the bear, but are not deemed essential to the bear's recovery.

Bald eagles fish along the Yellowstone River within 1/2 mile of the Dome Mountain and Jardine units, with perch trees within the units. No known bald eagle nests are located within these areas. South-facing cliffs in the Meyers Creek area provide nesting structure suitable for peregrine falcons, and peregrines have been sighted in recent years 4 miles north of the area.

The area includes about 35 miles of fishery streams. Most of the stream fishery is located in Deer Creeks (13.4 miles) and East Boulder (9 miles). No notable lake fisheries are found in the area.

Hardrock minerals potential is estimated to be very high on 87,213 acres, high on 5,760 acres, moderate on 11,005 acres, with the remainder of the area rated "low." Potential for oil and gas development is very high on 57,851 acres, moderate on 47,178 acres, and low on the rest of the area. On the Gallatin part of this roadless area, some 42,749 acres have been leased for oil and gas exploration. Most of this is in the Deer Creek unit. An additional 6,400 acres have been applied for. The Custer National Forest has 3,140 acres leased for oil and gas.

Geothermal resources exist in this area, with 2,560 acres rated as "very high" potential for geothermal energy, 6,000 acres rated "high," and 8,550 acres rated "moderate."

Area 1371 contributes approximately 190,000 acre-feet of water annually to the Yellowstone River system. There are a total of 13 inventoried water developments, including water transmission lines, the Silver Gate municipal water supply, and similar uses. Water quality generally meets Montana's B-1 standards.

Primitive and semiprimitive nonmotorized recreation use estimated at 9,000 and 44,000 RVDs of semiprimitive motorized use (primarily snowmobiling) also are estimated to occur in the Cooke City area. The Custer National Forest units are estimated to receive 1,000 RVDs of primitive, 2,000 RVDS of semiprimitive nonmotorized, and 500 RVDs of semiprimitive motorized use in an average year. Resource values for this area are displayed in Table C-1

D. Need

Area 1371 is less than a 2-hour drive from some population centers in Montana. Approximate highway mileage from 7 Montana cities are given below as a range from the nearest to the farthest unit of the area's 12 separate land units.

1.	Billings	81 to 178 miles
2.	Bozeman	30 to 140 miles
3.	Butte	113 to 226 miles
4.	Great Falls	173 to 286 miles
5.	Helena	130 to 240 miles
6.	Livingston	4 to 114 miles
7.	Missoula	230 to 340 miles

As mentioned earlier, most all of the segments of this roadless area are contiguous with the Absaroka-Beartooth Wilderness Area. However, the Mineral Mountain Unit lies about 1 mile from the Absaroka-Beartooth Wilderness and is

Table C-1: Roadless Resource Information for #1371 North Absaroka Roadless Area

Value/Resource	Gallatin N.F.	Custer N.F.
Gross Acres	170,684	22,700
Net Acres	159,259	22,500
Recreation (RVD's)		
Primitive	9,000	1,000
Semiprimitive Nonmotorized	44,000	2,000
Semiprimitve Motorized	3,400	500
Range		
Suitable Ac.	20,700	3,580
No. Allotments	27	4
AUM's of Use	6,235	1,052
Timber		
Tentatively Suitable (Ac.)	56,021	4,513
Standing Volume (MMBF)	419.4	22.5
Wildlife/Fish		
Winter Range Habitat (Ac.)	47,500	8,400
Grizzly Situation I (Ac.)	9,503	2,240
*Grizzly Situation II (Ac.)	20,989	1,280
Species Present	D,E,BH,GB,BE	D,E,BH,GB
Stream Fisheries (Mi.)	29	6.5
Lake Habitat (Ac.)	0	0
Water Developments (No.)	13	0
Locatable Minerals (Potential)		
Very High (Ac.)	82,403	0
High (Ac.)	950	7,800
Moderate (Ac.)	6,195	14,700
Low (Ac.)	69,711	0
Claims & Patents (No.)	672	13
Oil and Gas (Potential)		
Very High (Ac.)	45,883	0
High (Ac.)	0	0
Moderate (Ac.)	40,765	0
Low (Ac.)	72,611	2,250
Leased (Ac.)	42,795	3,140
Lease Applications (Ac.)	26,343	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle.

contiguous with Yellowstone National Park. One portion of the Jardine unit is lies about 2 miles north of the Absaroka-Beartooth Wilderness. One parcel of land in the Emigrant-Mill unit is separated from the Absaroka-Beartooth Wilderness by 1-1/2 miles.

The Lee Metcalf Wilderness Area in the Madison Mountain Range is about 16 air miles from the Dome Mountain segment of Area 1371.

The North Absaroka Wilderness Area on the Shoshone National Forest in northwestern Wyoming lies less than 1 mile south of the Mineral Mountain segment of Area 1371.

The "Alternative Wilderness Proposal W" supported by the Montana Wilderness Association has advocated wilderness for Mt. Rae, Tie Creek, Livingston Peak, Strawberry Creek, and the southern two-thirds of Emigrant-Mill. Public interest in the other units of Area 1371 for wilderness does not appear to be high, partly because of the placement of the Absaroka-Beartooth Wilderness Area boundaries in 1978 which basically excluded them from wilderness classificatiion at that time. Nearly all interest groups were in agreement not to include Meyers Creek, Deer Creeks, East Boulder, Mineral Mountain, and Mt. Abundance units in the Absaroka-Beartooth Wilderness Area.

Input from the public on the Draft EIS was evenly divided among those who wanted no more wilderness and those who wanted more. Two hundred thirty seven (237) people commented specifically on the North Absaroka Additions. These comments were almost entirely recommending wilderness for those roadless portions identified in "Alternative Wilderness Proposal W".

E. Contributions To the National Wilderness System

Taken in all, the 1371 Roadless Area contributes the following habitat types to the system:

1. About 35 percent of the area is in various series of subalpine, with ABLA/CLPS, ABLA/VAS, and ABLA/VAGL the best represented;

2. About 20 percent of the area is in the Douglas-fir series, with PSME/PHMA-PHM best represented;

3. About 12 percent of the area is in GRASSLANDS and about 20 percent in in ROCKLAND;

4. The remainder of the area is in small pockets of habitat types; this includes some stands of limber pine and Engelmann spruce.

The only habitat type that could be described as uncommon on the Gallatin National Forest is a small stand of ponderosa pine (PIPO/AGSP) in the Deer Creeks area. Some plants occur in the western units of the area that are unusual east of the Continental Divide. These include certain rare ferns, mooseberry, and beargrass.

Generally, the contribution of Area 1371 to the wilderness system would be to increase the size of the Absaroka-Beartooth Wilderness.

Table C-2: Management Emphasis for Roadless Area 1371 North Absaroka by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	38.2	31.7	2.0	24.2	17.7 (3.1)	4.6	20.6 (1.0)	14.1	0	20.6 (1.0)	10.0	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	1.9	0	0	1.9	0	0
Big Game	0	0	0	2.7	0	0	3.0	0	0	3.0	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	71.0	93.8	70.1	43.1	92.9	13.3	34.9	0	13.3	69.6	0
Dispersed Rec/ Wildlife	24.2 (22.5)	24.3 (21.8)	54.0	28.8 (19.5)	16.9 (17.8)	64.4 (22.5)	40.4 (18.2)	24.3	0	40.4	49.2	0
Livestock Range	25.4	50.6	2.5	50.6	30.4	16.8	42.6	27.5	0	42.6	49.3	0
Minimum Level	95.0	3.6	5.2	5.4 (3.0)	9.1 (1.6)	3.1	60.1 (3.3)	3.5	0	60.1 (3.3)	3.7	159.3
WILDERNESS--	0	0	22.5 (22.5)	0	64.7	0	0	77.5 (22.5)	181.8 (22.5)	0	0	0
SUMMARY												
Developed -												
Decade 1	8.8	8.8	0	7.5	5.6	1.4	7.7	0	0	7.7		
Decade 2	8.8	8.8	0	7.5	5.6	1.4	7.9	0	0	7.9		
Roadless -												
Decade 1	150.5	150.5	159.3	151.8	104.7	157.9	151.6	101.7	0	151.6		
Decade 2	150.5	150.5	159.3	151.8	104.7	157.9	151.4	101.7	0	151.4		
Wilderness -	0	0	0	0	49.0	0	0	57.6	159.3	0		
TOTAL ACREAGE -	159.3											

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1371 will vary depending on which of the alternatives are selected for future management of the area. Table C-2 displays the acreage within the Absaroka Roadless Area that would be managed as developed, nonroaded, and wilderness in the 10 Gallatin alternatives. The Custer National Forest Plan alternatives that correspond to the Gallatin alternatives are as follows:

Gallatin Alternatives:	1	2	3	4	5	6	7	8	9	10
Custer Alternatives	5	7	1,4	2	3		6			9

In Table C-2 the acreages shown in parentheses are the Custer NF portion of the total.

B. Environmental Consequences

1. Consequences Common to All Alternatives

Large portions of this area have been leased for oil and gas exploration. The leases are contracts, generally for ten years, that allow access for exploration and development. If development was done it would be accompanied by road construction and construction of drill pads. Portions of the roadless resource could be forgone. The wilderness character of the developed area would diminish. Efforts would be made to mitigate the visual effects of the development if it were to happen.

2. Designation: Wilderness
Management Emphasis: Wilderness

Alternatives that propose the area as wilderness range from the entire 181,758 acres to 64,700 acres to zero. Three of the Gallatin National Forest alternatives recommend land for wilderness. The Custer National Forest portion of the North Absaroka is recommended for wilderness in these same alternatives--3,8, and 9. The pieces given this designation would be additions to the Absaroka-Beartooth Wilderness.

Wilderness designation for these areas would add significantly to the wilderness resource on the Forest. In some cases, they would add a more logical boundary to the A-B Wilderness. The southeastern portion of the Mill Creek segment, which contains several wilderness trailheads, would fall into that category. In other cases the additional areas would cause less manageable boundaries. For instance, the Strawberry Creek area would include difficult-to-manage checkerboard ownership and would probably require a land exchange to render the area usable as wilderness.

Grizzly bear and big game habitat security would be maintained in this alternative. New trails or access points into the wilderness through these areas would be analyzed to determine their possible effects on the grizzly. Big game habitat could not be managed through timber harvest. Prescribed fire probably could not be used to increase forage outputs on the 56,000 acres of

winter range. Structural improvements such as fences could not be built to reduce competition between livestock and big game.

Livestock use levels could be maintained at their present levels of about 7300 AUMS per year. Stock driveways would have to be maintained with nonmotorized equipment. Range administration and livestock tending would be done by horseback. A wilderness designation would not preclude routine maintenance and reconstruction of fences, but may change the method of doing it. High country sheep allotments in the Absaroka would be affected, and the Deer Creek area which presently supports considerable grazing (6 allotments and 7,857 acres).

Vegetation management by timber harvest would not occur under this management emphasis. There are 60,500 acres of tentatively suitable timberland in these roadless areas. Approximately one half of this is in the Deer Creek area. The annual harvest from suitable lands in the North Absaroka area would be about 4 MMBF per year, or 20% of the total harvest for the Gallatin National Forest.

Oil and gas leases have been issued on 45,800 acres. If exploration and develpment were to take place, at least a portion of this area would lose its wilderness character. Three options to retain the wilderness characteristics of the area are: Honor the lease until expiration and if no discovery is made do not reissue; buy back the lease through congressional initiatives; negotiate with the lease holder to relinquish the lease or accommodate the wilderness resource to the extent possible.

Several non-priced resource values would be affected, as follows:

--water quality would remain high.
--big game and grizzly habitat security would be maintained.
--opportunity for motorized recreation use be eliminated
--existing visual conditions would be retained.
--access to some of the private land would be more difficult.

3. **Designation: Nonwilderness**
Management Emphasis: Nonroaded
Management Prescriptions: Minimum level, dispersed recreation/ wildlife, dispersed recreation nonroaded, and range.

In all alternatives except 5,8, and 9, the great majority of land is proposed for nonroaded prescriptions. This type of alternative would be most similar to the current management.

The largest amount of recreational use in this roadless area is of a nonmotorized, semi-primitive type. This type of use would continue under this management emphasis. Motorized use would also continue. Much of the recreation use is in conjunction with hunting and fishing. These two activities would continue because hunting opportunity would remain high and water quality would remain good.

In this alternative, the roadless resource would remain essentially intact. Some roads could be built to private inholdings. If oil and gas development were to occur, there would be road construction and the roadless character of pieces of the area would be lost. This could be minimized if, as part of the

exploration and development stipulations, it was required that roads be obliterated after use was completed.

Tentatively suitable timber lands would not be available for harvest under these prescriptions. However, these same lands would be re-evaluated in the next round of forest planning to determine if they are suitable. The timber resource would not be irretrievably lost. Some vegetation manipulation by presribed fire could be used. Fire could be used to improve wildlife habitat and it also could be used to reduce the risk of large wildfires and outbreaks of insects and disease.

Other nonpriced resources would be affected:

--grizzly bear security would be maintained.
--big game habitat would be maintained.
--water quality and fisheries habitat would be good.
--minerals exploration and development could take place.
--visual quality would continue as a natural landscape.

4. **Designation: Nonwilderness**
Management Emphasis: Roaded
Management Prescriptions: Dispersed recreation roaded, big game, and timber.

The Forest Plan alternatives assign between 2000 acres and 38,200 acres to these prescriptions. Alternative 2 awards 31,700 acres; Alternative 4, 24,200 acres; and Alternatives 7 and 10, 25,500 acres to these roading and timber management prescriptions.

These prescriptions would develop and manage the suitable acres for timber production. The single largest part of the roadless area with these prescriptions would be the Deer Creeks. Portions of the East Boulder, Tie Creek, Livingston Peak, and Emigrant-Mill areas would also be developed for timber management. These areas could contribute about 500 MBF of timber per year to the local mills.

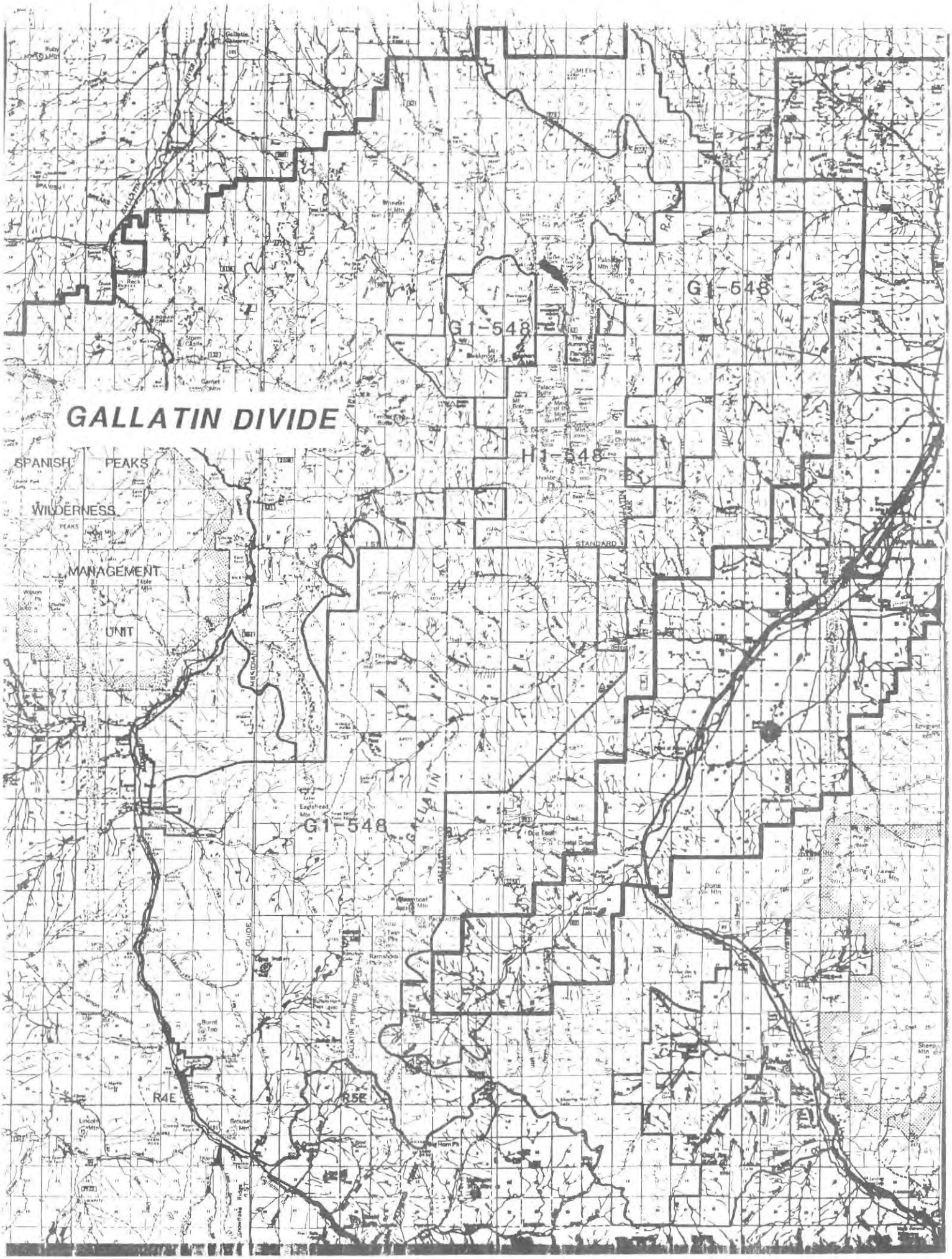
Roading activities in these areas would also provide opportunity for more motorized recreation activities such as motorbiking and snowmobiling. Some areas would become more accessible for hunting. This could provide for improved game management.

Habitat security for big game would decrease. Hunting opportunity could increase as more roads are constructed. Timber harvest in occupied grizzly habiat would be coordinated so that grizzly security would be maintained. This could increase the cost of timber management and would reduce the freedom of the timber operator to carry out his activities.

Some transitory livestock forage would be created on grazing allotments, especially in the Deer Creeks area. Forage for big game would also result from timber harvest and could occur on the key winter range areas.

Some nonpriced resource values that would be affected are as follows:

--visual quality would be reduced.
--diversity of recreation would increase.
--water quality would decrease.
--risk of fire and insects would be reduced.
--oil and gas exploration and development would be easier.
--roadless and wilderness characteristics would be lost.
--wildlife habitat diversity on timber management lands would be increased.
--grizzly bear security would be maintained.


GALLATIN DIVIDE
SPANISH PEAKS
WILDERNESS
MANAGEMENT
UNIT
G1-548
G1-548
G1-548
H1-548
STANDARD
GALLATIN
R4E
R5E

GALLATIN DIVIDE (G1548) AND HYALITE (H1548) ROADLESS AREAS

	Gross Acres	Net Acres
Gallatin N.F.	156,696	113,627

I. DESCRIPTION

Roadless areas G1548 and H1548 are best discussed together because the two areas include the Hyalite-Porcupine-Buffalo Horn Montana Wilderness Study Act Area. Acreages of the G1548 and H1548 areas do not agree exactly with the MWSA Area total because a few small additions to these areas were made during the roadless inventory.

The Gallatin Divide runs the length of these two roadless areas and includes a series of peaks of over 10,000 feet. The H1548 Hyalite area comprises the high peaks and mountain lakes at the crest of the range. The much larger G1548 Gallatin Divide roadless area consists of three parcels of land tangent to the H1548 area on the northwest (Mt. Blackmore parcel), northeast (Eightmile Creek parcel) and on the south (Windy Pass parcel). Please see the map.

The divide itself consists of rocklands and alpine meadows. Most of the scenic, high peaks are found in the H1548 Hyalite roadless area, although some peaks over 10,000 feet also occur southward in the G1548 portion of the area, such as Moose, Ramshorn, and Twin peaks.

Drainages descending from the divide to the east and west include dense stands of timber or in some cases a mosaic of timber and grasslands. Somewhat gentler topography to the southeast and southwest provides livestock grazing (upper Tom Miner country) and elk winter range (lower Porcupine-Buffalo Horn and Tom Miner).

The H1548 area includes only solid National Forest ownership. Most of G1548 is checkerboard ownership that was originally created by Congressional land grants to the Northern Pacific Railroad. These private lands are now owned by Burlington Northern and many different private owners. The area also includes State of Montana lands administered by the Department of Fish, Wildlife, and Parks (5,466 acres), plus City of Bozeman lands (1,115 acres).

These areas begin about 14 miles southeast of the City of Bozeman and extend southwest about 33 miles to the Yellowstone Park boundary. If G1548 and H1548 are considered together, there is one continuous roadless area.

The Mt. Blackmore portion of G1548 is accessed by trails off the Hyalite Canyon Road and from South Cottonwood and Squaw Creek. At present no public access exists to the Eightmile Creek portion of G1548; there are no access points on the east side of G1548 north of Big Creek and there is no legal access to the area from the Hyalite Road on the west. Access to the Hyalite area is provided by the--Hyalite Canyon Road from the north. Trails access Hyalite from the west out of Swan and Squaw Creek drainages. The Mt. Blackmore portion of G1548 is accessed by this same road.

The Gallatin Petrified Forest covers about 19,200 acres of the southern part of G1548 near Speciman Ridge. Most of this petrified forest is found across

the boundary in Yellowstone Park. The petrified wood in the area is not of lapidary quality. However, gathering specimens is popular with rockhounds.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

Most of Areas G1548 and H1548 are suitable for wilderness consideration. Impacts to the areas' natural integrity and natural appearance tend to be limited in extent -- most occur at the periphery of G1548. Most "evidence of man" could be removed by boundary adjustments. Natural appearance of the areas will be affected in a few places by sights or sounds from outside the boundaries, but these disturbances would probably affect less than 5 percent of the areas. The contiguous G1548 and H1548 areas easily meet the size requirements for wilderness consideration.

The paragraphs that follow specify various evidences of man within the areas and discuss some of the wilderness characteristics in more detail.

Natural integrity of the Hyalite area is unimpaired for the most part. The area contains three monitored snow courses, one of them equipped with an electronic transmitter. Some impact to naturalness has occurred from heavy recreation use. Impacts stemming from overuse might be corrected through management policy aimed at rehabilitation of sites. The area contains no buildings, roads, or other major impacts.

Natural integrity of G1548 has been affected in a number of places, mostly on the area's periphery. Four sections of private land within the boundary have been clearcut and logged south of Big Creek. About 1.5 miles of road has been built within the boundaries on the east side near Steamboat Mountain, and a Forest Service permit has been issued to extend the road about 2 more miles. About 5 miles of road are planned by Plum Creek, Inc. in Porcupine Creek, and a Forest Service permit has been issued for this road. Both the Rock Creek and Porcupine roading are intended to access timber on private sections of checkerboard. Impacts of the Porcupine Road and related timber harvest may be avoided if a land exchange is implemented for this area. A possible land exchange is being considered by Congress and the Forest Service but has not yet been finalized.

The Forest Service has granted Plum Creek, Inc. a permanent easement to access the Fox Creek drainage for timber harvest. This includes the northwest corner of the Mt. Blackmore segment, which is part of G1548.

The Pine Creek Road enters the Eightmile segment of G1548 on the northeast, crossing about 1/4 mile of National Forest and about 1/2 mile of private land. At the end of this road is a tumbled down sawmill with rusting machinery. A section of private land within the Eightmile segment was extensively logged about 20 years ago and has several partially regenerated clearcuts. Besides this development, a new road has recently been built up to the MWSA boundary on the east side of the Eightmile segment; it appears that the private owners will use this new road to conduct additional harvest activities on the private inholdings.

The roading, logging, and development within the boundaries, described in the previous paragraphs, have resulted in 2,500 acres of G1548 being rendered unsuited to wilderness. These developments have affected 2,100 acres of private land and 400 acres of National Forest.

Additional evidence of humans in G1548 includes a Forest Service cabin at Windy Pass and private cabin near Mud Lake in the Eightmile segment. Developed base camps used by outfitters and guides are found in Steele Creek, Porcupine Creek, and Bark Cabin Creek. There are also 3 electronics sites on Twin, Packsaddle, and Eaglehead Peaks. The Twin Peaks electronic site is conspicuous and can be seen from most high points in the area. The Packsaddle and Eaglehead sites are less visually obtrusive.

Natural appearance of the Hyalite area does not show the work of man's hand in any permanent way. Presently, motorbikes are allowed on all trails in the area, creating some noise impacts, but would not be allowed there if the area became wilderness. There are a few disturbing sights or sounds that obtrude from outside the area boundaries. These disturbances are caused primarily from logging operations and firewood gathering adjacent to the roadless areas.

Natural appearance of the G1548 area is affected in places by the structures, roads, and timber harvest already mentioned, and also by clearcutting immediately outside the area's borders. This would include sites near the upper part of the Hyalite Canyon Road, sites in the Tom Miner area, near Rock Creek, and in the basin by Mystic Lake.

Most of the recreation taking place in the H1548 part of the area at present is semiprimitive nonmotorized because of limited motorized use on the trail system. If the trails were closed to motorized use, all of H1548 would rate as suited for primitive recreation. In G1548, about 3,500 RVD's of primitive recreation presently take place. This is about 10 percent of the total recreational use. If G1548 were designated wilderness, about 85 percent of total recreational use could be classified as primitive. In both areas, camping, mountain climbing, fishing, horseback riding, and dirt bike riding are presently popular. Most of these activities are of a primitive or semiprimitive character. The Big Sky Snowmobile Trail and adjacent play areas are within the G1548 portion and are heavily used.

The experience of solitude is difficult to achieve on major trails or the most popular campsites in the Hyalite area during the warm months because of the popularity of the area. Solitude can be achieved by seeking out less frequented areas. The rugged character of the area contributes to topographical screening and enhances opportunities for solitude. Opportunity for solitude is high in most of the G1548 portions of the range except in frequented areas like trail junctions, popular camping sites, or the better fishing lakes.

An element of challenge or risk could be encountered in both H1548 and G1548 during such recreational experiences as mountain climbing or winter use of avalanche areas. The southern portion of the area includes about 26,000 National Forest acres of grizzly bear Situation 1 habitat; grizzlies could pose a degree of challenge or risk to hikers.

Both areas have some outstanding trails with features of high scenic interest, such as waterfalls, lakes, cirque basins, and scenic lookouts.

B. Manageability

Manageability of Area H1548 is enhanced by the area's compact shape and by the absence of any private inholdings. One challenge to management of the area as wilderness would be to accomodate present or increasing levels of recreational use while still preserving the quality of wilderness experiences for visitors.

The chief impediment to manageability of Area G1548 is the private, checkerboard inholdings. G1548 contains 43,069 acres of private land. As mentioned earlier, some of these inholdings are presently requiring roading and planned roading as private property owners exercise their right to access and use their land. Land exchange could eliminate need for some of this roading; a land exchange is presently being pursued in the Porcupine Creek drainage.

However, exchanges would be difficult where the private sections are owned by a number of different persons or organizations; this is the case in the south and southeast parts of G1548 and in the Eightmile Creek segment. The amount and scattered distribution of the inholdings would make the ownership problem difficult or impossible to entirely resolve.

Private lands with strict no trespass policies that are located both within and without the Eightmile segment make management especially difficult. For instance, the Pine Creek road is gated and closed 1/2 mile from the area's east boundary even though the road continues into the area. There is no legal way for a hiker to enter the area from the gated point on the road. In addition, it is not legally possible to hike across the Eightmile segment from the west because checkerboard private lands scattered throughout the interior of this segment also have strict no trespass policy. One solution of the problem would be by trail right-of-way acquisition. Another solution would be by land adjustment, but it is questionable whether the owners of the inholdings wish to sell or trade their land. At present, the Eightmile segment is largely unusable for recreation.

The present boundaries of G1548 follow lines of the MWSA legislation and would require adjustment where roading or clearcutting have occurred within the identified borders. The present boundaries would make more sense if parts of the G1548 area were to be considered for management together with the H1548 area. This would result in a single, contiguous area of manageable shape.

During the 1983 re-inventory, about 5,300 acres of additional roadless area was identified in the Gallatin Divide adjacent to the Gallatin River.

C. Resources

Taken together, the Hyalite area together with the three portions of G1548 offer a variety of both commodity resources such as timber and rangelands, and non-commodity values such as outstanding recreational opportunities and high scenic values. Resource values for these areas are summarized in Table C-3.

The timber in the Hyalite portion is sparce and tends to be found at the lower altitude sites, such as along the West Fork of Hyalite Creek. H1548 contains 2,600 ares of timber capable of sustaining commercial production, with a standing inventory estimated at 21.5 MMBF. The National Forest part of G1548 is estimated to include about 55,570 acres of timber tentatively suitable for commercial harvest. These acres have an estimated standing inventory of 444.6 MMBF. An epidemic of mountain pine beetle has infested the standing timber in the area. The lodgepole stands affected the most have been the mature stands at lower elevations The epidemic is more severe on the west side of the range and is presently crossing the range eastward. Some of the whitebark pine stands at higher elevations have been killed.

H1548 has no permitted livestock grazing and no identified suitable livestock range. G1548 has 9,590 acres of suitable livestock range within permitted grazing allotments. Actual grazing use in the area at present is 2257 AUMs annually. About 3,500 more acres of tentatively suitable livestock range have been identified in the vicinity of Windy Pass, but are not presently stocked.

The G1548 area has populations of bighorn sheep, elk mule deer, moose, black bear, and grizzly bear. The grizzlies are located in the south part of the area adjacent to Yellowstone Park. This is a high cub-producing area for the grizzly.

Area G1548 contains 32,500 acres of elk winter range on National Forest land. There are about 500 acres of bighorn sheep winter range at the head of Tom Miner Creek, but most of the sheep winter out of the area to the east. G1548 contains about 1,200 acres of mule deer winter range, but most of the mule deer winter out of the area in or along the adjacent valleys. The part of the area to the southwest along the Gallatin River has some use by wintering bald eagles. There are no bald eagle nest sites in the area.

Populations of bighorn sheep, mule deer, and elk inhabit the Hyalite area during summer and fall, but there is no winter range because the area is too high. Elevations range from 7,000 to 10,300 feet, and most of the area is over 8,000 feet.

The Hyalite area has a number of high mountain lakes, including Hyalite, Emerald, Arden, and Twin Lakes. Emerald is the only lake over 10 acres in size. Most of these lakes have cutthroat, rainbow, or grayling fisheries. The Hyalite area also has 3.4 miles of fishery streams, including the east fork of Hyalite Creek.

Table C-3: Roadless Resource Information for G1548 and H1548

Value/Resource	Gallatin N.F.
Gross Acres	156,740
Net Acres	113,671
Recreation (RVD's)	
Primitive	4,435
Semiprimitive Nonmotorized	31,429
Semiprimitve Motorized	6,510
Range	
Suitable Acres	2,500
No. Allotments	10
AUM's of Use	200
Timber	
Tentatively Suitable Acres	33,600
Standing Volume (MMBF)	275.9
Wildlife/Fish	
Winter Range Habitat (Ac.)	25,491
*Grizzly Situation I (Ac.)	26,000
Species Present	E,D,M,GB,BH
Stream Fisheries (Mi.)	25.8
Lake Habitat (Ac.)	25
Water Developments (No.)	2
Locatable Minerals (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	0
Low (Ac.)	113,671
Claims & Patents (No.)	0
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	60,236
Low (Ac.)	111,671
Leased (Ac.)	0
Lease Applications (Ac.)	34,400

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle; GE = Golden Eagle.

Fishing resources of G1548 are mostly located in the lakes and streams of the south portion. Fisheries include Ramshorn Lake and the Buffalo Horn Lakes, both with fair cutthroat trout fishing; Big, Porcupine, and Buffalo Horn Creeks with small and mid-sized cutthroat trout; and Golden Trout Lakes. Only one of the 3 Golden Trout Lakes produces 8- to 10- inch goldens; the other 2 are barren. G1548 contains an estimated 22.4 miles of fishery streams.

Area G1548 is presently attracting about 60,000 RVDs of recreational use annually. Present uses include hiking, backpacking, camping, snowmobiling, fishing, hunting, dirt-bike riding, horseback riding, and skiing. The Petrified Forest attracts specimen collectors and rockhounds. Recreational use is unevenly distributed; this is due in part to serious access problems in parts of the area. Both areas have an extensive network of trails. Recreational use in the Hyalite area is estimated at about 8,000 RVDs per year.

Snowmobiling is very popular in parts of G1548. The Big Sky Snowmobile Trail extends for about 17 miles through the southwest part of the area. There are some snowmobile play areas in basins off of this trail. Use is also heavy off of the upper part of the Hyalite Canyon Road into the Mt. Blackmore segment.

Water quality is extremely important in the northwest portion of the Eightmile segment because this land is headwaters to Bozeman and Hyalite creeks and thus provides water for the Bozeman City Water Supply.

No National Forest land in G1548 is leased for oil and gas at the present time. About 32,400 acres are under lease application. No leases will be granted on National Forest lands while the area is under study. About 60,236 acres of G1548 are rated "moderate" for oil and gas potential; the remainder of the area is rated "low". All of Area H1548 is rated "low" for oil and gas potential.

All of the G1548 and H1548 portions of the area are rated "low" for hardrock minerals potential. There are no mining claims in either portion of the area.

Visuals are an attraction of both areas. G1548 is more scenic in its central and northern portions. Trails along the divide offer views of several peaks within the area that are over 10,000 feet. All of H1548 offers impressive scenery. Scenic values in the Hyalite area are rated as "distinctive" and help account for the area's present popularity with recreationists.

D. **Need**

The areas begin about 14 air miles south of Bozeman and 14 air miles southwest of Livingston. Distances are 170 miles to Billings, 230 miles to Great Falls, and 250 miles to Missoula.

The Absaroka-Beartooth Wilderness is about 9 air miles from the areas. Parts of the Lee Metcalf Wilderness are about 1 mile from the areas. Yellowstone National Park, recommended for wilderness, shares a common boundary with the areas on the south. The North Absaroka Wilderness is about 50 miles to the east.

Much public opinion has been expressed about possible wilderness designation for these areas. Public meetings and mass mailers have been used to sample public opinion. The areas have very high value for snowmobilers because the Big Sky Snowmobile Trail traverses about 17 miles of the area in the Buffalo Horn and Porcupine drainages. Snowmobilers are strongly opposed to wilderness designation. Other individuals and trade groups oppose wilderness classification because of concerns over use of and access to private inholdings or minerals. Groups advocating wilderness tend to support a wilderness recommendation for all or part of the area. Wilderness advocates emphasize a land exchange or purchase to render wilderness management more practical. Groups concerned about grizzly bear recovery advocate roadless management for the southern part of the areas. The preponderance of opinion by the public, expressed in public meetings and by mail, had been for nonwilderness management.

Because this area encompasses the Hyalite-Porcupine-Buffalo Horn portion of the Montana Wilderness Study Area, it was evaluated in a separate Wilderness Study Report. It generated a lot of public input during the comment period on the Forest Plan and in hearings that were held for the Montana Wilderness Study. The input was evenly split between those who wanted the area to become wilderness and those who want no more wilderness anywhere on the Forest. Those who want no more wilderness generally expressed a desire to have no more of the Forest closed to motorized use.

E. Contribution To the National Wilderness System

These areas would contribute the following habitat types to the National Wilderness System:

1. About 65 percent of the areas have the various subalpine fir (ABLA) series, with ABIA-PIAL/VAS best represented. This is the only tree type found in the H1548 area because of the altitude.

2. About 8 percent of the areas are in various Douglas-fir series, with PSME/FEID and PSME/CARU-CAR most frequently encountered;

3. Small amounts--less than 3 percent--of spruce and limber pine series are encountered;

4. About 17 percent of the areas are in grasslands or sagebrush grasslands;

5. About 8 percent of the area is rock.

These habitat types are all common on the Gallatin National Forest and the distribution is fairly typical.

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Areas G1548 and H1548 will vary depending on which of the alternatives are selected for future management of the areas. Table C-4 displays the acreage within these roadless areas that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

Five of the ten alternatives recommend all or portions of these roadless areas for wilderness. Alternatives 8 and 9 recommend the entire area; Alternatives 5 and 3 recommend 67% and 41% respectively; and Alternative 4 recommends the Hyalite portion or 14% of the total area.

This management emphasis would preserve or enhance the wilderness attributes of the area. The 4,435 RVDs of existing primitive recreation use would provided for in addition to expanding the capacity of the Forest to provide for wilderness experiences. Nonrecreation wilderness values, such as clean air and water, and unblemished landscapes would be maximized.

Current uses such as motorized recreation, wildlife habitat improvement, and other uses or facilities not compatible with wilderness management would be eliminated. At most, about 6,400 RVDs of semiprimitive motorized use would be displaced and accommodated elsewhere on the Forest.

The private lands in these roadless areas would be affected in Alternatives 3, 5, 8, and 9. An attempt would be made to acquire these lands.

Approximately 2,600 to 33,600 acres of tentatively suitable National Forest timber would be unavailable for harvest. To obtain the timbered private lands through land exchange, other Federal timber lands would need to be given up in the exchange. This would further reduce the Gallatin National Forests's timber base. Salvage selling of timber damaged or killed by the mountain pine beetle would be forgone. Downfalls in the aftermath of the beetle epidemic would impede trail use. Fuel loading would increase due to beetle-killed timber, thus increasing hazard of serious wildfires.

The existing oil and gas leases covering 3,000 acres in the Gallatin Fringe portion could forgo the wilderness resource even within this management emphasis because the leases are a preexisting legal contract. Options to retain the wilderness characteristics under this management emphasis in Alternatives 8 and 9 are to honor the lease until expiration and then withdraw the area (FLPMA Sec. 204), buy back the lease through Congressional initiative, or to negotiate with the leaseholder to relinguish the lease or accommodate wilderness resource to the extent possible. About 60,000 acres of moderate potential for oil and gas would be withdrawn.

Table C-4: Management Emphasis for G1548 and H1548 by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	20.8	25.7	0.1	19.1	2.0	0.3	14.5	0	0	14.5	9.9	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	1.1	0	0	1.7	0	0	1.7	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	2.1	2.5	1.5	5.9	38.2	41.4	0	0	41.4	4.0	0
Dispersed Rec/ Wildlife	16.7	11.9	26.1	17.0	0	35.3	42.9	0	0	42.9	4.0	0
Livestock Range	10.7	4.5	4.7	0.5	0	24.9	3.6	0	0	3.6	5.5	0
Minimum Level	65.5	69.3	16.0	52.5	0.1	15.0	9.5	0	0	9.5	69.3	113.6
WILDERNESS--	0	0	64.2	22.1	105.6	0	0	113.6	113.6	0	0	0
SUMMARY												
Developed -												
Decade 1	1	1	0	0	0	0	0	0	0	0		
Decade 2	2.5	4.5	0	0	0	0	1.5	0	0	1.5		
Roadless -												
Decade 1	112.6	112.6	49.4	91.5	0	113.6	113.6	0	0	113.6		
Decade 2	111.1	109.1	49.4	91.5	0	113.6	112.1	0	0	112.1		
Wilderness -	0	0	64.2	22.1	105.6	0	0	113.6	113.6	0		
TOTAL ACREAGE -	113.6											

Some of the nonpriced resource values affected are:

- Existing visual conditions would be maintained.
- The Wilderness System would increase.
- Water quality and fisheries quality would be maintained at natural levels.
- Security for grizzly bear and elk would be maintained or enhanced. About 25,000 acres of elk winter habitat would be unavailable for management to maintain forage levels.
- Insect and fire risks would increase.
- Timber harvest would be unavailable as a tool to increase habitat diversity.

Social and economic effects center around the resource values of timber, minerals, wildlife, recreation and wilderness. Since wilderness precludes timber harvest or mineral development, the related industries would not be supported by this emphasis. Timber supply, forestwide, would drop --particularly in Alternatives 8 and 9-- resulting in a loss of jobs and income. The service sector, which includes resorts and outfitter and guide operations, could benefit from the attraction of wilderness. From a social aspect, the publics valuing wilderness would be supported.

In addition, actions to acquire 40,000 acres or more of private land could have a major impact on the landowners (a majority is owned by Burlington Northern) as well as the environment of the lands which are traded. The acquisition through trade could be costly (time and money) to the landowners and disruptive to the communities where the landownership patterns are changed.

2. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Nonroaded</u>
<u>Management Prescriptions: Minimum level, dispersed recreation/wildlife, dispersed recreation nonroaded, and range</u>

Seven of the ten alternatives assign a majority (60-98%) of the area to a nonroaded management emphasis, and Alternative 5 awards 25 % of the area to this management emphasis. Even though this management emphasis and associated prescriptions do not schedule road access, road access to the private lands interspersed throughout this roadless area will be accommodated as landowners request access.

This management emphasis would preserve the wilderness attributes of the area as long as landowner requests for access do not occur. The roadless character would remain intact and a variety of recreation uses would be accommodated such as primitive, semi-primitive nonmotorized, and motorized uses.

Tentatively suitable timber will be unavailable--primarily in alternative 6--because of this management emphasis. About 30-40% of the tentatively suitable timber is unavailable because of this emphasis in alternatives 1-4, 7, and 10.

Currently, most of the area is not leased for oil and gas but would become available for leasing in this emphasis. Stipulations would be applied to maintain the roadless character to the maximum extent possible, fully recognizing that the leases must allow for the development of the resources leased and the roadless option could be forgone.

Some of the nonpriced resource values affected are:

- Existing visual conditions would be maintained.
- Water quality and fisheries qualtiy would be maintained at natural levels.
- Security for grizzly bear and elk would be maintained. Elk winter habitat would be maintained or improved.

Since this management emphasis maintains the area much like the existing condition, current public uses would also be maintained. A variety of recreation experiences would be available, including primitive, semi-primitive nonmotorized and motorized recreation. The amenities of the area would continue to support outfitter and guide operations, resorts, and other service-oriented businesses. Mineral exploration would not be precluded. However, operations would have to protect the roadless character to the extent possible. The tentatively suitable timberland which is unavailable could affect the jobs and income in the wood products industry. However, access through this emphasis would be allowed.

3. Designation: Nonwilderness
   Management Emphasis: Roaded
   Management Prescriptions: Dispersed recreation roaded, big game, timber

Eight of the ten alternatives assign some of the area to a developed management emphasis, including road access, timber harvest, and wildlife habitat management. Three alternatives, 3, 5, and 6, assign less than 10% of the area to this management emphasis. Five alternatives, 1, 2, 4, 7, and 10, provide 20-30% of the area to the emphasis. The portions assigned to this emphasis would be in the Gallatin Divide and Gallatin Fringe portions. In the Gallatin Fringe, the timber uses are generally adjacent to the private checkerboard land ownership.

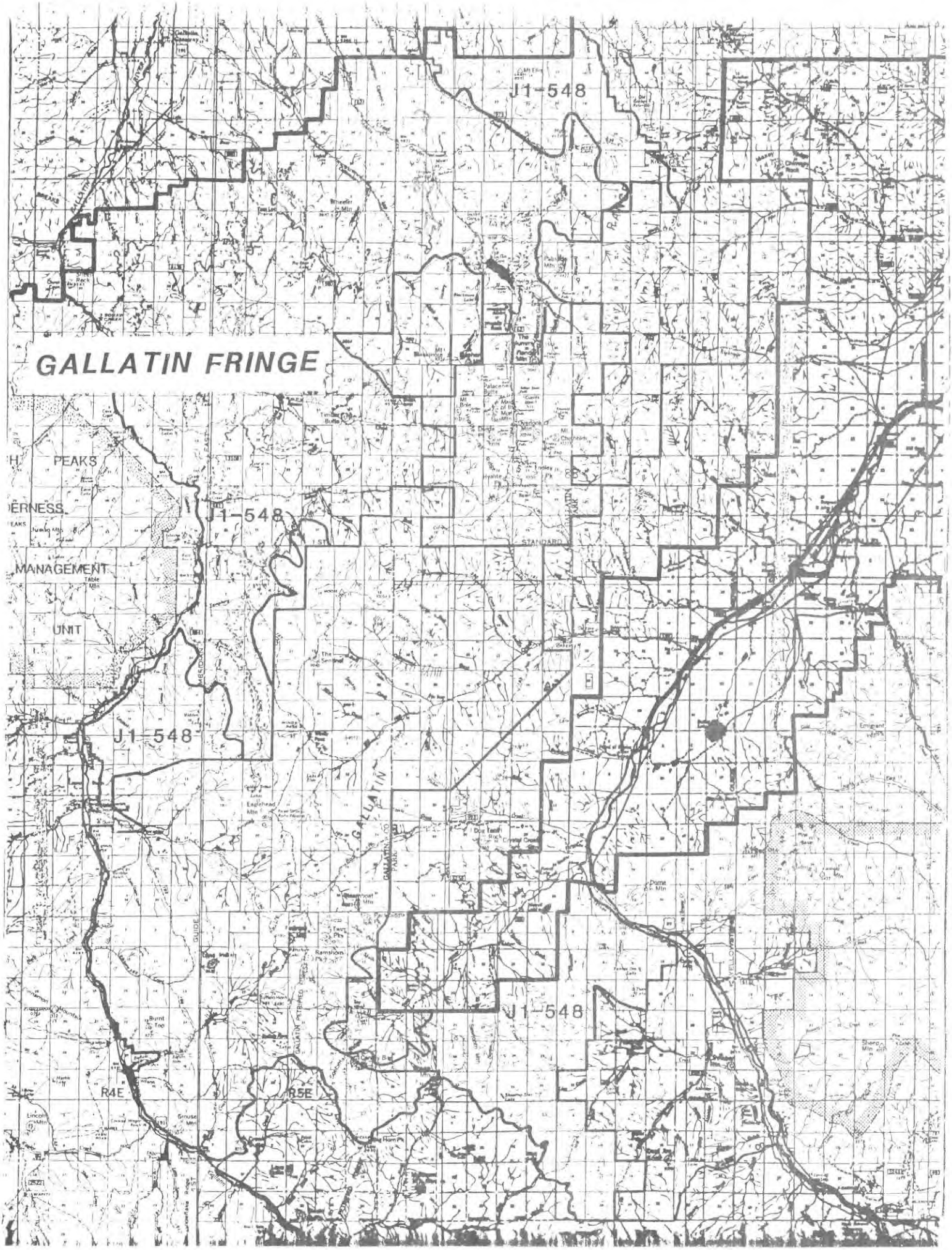
The wilderness attributes and roadless resource could be forgone on greater than 30% of the area; primarily the checkerboard ownership area of the Gallatin Divide portion. The landscape would be altered by roads and cutting units.

Approximately 1,000 to 45,000 acres of tentively suitable timber would be available for timber harvest. In addition, the tentatively suitable timber on private lands would be more easily accessible in this management emphasis.

Some of the high and moderate potential acres for oil and gas would become available for leasing.

Some of the nonpriced resource values affected are:

--some habitat diversity would be created through timber harvest;
--wildlife habitat improvement through such measures as controlled burning would be allowed;
--the roadless resource would be reduced;
--grizzly bear security might be reduced;
--some impacts to scenic values would probably occur.


GALLATIN FRINGE
J1-548
J1-548
J1-548
J1-548
PEAKS
MANAGEMENT
UNIT
STANDARD
GALLATIN
R4E
R5E

GALLATIN FRINGE ROADLESS AREA (J1548)

	Gross Acres	Net Acres
Gallatin N.F.	46,180	44,482

I. DESCRIPTION

This roadless area consists of 3 separate parcels of land. Mt. Ellis, the northernmost portion, is about 26 miles--border to border--from the Horse Creek portion to the south. A third parcel of land, comprising parts of the Goose and Levinski Creek drainages, is located about 12 miles northwest of the Horse Creek portion. These 3 parcels may be thought of as unroaded extensions to the Hyalite-Porcupine Buffalo Horn MWSA Area.

The Mt. Ellis parcel, which includes 11,800 National Forest System acres, is a rolling, timbered area. The only landmark in this area is Mt. Ellis itself, a rounded 8,331-foot peak with slopes covered with sparse timber and sagebrush/grass. The area overlooks but does not include the Mystic Lake Reservoir to the southwest. The crest of the area'a single dominant ridge provides a scenic view of the high, rugged Hyalite Peaks to the south. The Bozeman Creek Road provides the southwest boundary of the area, and the east boundary is close to the Bear Canyon jeep road.

Goose-Levinski is a 2-part roadless unit near where U.S. Highway 191 passes through the Gallatin Canyon. The segment is about 50 miles south of Bozeman and includes 10,479 acres of National Forest. Although the two portions of the Goose-Levinski Unit are separated from each other by roading and development, both pieces border Roadless Area G1548. The area could be best described as broken, irregular ridges that rise from the canyon floor toward the country of the main Gallatin Range. High points in the area offer views of the scenic Spanish Peaks to the west and the peaks of the main Gallatin Range to the east.

Goose-Levinski features a golden trout fishery in the Hidden Lakes and about 1,700 acres of Situation 2 grizzly bear habitat near Levinski Creek. The area is accessed from the Portal Creek Road, which effectively splits it, and also by Highway 191 on the west. Moose Creek Road accesses the northeastern arm of the area. For the most part, the Goose-Levinski area is not a destination point for recreationists, but is crossed to enter deeper into the Gallatin Range. It is also crossed in winter by snowmobiles since it contains about 1/2 mile of the Big Sky Snowmobile Trail in upper Moose Creek. The Hidden Lakes and their fishery attract some recreationists.

Horse Creek is not only the largest of the three parts of J1548, but is also the most scenic and remote. It includes 23,488 acres of National Forest. The Horse Creek area is a parcel of high rugged country bordering Yellowstone Park on the south. It also includes a high, rocky ridge that separates the Tom Miner and Cinnabar Basins. Dominating landmarks include Sawtooth Mountain and the scenic 10,095-foot Sheep Mountain. Most of the area is characterized by rugged cliffs and steep forested slopes, although considerable livestock grazing takes place in grasslands and parks at the lower elevations. Yankee Jim and Shooting Star lakes both have scenic value and possess recreational

importance for their fisheries. The higher elevation portion of the area, adjacent to Yellowstone Park, is within Situation 1 grizzly bear habitat.

A major obstacle to public use of the Horse Creek area is lack of public access. The only road access open to the public is off of the frontage road along the west side of the Yellowstone River. This road access is near a trail up Sphinx Creek. However, the Yellowstone River Road access is at the end of the area's northeast arm, and is 12 miles from the area's opposite boundary. Two trails access the area from the south across the boundary from Yellowstone Park. Some roads reach the area across private lands in the Cinnabar Basin but are closed to public use. The Forest Service is presently considering extentions of the public right-of-way in the Mol Heron, Horse, and Mill Creek drainages to access the area.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The three parts of area J1548 are almost unimpaired with respect to their natural integrity. The Horse Creek part is not affected to any extent by evidence of man within the area's borders. The other two parts of J1548 are natural in appearance with respect to the area within their borders, but a visitor's sense of naturalness is affected by disturbances outside the boundaries. The Horse Creek segment offers the best opportunities for primitive recreation of the three units, chiefly because of its size and remoteness. All of the portions of J1548 offer some opportunities for solitude. Solitude is easier to obtain in Horse Creek; the other two areas are more often visited or are close to maintained roads. None of the portions receive intensive recreational use which could compromise some aspects of natural integrity.

Natural appearance is unimpaired for Horse Creek except for one microwave facility on Sheep Mountain seen from Yellowstone Valley. The Mt. Ellis and Goose-Levinski portions of the area are subject to intrusion from human activities outside the area. Mt. Ellis has heavy motorbike and snowmobile use on the Bear Canyon jeep road and the noises are very apparent on the northeast half of the area. The trail along the central ridge of the Mt. Ellis portion overlooks clearcutting on the east as well as clearcutting and roading throughout the basin around Mystic Lake. Mystic Lake itself is a man-made reservoir and has been largely drained due to problems with the dam. Hence the reservoir is visually quite unattractive. The City of Bozeman, only 6 miles away, is also very apparent from high points in the Mt. Ellis segment.

The Bozeman Creek drainage in the Mt. Ellis segment is a municipal watershed which is managed to provide water for the City of Bozeman and for irrigation in the valley. Wilderness classification of the municipal watershed would restrict opportunities to maintain or enhance the area's water yield for irrigation and city use, but could reduce risk of impairing water quality.

Goose-Levinski is close to Highway 191 and subject at times to a high degree of traffic noise. Normal traffic sounds are magnified by the canyon walls. The broken appearance of the Goose-Levinski boundaries is caused by past intrusions into the area by timber harvest and related roading. Timber harvest impacts are very apparent visually in the vicinity of the Moose Creek

and Portal Creek roads. Neither the Mt. Ellis or Goose-Levinski segments possess much topographic screening.

Strictly speaking, little or none of the Mt. Ellis and Goose-Levinski segments are capable of meeting the criteria for primitive recreation. All portions of these areas are too close to roads and fail to meet the criterion of remoteness. Almost all of the Horse Creek segment meets criteria for primitive recreation.

Recreational use is presently light to moderate in the area. Elk hunting is popular in all the portions of the area during fall. Climbing Mt. Ellis is popular via the New World Gulch Trail or the Bozeman Creek Road. Goose-Levinski receives some recreational use as recreationists cross the area on a trail to other destinations. There is some fishing for golden trout in Goose-Levinski's Hidden Lakes. The Big Sky Snowmobile Trail also crosses part of the Goose-Levinski Area.

The Horse Creek segment fits the popular conception of a wilderness better than the other segments and would probably be receiving much heavier recreational use than at present if it were not for the acute problem of access. If the Forest Service improves access, it is reasonable to expect increases in use.

The Horse Creek area offers a much higher degree of challenge to recreationists than do the other segments of J1548. The presence of grizzly bear Situation 1 habitat and the ruggedness of the terrain contribute to the element of challenge.

Visual quality, remoteness, and opportunity for solitude are greater in the Horse Creek segment than in the other segments. Solitude is compromised in the Mt. Ellis and Goose-Levinski portions mainly by the proximity of roads and the intrusion of external sights and sounds.

B. Manageability

The Mt. Ellis segment could be managed as wilderness without great difficulty except for the private land at the end of the southeastern arm. The small amount of private land in the area might be eliminated by boundary adjustments. Most of the boundary of this segment is located on topographic lines except for the northern boundary, which is the Forest boundary between State ownership and National Forest.

The tortuous contours of the Goose-Levinski segment would impair manageability of the area. The contorted boundary lines and the segment's fragmented appearance have resulted from resource development in recent years. The 2-part split of this area could also pose administrative problems. Finally, a private inholding separates the northernmost section of National Forest ownership from the rest of the Goose-Levinski segment. The area is easier to administer as roadless together with the larger roadless areas adjoining it.

Only about 35 percent of the boundary of the Horse Creek area follows natural topographic features. The remainder follows section lines.

The Horse Creek segment has only 9 percent of its area in private lands, but their location cuts off the area's northeastern arm. Landowership adjustment would be a possible way to avoid managing the Horse Creek segment as two pieces. The acute access problem discussed earlier would make it difficult to distribute recreational use. One favorable consideration toward manageability is the area's 8-mile common border with Yellowstone National Park. The park is currently proposed for wilderness designation.

Because of private land access and timber sales, 1,010 acres of this roadless area were eliminated from the original inventory.

C. Resource Values

Overall, Area J1548 contains 21,969 National Forest acres of capable timberland, with a standing inventory estimated at 168.7 MMBF. Horse Creek, the only segment with active livestock grazing, contains 7,095 acres of suitable rangelands that are currently producing 2,057 AUMs of grazing use each year.

Area J1548 is important for wildlife. All the segments have populations of elk, mule deer, and moose. The area as a whole has about 7,100 acres of elk and mule deer winter range; about 74 percent of this is in the Horse Creek segment. Both the Goose-Levinski and Horse Creek segments have occupied grizzly bear habitat. Horse Creek has 6,476 acres of Situation 1 and 17,280 acres of Situation 2. Goose-Levinski has 1,715 acres of Situation 2 habitat. (Situation 1 areas are actively used by the grizzly bear and are deemed essential to its recovery. Situation 2 areas are used occasionally by the bear.)

The Horse Creek area has the broadest mix of important wildlife species in J1548, including bighorn sheep, golden eagle, and some bald eagles that winter near Yankee Jim Canyon. These species are in addition to basic populatioins of mule deer, elk, and moose. An outfitter-guide service takes hunters into the Horse Creek area during the hunting season. Herds of resident elk move in or out of the Horse Creek area from Yellowstone Park. Some migratory elk move through the Sphinx Creek area to the north.

This area contains 3.6 miles of fishery streams in the Horse Creek segment. Lake fisheries include the Hidden Lakes in Goose-Levinski and the Yankee Jim and Shooting Star lakes in the Horse Creek area.

In Area J1548 as a whole, about 10 percent of the 17,067 RVDs of recreation currently taking place annually is estimated to be primitive, about 74 percent is semiprimitive nonmotorized, and about 15 percent is semiprimitive motorized.

Hardrock minerals potential for all of J1548 is rated "low." Mt. Ellis is the only parcel of land with oil and gas leases; about 3,000 acres of this segment are under lease. There are 9,600 acres in the Mt. Ellis portion of the area rated as "high" for oil and gas potential; the rest of the J1548 area is rated low for oil and gas.

Table C-5 summarizes these resources for this roadless area:

Table C-5: Roadless Resource Information for J1548 Gallatin Fringe

Value/Resource	Gallatin N.F.
Gross Acres	46,180
Net Acres	44,482
Recreation (RVD's)	
Primitive	1,786
Semiprimitive Nonmotorized	12,659
Semiprimitve Motorized	2,622
Range	
Suitable Acres	7,095
No. Allotments	9
AUM's of Use	2,057
Timber	
Tentatively Suitable Acres	21,969
Standing Volume (MMBF)	168.7
Wildlife/Fish	
Winter Range Habitat (Ac.)	7,100
*Grizzly Situation I (Ac.)	6,476
Species Present	E,D,M,GB,BH,BE,GE
Stream Fisheries (Mi.)	3.6
Lake Habitat (Ac.)	36
Water Developments (No.)	2
Locatable Minerals (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	0
Low (Ac.)	44,482
Claims & Patents (No.)	0
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	9,600
Moderate (Ac.)	22,400
Low (Ac.)	12,482
Leased (Ac.)	3,000
Lease Applications (Ac.)	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle; GE = Golden Eagle.

D. Need

The area J1548 is, on average, within driving distance of the following population centers. Because the pieces of J1548 are so far apart, mileage is given to both the closest and farthest portions.

1.	Bozeman, Montana	5 to 90 miles
2.	Livingston, Montana	16 to 50 miles
3.	Billings, Montana	125 to 175 miles
4.	Missoula, Montana	240 to 300 miles
5.	Butte, Montana	90 to 140 miles
6.	Great Falls, Montana	220 to 280 miles
7.	Helena, Montana	90 to 140 miles
8.	Cody, Wyoming	75 to 140 miles

Nearby wilderness or proposed wilderness area are as follows:

1. The Horse Creek segment is contiguous with Yellowstone Part on the south.

2. Both the Mt. Ellis and Horse Creek segments are close to the Absaroka-Beartooth Wilderness--30 and 3 miles, respectively.

3. The Goose-Levinski segment is separated by a 3/4-mile highway corridor from the the Lee Metcalf Wilderness.

Public interest in these areas for wilderness consideration does not appear to be high. Wilderness proponents have not included these areas in any of their wilderness proposals. The only sensitive public issue involving these areas at present is the question of access to the Horse Creek parcel.

E. Contributions To the National Wilderness System

Area J1548 would contribute the following habitat types to the system:

1. The Mt. Ellis segment would contribute about 9,000 acres of the alpine fir series, mostly ABLA/VAGL, with the remainder of the area in MOUNTAIN GRASSLANDS.

2. The Goose-Levinski segment would contribute about 4,000 acres of the alpine fir species, about evenly divided between ABLA-PIAL/VASC and ABLA/VASC-VAS; about 1,500 acres of whitebark pine habitat (PIAL-ABLA); about 1,150 acres of Douglas-fir habitat; and the remainder of the segment in ROCKLAND.

3. Horse Creek would supply about 17,000 acres of alpine fir habitat types, with ABLA-PIAL/VAS being best represented; about 2,500 acres in Douglas-fir types, chiefly PSME/CAIR-CAR; about 2,000 acres of MOUNTAIN GRASSLANDS; and the remainder of the area in ROCKLANDS.

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Area J1548 will vary depending on which of the alternatives are selected for future management of the area. Table C-6 (next page) displays the acreage within these roadless areas that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

Two of the ten alternatives--Alternatives 8 and 9-- recommend all of the J1548 area for wilderness. No other alternatives recommend any of the J1548 area for wilderness.

This management emphasis would preserve or enhance the wilderness attributes of the area. The 1,786 RVDs of existing primitive recreation use would be retained in addition to expanding the capacity of the Forest to provide for wilderness experiences. Nonrecreation wilderness values, such as clean air and water and unblemished landscapes, would be maximized.

Current uses such as motorized recreation, wildlife habitat improvement, and other uses or facilities not compatible with wilderness management would be eliminated. At most, about 2,620 RVDs of semiprimitive motorized use would be displaced and accommodated elsewhere on the Forest.

The private lands in these roadless areas would be affected only in Alternatives 8 and 9. In these alternatives, where the entire area would go to wilderness, these lands would need to be acquired. In Area J1548 only about 1,700 acres of private lands would be affected.

Approximately 22,000 acres of tentatively suitable National Forest timber would be unavailable for harvest. To obtain the timbered private lands through land exchange, other Federal timber lands would need to be given up in the exchange. This would further reduce the Gallatin National Forests's timber base. Salvage selling of timber damaged or killed by the mountain pine beetle would be forgone. Downfalls in the aftermath of the beetle epidemic would impede trail use. Fuel loading would increase due to beetle-killed timber, thus increasing hazard of serious wildfires.

Table C-6: Management Emphasis for J1548 Gallatin Fringe by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	17.2	18.6	0.1	16.0	10.5	3.5	13.7	0	0	13.7	8.8	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	2.2	0	0	2.2	0	0
Big Game	0	0	0	1.1	0	0	0.9	0	0	0.9	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	15.3	18.1	16.3	15.7	14.1	10.2	0	0	10.2	17.6	0
Dispersed Rec/ Wildlife	9.8	7.4	24.8	9.9	16.4	21.4	6.9	0	0	6.9	16.2	0
Livestock Range	5.7	2.7	0.9	1.7	1.4	4.9	6.7	0	0	6.7	1.4	0
Minimum Level	11.8	0.5	0.5	0.5	0.5	0.5	3.9	0	0	3.9	0.5	44.5
WILDERNESS--	0	0	0	0	0	0	0	44.5	44.5	0	0	0
SUMMARY												
Developed -												
Decade 1	1	1.3	0	1.7	0	0	1.7	0	0	1.7		
Decade 2	2.8	4.6	0	1.9	0.6	0.2	3.1	0	0	3.1		
Roadless -												
Decade 1	43.5	43.2	44.5	42.8	44.5	44.5	42.8	0	0	42.8		
Decade 2	41.7	39.9	44.5	42.6	43.9	44.3	41.4	0	0	41.4		
Wilderness -	0	0	0	0	0	0	0	44.5	44.5	0		
TOTAL ACREAGE -	44.5											

The existing oil and gas leases covering 3,000 acres in the Eightmile Creek portion could impact the wilderness resource even within this management emphasis because the leases are a preexisting legal contract. Options to retain the wilderness characteristics under this management emphasis in Alternatives 8 and 9 are to honor the lease until expiration and then withdraw the area (FLPMA Sec. 204), buy back the lease through Congressional initiative, or to negotiate with the leaseholder to relinguish the lease or accommodate wilderness resource to the extent possible. Areas withdrawn as a result of wilderness designation would include 9,600 acres of high oil/gas potential, 22,400 acres of moderate potential, and 12,482 acres of low potential.

Some of the nonpriced resource values affected are:

- Existing visual conditions would be maintained.
- The Wilderness System would increase.
- Water quality and fisheries quality would be maintained at natural levels.
- Security for grizzly bear and elk would be maintained. About 7,100 acres of elk winter habitat would be unavailable for management to maintain forage levels.
- Insect and fire risks would increase.
- Timber harvest would be unavailable as a tool to increase habitat diversity.

Social and economic effects center around the resource values of timber, minerals, wildlife, recreation and wilderness. Since wilderness precludes timber harvest or mineral development, the related industries would not be supported by this emphasis. Timber supply forestwide would drop, resulting in a loss of jobs and income. The service sector, which includes resorts and outfitter and guide operations, could benefit from the attraction of wilderness. From a social aspect, the publics valuing wilderness would be supported. In addition, The acquisition through trade of about 1,700 acres of private land could involve some cost in time and money to the landowners involved.

2. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Nonroaded</u>
<u>Management Prescriptions: Minimum level, dispersed recreation/wildlife, dispersed recreation nonroaded, and range</u>

Eight of the ten alternatives prescribe more than half (56%-99%) of the area to a nonroaded management emphasis. Additional road access could be required to access the 1700 acres of private lands within the area boundaries, but any such roading would probably be minor, as only 3.6% of the area's gross acreage is private land.

This management emphasis would preserve the wilderness attributes of the area except where access roads to private land might be built. The roadless character would remain intact and a variety of recreation uses would be accommodated such as primitive, semi-primitive nonmotorized, and motorized uses.

Tentatively suitable timber will be unavailable--primarily in Alternatives 3 and 6-- because of this management emphasis.

Currently, most of the area is not leased for oil and gas but would become available for leasing in this emphasis. Stipulations would be applied to maintain the roadless character to the maximum extent possible, fully recognizing that the leases must allow for the development of the resources leased and the roadless option could be forgone.

Some of the nonpriced resource values affected are:

- Existing visual conditions would be maintained.
- Water quality and fisheries qualtiy would be maintained at natural levels.
- Security for grizzly bear and elk would be maintained. Elk winter habitat would be maintained or improved.

Since this management emphasis maintains the area much like the existing condition, current public uses would also be maintained. A variety of recreation experiences would be available, including primitive, semi-primitive nonmotorized and motorized recreation. The amenities of the area would continue to support outfitter and guide operations, resorts, and other service-oriented businesses. Mineral exploration would not be precluded. However, operations would have to protect the roadless character to the extent possible. The tentatively suitable timberland which is unavailable could affect the jobs and income in the wood products industry. However, access through this emphasis would be allowed.

3. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Roaded</u>
<u>Management Prescriptions: Dispersed recreation roaded, big game, timber</u>

Eight of the ten alternatives assign some of the area to a developed management emphasis, including road access, timber harvest, and wildlife habitat management. Two alternatives, 3 and 6, prescribe less than 10% of the area to this management emphasis. Six alternatives (1, 2, 4, 5, 7, and 10) provide 25-42% of the area to the emphasis. The acres assigned to this emphasis would chiefly be in the Mt. Ellis and Goose-Levinski segments.

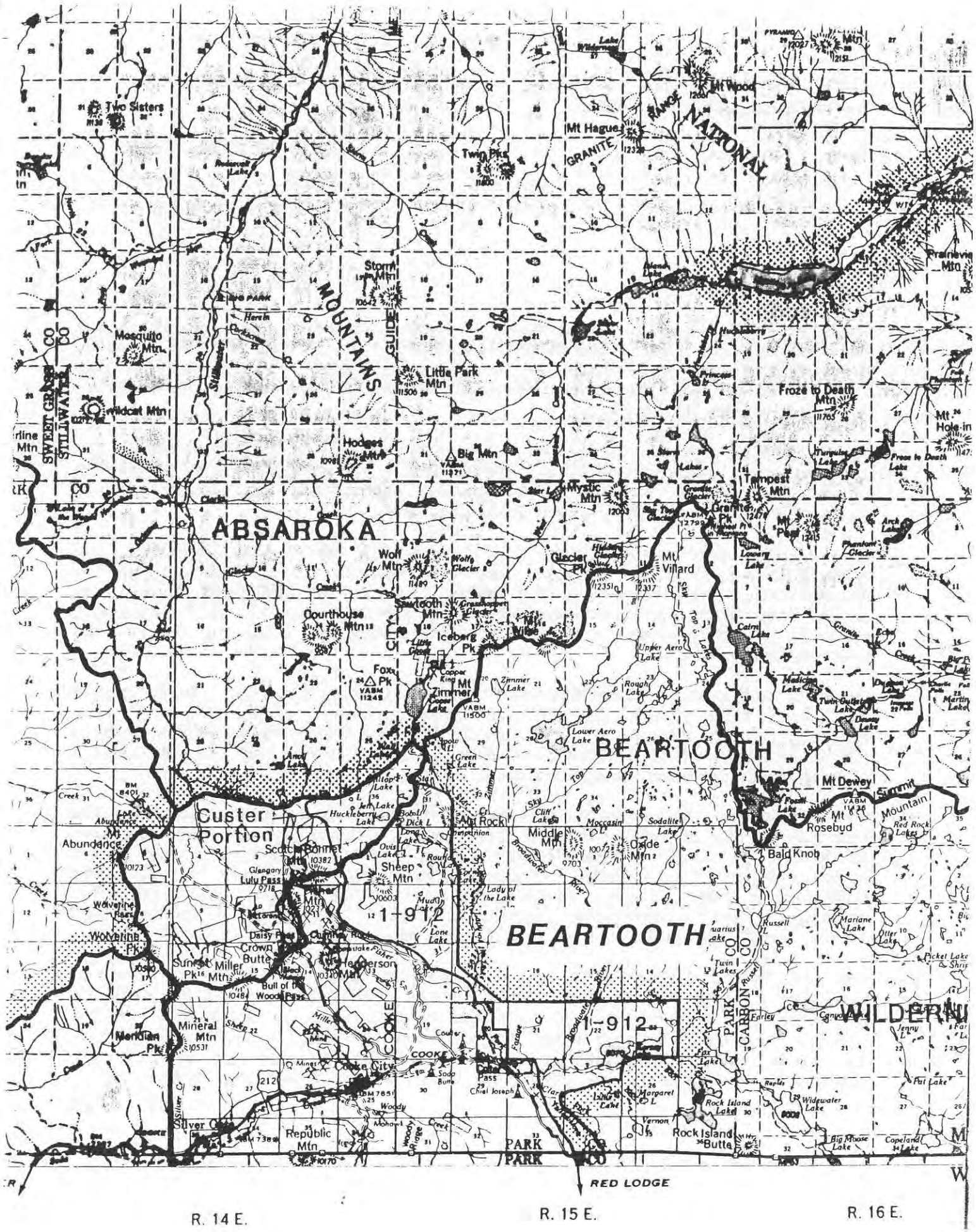
The wilderness attributes and roadless resource could be forgone on about 30% of the area. However, harvest would probably take place in areas like Goose-Levinski where collector roads are in place and some logging has been done. The natural appearance of these areas has already been somewhat affected by nearby logging and roads. Generally, the more remote areas that are now far from roads would not receive development emphasis. Where logging did take place, the landscape would be altered by roads and cutting units.

From about 100 to 18,600 acres of tentively suitable timber would be available for timber harvest, depending on the alternative. In addition, the tentatively suitable timber on private lands would be more easily accessible in this management emphasis.

Some of the acres rated as having high and moderate potential for oil and gas would become available for leasing.

Some of the nonpriced resource values affected are:

--some habitat diversity would be created through timber harvest;
--wildlife habitat improvement through such measures as controlled burning would be allowed;
--the roadless resource would be reduced;
--grizzly bear security might be reduced;
--some impacts to scenic values would probably occur.



Two Sisters
Mt Hague
Mt Wood
GRANITE RANGE
NATIONAL
Twin Pks
Storm Mtn
MOUNTAINS
GUIDE
Mosquito Mtn
Wildcat Mtn
SWEET GRASS CO
STILLWATER CO
Little Park Mtn
Hodges Mtn
Big Mtn
Mystic Mtn
Tempest Mtn
Granite Pk
Froze to Death Mtn
Mt Hole-in
Prairieville Mtn
ABSAROKA
Wolf Mtn
Glacier Pk
Mt Villard
Courthouse Mtn
Sawtooth Mtn
Iceberg Pk
Mt Wilse
Fox Pk
Mt Zimmer
Zimmer Lake
Upper Aero Lake
Lower Aero Lake
BEARTOOTH
Mt Dewey
Mt Rosebud
Bald Knob
Custer Portion
Mt Abundance
Scotch Bonnet Mtn
Sheep Mtn
Middle Mtn
Oxide Mtn
Lady of the Lake
1-912
BEARTOOTH
Wolverine Pk
Daisy Pass
Crown Butte
Sunset Pk
Miller Mtn
Henderson Mtn
Bull of the Woods Pass
Mineral Mtn
Meridian Pk
COOKE
Cooke City
Colter Pass
Chief Joseph
Silver Gate
Republic Mtn
Rock Island Butte
Rock Island Lake
PARK CO
CARBON CO
WILDERN
RED LODGE
R. 14 E.
R. 15 E.
R. 16 E.

BEARTOOTH ROADLESS AREA (1912)

	Gross Acres	Net Acres
Gallatin N.F.	5,040	4,720
Custer N.F.	1,280	1,180
	6,320	5,900

I. DESCRIPTION

Area 1912 begins about 2-1/2 miles northeast of Cooke City, Montana, and extends north and east to the boundaries of the Absaroka-Beartooth Wilderness. This area is located on both the Gallatin and Custer National Forests. The Gallatin Forest has been named the lead Forest in conducting the roadless re-inventory for this area.

The Gallatin's portion of the area includes two parcels of land that adjoin the wilderness on the north and east. These parcels are separated from each other by about 1 mile of roading and development associated with planned cutting units of the Kersey-Fisher Timber Sale scheduled for 1985.

The Custer Forest's part of the area is located north of the Gallatin's, and extends the Gallatin's Long Lake segment northwards to the boundries of the Absaroka-Beartooth Wilderness. The Custer piece is an elongated triangular-shaped unit about two miles long and one mile wide (see map). This north most piece is a gentle-sloped area of wet, alpine meadows, subalpine forest, and numerous small lakes.

Overall, the area is comparatively level, basin-like country. It is dotted with lakes and mostly tree-covered. The northwest corner has different terrain--rugged, unvegetated rock from 10,603-foot Sheep Mountain northward to the Absaroka-Beartooth Wilderness boundary. This rockier area has some pockets of timber and includes swamps and bogs.

The borders of this area are defined on the north, east, and south by the boundary of the Absaroka-Beartooth Wilderness, and on the west by the Fisher Creek Road and the Beartooth Highway. These roads provide good access to the area. Jeep roads enter both portions of the area from the west to access the more popular lakes. These jeep roads are used by four-wheelers and dirt-bikers in summer, and by extensive snowmobile traffic in winter. An unmaintained forest trail crosses the entire Long Lake segment from southwest to northeast.

One significant feature of the area is Kersey Lake. This 110-acre lake has very good fishing for rainbow and brook trout. It is one of the few lakes in the area still accessible by motorized vehicles and is a favorite of the elderly. In all, the area has 5 lakes of over 10 acres area; these all have fisheries. Snowmobiling and cross-country skiing take place in parts of the area near Cooke City as well as off the Lulu Pass and Goose Lake roads.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

Area 1912 meets some wilderness characteristics more successfully than others. Portions of the area reveal evidence of man, but these parts could be separated from the roadless area to leave the remainder of the area more suited to wilderness consideratiion. The northern parts of the area offer wilderness opportunities comparable to the adjoining Absaroka-Beartooth Wilderness.

Natural integrity of the area is affected by several marks of man. The east portion has a jeep road to Kersey Lake. A cabin at Kersey Lake serves as the office for a rowboat rental service. A 1/4-mile square private inholding just east of Kersey Lake is presently being developed for summer homes. The southwest boundary of the area follows but does not include a power transmission line. Four isolated parcels of private land are located within the area.

Some evidence of old mining activity can be found in both parts of the area but is more evident in the Long Lake portion. Structures associated with old mining claims are visible from some locations. A jeep road runs the length of the Long Lake segment; this road extends to Goose Lake but presently is closed to the general public at the Absaroka-Beartooth Wilderness boundary. Other jeep roads now receiving little or no use are scattered throughout the area; these date from days of active mining.

Natural appearance of the area is affected by the man-made developments just noted. In addition, sounds from Highway 212 would be evident in the southwest portion of the Kersey Lake segment where the highway is within 1/4-mile of the boundary.

The area is now classified as suited for semiprimitive motorized recreation. Popular activities include fishing, motorized activities (snowmobiling, jeeping, and dirt-biking), hiking, hunting, and cross-country skiing. The area presently receives some use along trails that pass through it into the Absaroka-Beartooth Wilderness. If all motorized use were to be eliminated within the boundaries, about 2/3 of the area would meet criteria for semiprimitive nonmotorized recreational use.

Opportunity for solitude in the area varies by site and season of use. If a person would avoid periods of peak use (e.g., hunting season), and avoid the jeep roads, there would be some opportunity to attain solitude. The entire area is grizzly habitat; this could add some element of risk to hiking or similar activities. Climbing Sheep Mountain would pose a degree of challenge and risk.

B. Manageability

The long, shared border with the Absaroka-Beartooth Wilderness would make management of the area fairly easy if it were to go to wilderness. Summer homes being developed in Section 23 of the Kersey Lake segment along with the road accessing them would make some boundary adjustment necessary. Several parcels of private land west of Sheep Mountain could be excluded from the area through boundary adjustments. In the 1983 re-inventory, 370 acres were

eliminated from the roadless area because of the proposed Kersey-Fisher timber sale on the Gallatin National Forest.

C. Resources

This roadless area contains about 890 acres of timber capable of sustaining commercial harvest. Standing timber inventory is estimated at 7.2 MMBF. Most of the commercial timber lies in the southwest portion of the area close to the proposed cutting units of the Kersey-Fisher Timber Sale. Timber includes mixed stands of spruce and alpine fir, with stands of lodgepole pine and stands of whitebark pine. The whitebark stands are not commercially valued. See Table C-7 for a summary of this and other resources of the area.

Table C-7: Roadless Resource Information for #1912 Beartooth Roadless Area

Value/Resource	Gallatin N.F.	Custer N.F.
Gross Acres	5,040	1,280
Net Acres	4,720	1,180
Recreation (RVD's)		
Primitive	0	248
Semiprimitive Nonmotorized	425	75
Semiprimitve Motorized	800	0
Range		
Suitable Ac.	900	0
No. Allotments	0	0
AUM's of Use	0	0
Timber		
Tentatively Suitable (Ac.)	890	0
Standing Volume (MMBF)	7.2	0
Wildlife/Fish		
Winter Range Habitat (Ac.)	0	0
*Grizzly Situation I (Ac.)	511	0
Species Present	E,D,M,GB	E,D,M,GB,BH
Stream Fisheries (Mi.)	1.8	0
Lake Habitat (Ac.)	205	12
Water Developments (No.)	0	0
Locatable Minerals (Potential)		
Very High (Ac.)	3800	0
High (Ac.)	0	590
Moderate (Ac.)	920	590
Low (Ac.)	0	0
Claims & Patents (No.)	16	4
Oil and Gas (Potential)		
Very High (Ac.)	0	0
High (Ac.)	0	0
Moderate (Ac.)	0	0
Low (Ac.)	4,720	1,180
Leased (Ac.)	0	0
Lease Applications (Ac.)	0	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle.

No commercial livestock grazing presently takes place in the area, but 900acres of suitable range have been identified.

The area contains 511 acres of grizzly bear habitat classed as Management Situation 1; the rest of the area is Management Situation 2. The Situation 1 areas are located in the eastern half of the Kersey Lake segment. The area contains no big game winter range. Populations of elk, mule deer, and moose are found in the area. Some bighorn sheep summer range exists in the northern (Custer) portion of the area. The area also contains 5 lakes of over 10 acres in size which contain fisheries, plus 1.8 miles of fishing streams.

About 1,120 acres of the area are rated medium for locatable minerals potential, with the remainder of the area being rated as low. The entire area is rated low for oil/gas potential. The area contains 11 unpatented mining claims and 5 patented claims. Most of the present and past mining activity is located in the Long lake portion. There are no oil and gas leases or lease applications on record for this area.

D. Need

The Beartooth Roadless Area is 150 miles from Cody, Wyoming; 135 miles from Bozeman, Montana; and 125 miles from Billings. The area is tangent to the Absaroka-Beartooth Wilderness for about 60 percent of its borders. A spur off of the the Kersey Lake segment of the area extends southward to meet roadless Area 2912 on the Shoshone National Forest; this spur is about 1-1/2-miles from the boundary of the North Absaroka Wilderness. The area is about 5 miles from Yellowstone Park, which is proposed for wilderness.

The lands in Area 1912 have not been suggested for wilderness by any organized wilderness groups. Because of the high levels of snowmobile use within this area, many residents of nearby towns as well as snowmobilers who visit the area are strongly opposed to wilderness classification. It is possible that some individuals may want wilderness for Area 1912, but this view was not expressed in the responses to a public involvement mailer pertaining to the area which was distributed September of 1983.

E. Contributions To the National Wilderness System

Essentially, Area 1912 represents proposed annexes or additions to the Absaroka-Beartooth Wilderness. Portions of the area might enhance manageability of the Absaroka-Beartooth, while other portions would be likely to add to management problems.

Habitat types that would be contributed to the National Wilderness System if this area were to become wilderness are all in the alpine fir (ABLA) series. The upper subalpine fir series (ABLA-PIAL/VAS), described as "subalpine fir whitebark pine/grouse whortleberry." is predominant. This is a common habitat type in the area. About 27 percent of the total area of Area 1912 is unvegatated rock, talus, or open water.

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1912 will vary depending on which of the alternatives are selected for future management of the area. Table C-8 (next page) displays the acreage within the Beartooth roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

This prescription proposes the area to remain in a roadless condition, with a recommendation to Congress for inclusion in the Absaroka-Beartooth Wilderness. The Gallatin portion of the Beartooth is recommended for wilderness only in Alternative 9. The Custer National Forest portion is recommended for wilderness in Alternatives 1, 3, 8, and 9.

The wilderness alternative would change the recreation use that is currently made of the area. No motorized use on the primitive roads and trails would be allowed. The private land use, especially around Kersey Lake, would be adversely affected by a closure to motorized use.

The primary recreational use of the area at present is motorized use. This would end with wilderness classification. The inability to drive vehicles to the lakes would be especially disappointing to some local people. Public input from local residents has been overwhelmingly in favor of keeping the area out of wilderness. Because it contains several hard rock mining claims and patents it would be very difficult to manage as wilderness. If any of these claims were developed, the wilderness character would be diminished.

Nonpriced values would be affected as follows:

--grizzly bear security would be increased in this alternative.
--other wildlife habitat would be maintained.
--visual quality would continue as it exists today.
--it would be more difficult to develop mining claims.
--people could no longer drive to the lakes to fish.

2. Designation: Nonwilderness
Management Emphasis: Nonroaded
Management Prescriptions: Minimum management, dispersed recreation/wildlife, and dispersed recreation nonroaded.

The majority of the Beartooth Area in all alternatives is proposed for wilderness or roadless management. Alternatives 2, 5, 6, 7 and 10 assign at least 85 percent to roadless emphasis. This kind of emphasis would essentially keep the area and its uses as they are today. Motorized uses would continue. If access were needed for mining or oil and gas exploration, it could be granted. The lakes would continue to be easily accessible.

Table C-8: Management Emphasis for Roadless Area 1912 Beartooth by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	1.0	0.8	0	0	0.7	0	0	0.8	0	0	0.8	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0.8	0	0	1.0	0	0	1.0	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	1.0	0	0	0	0	0	0	0	0	0
Dispersed Rec/ Wildlife	3.7	5.1	3.7	5.1	5.2	5.9	4.9	3.9	0	4.9	5.1	0
Livestock Range	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Level	0	0	0	0	0	0	0	0	0	0	0	4.7
WILDERNESS--	1.2	0	1.2	0	0	0	0	1.2	5.9	0	0	0
SUMMARY												
Developed -												
Decade 1	1.0	0.8	0	0.8	1.0	0	1.0	0.8	0	1.0		
Decade 2	1.0	1.0	0	0.8	1.0	0	1.0	0.8	0	1.0		
Roadless -												
Decade 1	3.7	3.9	4.7	3.9	4.0	4.7	3.7	3.9	0	3.7		
Decade 2	3.7	3.7	4.7	3.9	4.0	4.7	3.7	3.9	0	3.7		
Wilderness -	0	0	0	0	0	0	0	0	4.7	0		
TOTAL ACREAGE -	4.7											

Management under this alternative would favor the grizzly bear and recreation where it was compatible with the recovery of the grizzly. Some mitigation might be needed in the future, if recreation increased dramatically. However,an increase within this area is not envisioned. Hunting and fishing would continue to be the main use of the area.

The roadless resource as it now exists would be maintained, even though the primitive roads would continue to be used.

Nonpriced values would be affected as follows:

--grizzly bear security would be monitored.
--existing visual quality would remain.
--recreation diversity would be maintained.
--the area would be available for minerals, oil, and gas exploration and development.

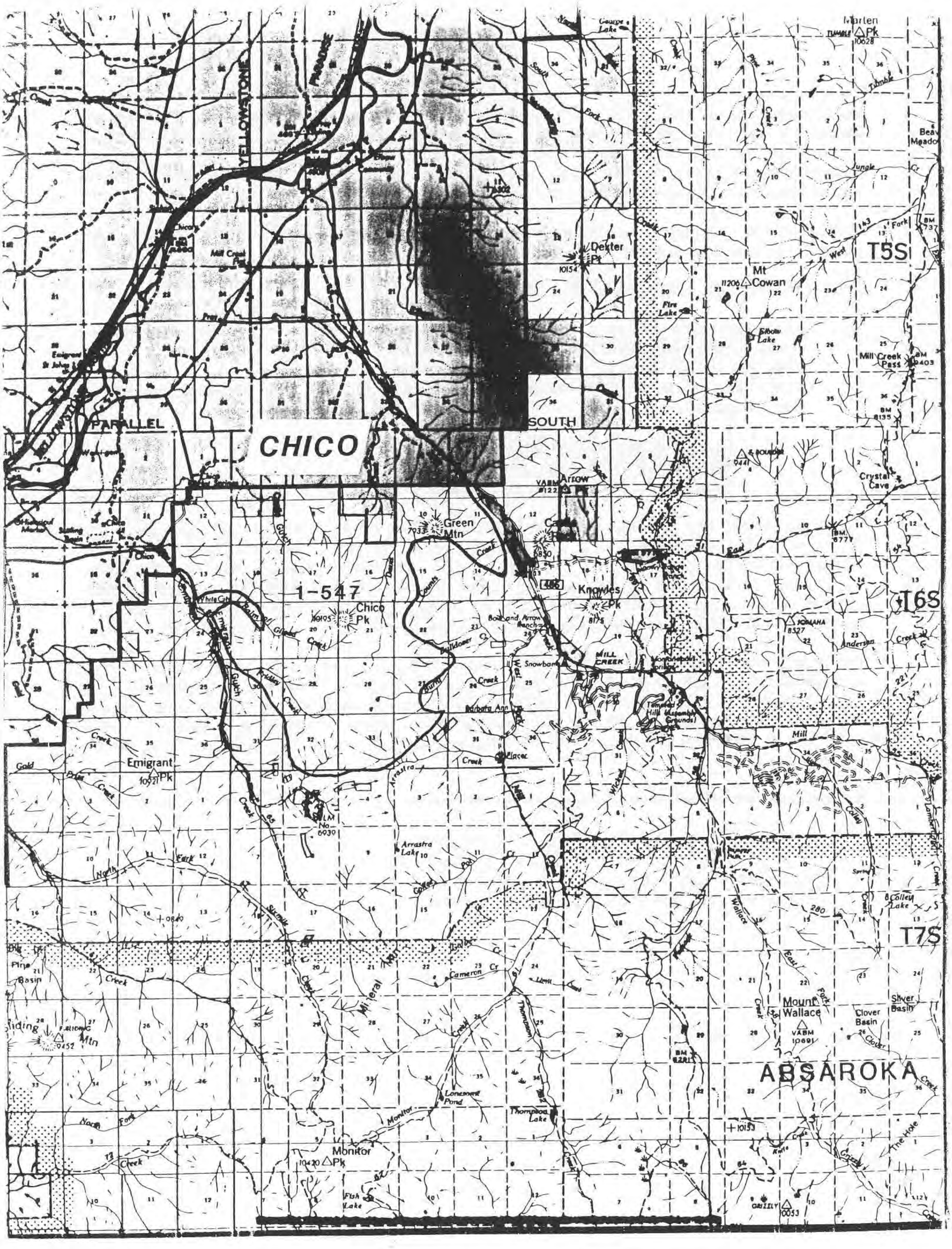
3. **Designation: Nonwilderness**
Management Emphasis: Roaded
Management Prescriptions: Timber, big game

The most that any alternative assigns to these roaded prescriptions is 1,000 acres or 17% in Alternative 1. Alternatives 2, 5, and 8 award slightly less to timber harvest. Under this alternative, the standing timber volume of 7.2 MMBF would be harvested over the next several years and managed for future timber production. This would contribute to the Gallatin National Forest annual harvest, and could provide some timber to the small local mill in Cooke City.

On those portions of the roadless area that are harvested and roaded, the wilderness character would be lost. Timber harvest would not decrease the visual quality as much on the relatively flat terrain of this area as would occur on more varied terrain. Some mitigation, such as the way sales are laid out, could reduce the amount of cutting areas that would be visible from roads and trails.

Nonpriced values would be affected as follows:

--some habitat diversity would be created.
--the roadless resource would be reduced.
--minerals development would be easier.
--grizzly bear security might be reduced.



CHICO
1-547
PARALLEL
SOUTH
YELLOWSTONE
T5S
T6S
T7S
ABSAROKA
Marten Pk
10628
Mt Cowan
11206
Dexter Pt
10154
Fire Lake
Elbow Lake
Mill Creek Pass
Crystal Cave
Green Mtn
7933
Arrow
Knowles Pk
8175
Chico Pk
Bow and Arrow Ranch
Snowbank
MILL CREEK
Barbara Ann
Placer
Emigrant Pk
10921
Arrastra Lake
Colley Lake
Pine Basin
Cameron Cr
Mineral Mtn
Sliding Mtn
9452
Mount Wallace
VABM 10691
Clover Basin
Silver Basin
Lonesome Pond
Thompson Lake
Monitor Pk
Fish Lake

CHICO PEAK ROADLESS AREA (1547)

	Gross Acres	Net Acres
Gallatin N.F.	11,555	10,855

I. DESCRIPTION

Area 1547 is located along the west side of the Absaroka Mountains where they meet the Paradise Valley about 23 miles south of Livingston, Montana. The area is dominated by 10,195-foot Chico Peak. It includes both high, mountainous country and foothills.

The northern part of the area is heavily timbered, mainly with lodgepole pine and Douglas-fir. From Chico Peak southward, high rock and alpine meadows tend to predominate. The west side of the area is timbered with lodgepole stands.

The area has no trail system and is lightly used except in autumn by elk hunters. Some people occasionally enter the area to hike or to climb Chico Peak. Scenic values are high; the area is highly visible from U.S. Highway 89.

Access to the area is good. It is reached from the north by the Chico Road; from the east by the West Fork of Mill Creek Road; from the south by the Arrastra Creek Road; and from the west by Emigrant Creek Road. The Balm of Gilead jeep road creates a roaded corridor about 1-1/2 miles into the area from the west.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The Chico Peak area shows few evidences of man's hand. In most of the area natural ecological processes continue undisturbed. Disturbances that do exist do not extend to the area's core and could be excluded by boundary adjustments. The core of the area offers opportunities for solitude, primitive recreation, and the practice of outdoor skills.

Natural integrity of the area is relatively unimpaired. Chief impacts of past human activities are scattered test pits left from past mining activity. The Balm of Gilead road accesses mining activity at the road's end. Firewood cutting and corral post timber cutting have been taking place along the sides of this jeep road. Although the road corridor itself has been excluded from the area with a boundary adjustment, sights and sounds of human activity along the road--such as vehicle traffic or the sound of chainsaws--sometimes disturb the natural appearance of the area. Besides this one roaded corridor into the area, there has been some trespass timber cutting which extends about a mile into the area along the north boundary. In addition, the Burnt Creek Timber Sale has extended into the southeast part of the area by about 1/2-mile. Except for some clearcuts and developments in the adjacent Yellowstone River valley, there are no major man-made developments visible from the area's high points that would compromise the area's naturalness.

Although the area is not large, its compact shape and some topographic screening create a degree of remoteness. There are good opportunities for solitude in the area's core.

The 2,649 RVDs of recreation currently estimated to occur in the area each year are classified as semiprimitive nonmotorized use. The area presently meets all criteria for primitive ROS classification except for trailbike or jeep use near or within the boundaries. Some outfitted recreation activity presently exists in the area: organized horseback trail rides enter the area from Chico Hot Springs. The Forest Service has been studying proposals for helicopter skiing in this area but none have been approved up to now.

Opportunity for outdoor activities posing a degree of challenge and risk would probably be limited to mountain climbing.

B. Manageability

Area 1547 has 700 acres of private land within its boundaries. This private land might either be excluded or acquired without inpairing the integrity of the area. Timber activities in Section 9 along the northern boundary have tended to create a 1/2 mile neck of roadless land between the Green Mountain segment to the northeast and the main portion of the area (see map). Otherwise, the area's shape is compact and easily manageable. When the area was re-inventoried in 1983, 845 acres were eliminated because of existing mining roads.

The area is not tangent to any wilderness or other roadless area. Its size makes wilderness designation possible, but designation would result in a very small wilderness compared to existing wildernesses in the area.

C. Resource Values

Chico Peak presently has 3,724 acres of timberlands capable of sustaining commerical production. These timber lands have a standing inventory of 29.5 MMBF. Roadless areas are summarized in Table C-9 (next page).

The area has no permitted grazing of livestock, but 12 Forest Service horses are pastured on Section 12 at the area's northwest corner for about 7 months of each year.

The area sustains populations of elk, mule deer, and moose. There are 1,600 acres of elk and mule deer winter range, mainly located in the northern part of the area. Bighorn sheep summer on Green Mountain; there are a few hundred acres of bighorn sheep winter range north and east of Green Mountain. No threatened or endangered species use the area. There are no fisheries.

The area contains 2,500 acres under lease for oil and gas development with an additional 4,000 acres under lease application. The area has 1,600 acres rated "moderate" for oil and gas potential, with the remainder of the area rated "low."

Table C-9: Roadless Resource Information for #1547 Chico

Value/Resource	Gallatin N.F.
Gross Acres	11,555
Net Acres	10,855
Recreation (RVD's)	
Primitive	0
Semiprimitive Nonmotorized	2,649
Semiprimitve Motorized	100
Range	
Suitable Ac.	0
No. Allotments	0
AUM's of Use	0
Timber	
Tentatively Suitable (Ac.)	3,724
Standing Volume (MMBF)	29.5
Wildlife/Fish	
Winter Range Habitat (Ac.)	1,600
Grizzly Situation I (Ac.)	0
*Grizzly Situation II (Ac.)	0
Species Present	E,D,BH,M
Stream Fisheries (Mi.)	0
Lake Habitat (Ac.)	0
Water Developments (No.)	2
Locatable Minerals (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	10,855
Low (Ac.)	0
Claims & Patents (No.)	21
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	1,600
Low (Ac.)	9,255
Leased (Ac.)	2,500
Lease Applications (Ac.)	4,000

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE= Bald Eagle

There are about 21 unpatented mining claims in the area clustered along the western and southern boundaries. About 1,600 acres in this area are rated "moderate" for locatable minerals, with the rest of the area rated "low." The area has a long history of minerals activity.

D. Need

Area 1547 is close to the Absaroka-Beartooth Wilderness--about 3 miles from the area's eastern border. The area is about 15 miles north of the Yellowstone Park boundary, and about 25 linear miles east of the Lee Metcalf Wilderness.

The area is within driving range of the following population centers:

1.	Bozeman, Montana	50 miles
2.	Livingston, Montana	25 miles
3.	Billings, Montana	140 miles
4.	Butte, Montana	140 miles
5.	Gardiner,Montana	30 miles

Little interest has been expressed in advocating this for wilderness by either individuals or organizations.

E. Contributions To the National Wilderness System

Area 1547 would contribute the following habitat acres if it were to be included in the National Wilderness System:

1. About 3,350 acres of the alpine fir series, with the ABLA-LIBO groups best represented;
2. About 2,700 acres of Douglas-fir habitat types, mainly PSME/PHMA-CAR;
3 About 1,350 acres of whitebark pine-subalpine fir (PIAL-ABLA);
4. About 1,350 acres of MTN GRASSLANDS.

The remainder of the area is mostly rock.

III. Alternatives and Environmental Consequences

A. Management Emphasis By Alternatives

Environmental effects on Roadless Area 1547 will vary depending on which of the alternatives are selected for future management of the area. Table C-10 (next page) displays the acreage within the Chico roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

Table C-10: Management Emphasis for Roadless Area 1547 Chico by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	5.1	4.8	0	3.9	1.5	0	4.8	0	0	4.8	4.8	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0.5	0	0	0	0	0	0	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	7.1	0	6.2	6.7	0	0	0	0	0	0
Dispersed Rec/ Wildlife	2.3	2.4	0.8	2.4	1.4	1.8	2.0	0	0	2.0	2.4	0
Livestock Range	0.8	1.6	0.3	1.6	0.8	0.8	1.6	0	0	1.6	1.6	0
Minimum Level	2.7	2.1	2.7	2.6	1.0	2.6	2.5	0	0	2.5	2.1	10.9
WILDERNESS--	0	0	0	0	0	0	0	10.9	10.9	0	0	0
SUMMARY												
Developed -												
Decade 1	0.7	0.7	0	0.7	0	0	0.7	0	0	0.7		
Decade 2	0.7	0.7	0	0.7	0	0	0.7	0	0	0.7		
Roadless -												
Decade 1	10.2	10.2	10.9	10.2	10.9	10.9	10.2	0	0	10.2		
Decade 2	10.2	10.2	10.9	10.2	10.9	10.9	10.2	0	0	10.2		
Wilderness -	0	0	0	0	0	0	0	10.9	10.9	0		
TOTAL ACREAGE -	10.9											

B. Environmental Consequences

1. Designation: Wilderness Management
Management Emphasis: Wilderness

Only Alternatives 8 and 9 recommend the Chico roadless area as wilderness. This designation would preserve the wilderness character of the area. The private land in the roadless area is on the periphery and could easily be excluded from wilderness. The mining claims in this area are unpatented and no further development of them would be allowed if the area were wilderness. The small amount of motorized use that occurs on the jeep roads and trails would no longer be allowed. Outfitter use of the area would continue.

In this alternative the tentatively suitable timberlands would not be harvested. The 29.5 MMBF of standing volume would be lost to the local market. There is no livestock grazing that would be affected.

The lease application for oil and gas exploration on 400 acres would not be granted. However the lease on 2500 acres would mean that exploration would occur if the company chose to do so, and that any possible development would cause a loss of the wilderness character in the area.

Other nonpriced values would be affected as follows:

--water quality would remain high.
--the existing visual condition would be maintained.
--oil, gas, and minerals values on those lands not leased or patented
--would be forgone.
--firewood, posts, and poles would no longer be available.
--the roadless resource would remain undiminished.

2. Designation: Nonwilderness
Management Emphasis: Nonroaded
Management Prescription: Minimum level, dispersed recreation/wildlife, dispersed recreation nonroaded, range

Alternative 6 assigns all the roadless area to nonroaded prescriptions. Other alternatives award varying amounts. Nonroaded emphasis would tend to keep the area as it currently is. All use, including the motorized use that now takes place, would continue. Work would probably continue on the unpatented mining claims. However, no new roads would be constructed into the area except for possible minerals exploration and development.

The wilderness qualities of the area would remain intact if there are no mineral developments. With this management emphasis, the 4000-acre petroleum lease application would be granted and more applications would be expected in the future. Mining, oil, and gas are the only activities expected to affect the wilderness character.

Some nonpriced values are:

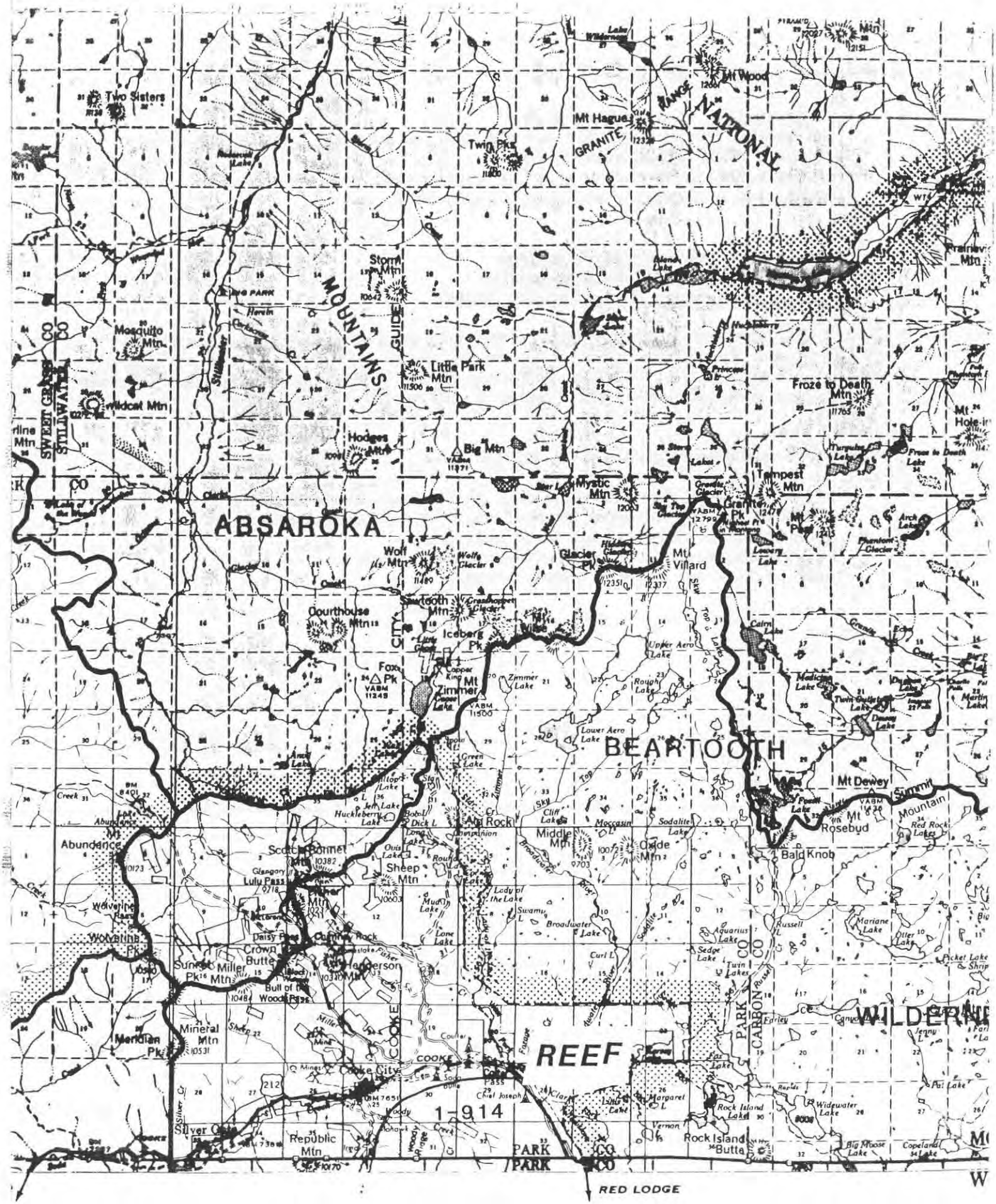
- water quality would remain high.
- the area would be available for oil and gas activity.
- visual quality would remain high.
- wildlife habitat security would be maintained.
- recreation opportunity would remain diverse.

3. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Roaded</u>
<u>Management Prescriptions: Timber</u>

The 3,724 acres of suitable timberland would be accessed under Alternatives 1, 2, 4, 7 and 10. This is mostly in the northern 1/3 of the roadless area and would not affect the roadless character of the remainder of the area. Timber could be harvested under this emphasis and would be available to the local market.

Nonpriced values affected are as follows:

- existing visual condition would be changed by timber harvest.
- the roadless character of much of the area would be lost.
- more wildlife diversity would be provided.
- habitat security for big game would be provided.
- risk of fire and insects would decrease.


ABSAROKA
BEARTOOTH
REEF
WILDERNE
MOUNTAINS
GUIDE
GRANITE
RANGE
NATIONAL
SWEET GRASS
STILLWATER
CO
PARK
CARBON
COOKE
CITY
Two Sisters
Mt Hague
Twin Pks
Mt Wood
Storm Mtn
Mosquito Mtn
Wildcat Mtn
Little Park Mtn
Hodges Mtn
Big Mtn
Mystic Mtn
Froze to Death Mtn
Tempest Mtn
Granite Pk
Mt Pope
Wolf Mtn
Glacier Pk
Mt Villard
Courthouse Mtn
Sawtooth Mtn
Iceberg Pk
Fox Pk
Mt Zimmer
Mt Dewey
Mt Rosebud
Bald Knob
Mt Abundance
Scotch Bonnet Mtn
Sheep Mtn
Middle Mtn
Oxide Mtn
Lulu Pass
Wolverine Pass
Wolverine Pk
Daisy Pass
Crown Butte
Sunset Pk
Miller Mtns
Bull of the Woods Pass
Mineral Mtn
Meridian Pk
Cooke City
Silver Cate
Republic Mtn
Rock Island Butte
Chief Joseph
Red Lodge
I-914
212
R. 14 E.
R. 15 E.
R. 16 E.

REEF ROADLESS AREA (1914)

Gross Acres	Net Acres
2,300	2,200

I. DESCRIPTION

The Reef Roadless Area represents the northmost extension of a high, rocky ridge which gives the area its name. This feature extends across the Montana-Wyoming border from the south. The western portion of the Reef area also takes in the lower, gentler slopes of Woody Ridge. The Woody Ridge-Woody Creek area contains most of what timber the area has.

The reef formation rises abruptly in a series of scarps and high-energy slopes from the timbered lands to the west. Parts of the reef formation in this area reach over 10,000 feet in elevation. The high part of this roadless area is mostly bare rock. To the south, outside the boundaries, much higher promontories are visible, such as 11,708-foot Pilot Peak.

The Reef Roadless Area is located just southeast of Cooke City, Montana. It is accessed on the northeast by U. S. Highway 212, and on the west by two local roads out of Cooke City.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The Reef Roadless Area possesses a high degree of natural integrity. The evidence of man that does exist is mostly localized, inconspicuous, and will become less conspicuous with time. Portions of the area not immediately adjacent to Highway 212 are natural in appearance. The area is well suited to recreational activities of a primitive character, such as hiking, mountain climbing, or hunting. However, the proximity of Highway 212 makes it impossible to classify parts of the area as primitive. The area is seldom visited by man; away from the highway, the experience of solitude is easy to obtain. The Reef area is contiguous with a much larger roadless area on the Shoshone National Forest which was excluded from Wilderness classification in the Wyoming Wilderness Act of 1984.

Natural integrity is affected by a patented mining claim (Sec. 32, T9S, R15E) that shows evidence of old placer activity but has not been worked in recent years. An old mining road is still evident.

Natural appearance is affected by the proximity of U.S. Highway 212, but dense timber along the edges of the area reduces the sights and sounds of traffic. The Mohawk Mine on the area's western edge is still active. Although the mine is just outside the boundary, some disturbance of naturalness could be expected within 1/2 mile of the mine at times when it is in operation.

The characteristic of remoteness is such that all of the area except a 1/4-mile strip along the highway is suitable for semiprimitive nonmotorized recreation. Good vegetative and topographic screening enhances the remoteness. Areas

screened from the highway could be classified for primitive recreation. This would include from 1/4 to 1/3 of the area.

The rugged topography of the reef formation lends itself well to recreational activities of a primitive character that challenge a visitor and demand the use of outdoors skills. The wooded lower country on the west of the area lends variety and provides some limited opportunities for fishing. The presence of grizzly bears adds an element of risk to recreational activities in the area. There is also an avalanche or rockfall hazard on the high-energy slopes.

Some opportunities for solitude exist in the southern portion of the area. Highway noises reduce the experience of solitude in the area's northern half.

B. **Wilderness Manageability**

Because of its small size, the area could only be manageable when dealt with as an extension of the North Absaroka Wilderness on the Shoshone National Forest. The shape of the area is compact; there are 100 acres of private inholdings. Because of an acreage recalculation, the size of the area has been reduced from 12,200 acres to 2,170 acres.

C. **Resource Value**

The area has 711 acres of timberlands capable of sustaining commercial production, with a standing inventory of 5.7 MMBF. No commercial livestock grazing takes place, but there is a 70-acre horse pasture along Woody Creek that is used by an outfitter. About 10 horses are grazed there off and on during parts of the year.

About 1,280 days of recreation presently occur in the area annually due to use by snowmobilers, hikers, climbers, hunters, and cross-country skiers. Snowmobilers skirt the edge of the area near the highway and also enter the Woody Creek area by using the Mohawk Mine road to reach the area's boundary. A site on Woody Ridge was identified in the National Forest Recreation Survey as suitable for development as a downhill ski area but no commercial interest appears to exist. About 480 acres of the area are rated "very high" for locatable minerals potential; the remainder of the area is rated "low." The entire area is rated "low" for oil and gas potential. There is one patented mining claim and no land leased for oil or gas.

Wildlife winter range is not found in the area, although about 60 percent of the area provides big game summer range. Some deer, elk, and bighorn sheep summer in the area. Most of the area--about 1,450 acres--is Situation 1 grizzly bear habitat; the remainder of the area is classified Situation 2.

Visuals for the area are rated as "common," and are best described as "unmodified natural landscape." However, from high in the reef formation some "distinctive" scenery is visible, including a number of high peaks of the Beartooth Range to the south and east.

Table C-11 shows the resource values of 1914.

Table C-11: Roadless Resource Information for #1914 Reef Roadless Area

Value/Resource	Gallatin	N.F.
Gross Acres	2,300	
Net Acres	2,200	
Recreation (RVD's)		
Primitive	0	
Semiprimitive Nonmotorized	200	
Semiprimitve Motorized	1080	
Range		
Suitable Ac.	0	
No. Allotments	0	
AUM's of Use	0	
Timber		
Tentatively Suitable (Ac.)	711	
Standing Volume (MMBF)	5.7	
Wildlife/Fish		
Winter Range Habitat (Ac.)	0	
*Grizzly Situation I (Ac.)	1459	
Species Present	E,D,M,GB	
Stream Fisheries (Mi.)	0.8	
Lake Habitat (Ac.)	0	
Water Developments (No.)	0	
Locatable Minerals (Potential)		
Very High (Ac.)	480	
High (Ac.)	0	
Moderate (Ac.)	0	
Low (Ac.)	1720	
Claims & Patents (No.)	5	
Oil and Gas (Potential)		
Very High (Ac.)	0	
High (Ac.)	0	
Moderate (Ac.)	0	
Low (Ac.)	2,200	
Leased (Ac.)	0	
Lease Applications (Ac.)	0	

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE= Bald Eagle

D. Need

No large population centers are close to this area. Bozeman and Billings are both about 130 miles away. The area is about 50 miles from Cody, Wyoming. Some use of the area comes from the smaller towns nearby, such as Gardiner, Silver Gate, Cooke City, and Red Lodge. Tourism to Yellowstone National Park brings recreationists to the area.

The Reef area is tangent to the North Absaroka Wilderness, less than 1 mile from the Absaroka-Beartooth Wilderness, which lies just across Highway 212 and 3 miles from Yellowstone National Park which is presently proposed for wilderness.

This area has attracted public interest. The Montana Wilderness Association has included the area in their "Alternative W" proposal for wilderness designation. Following the RARE II study, the Forest Service recommended 427 acres of the area (comprising the southern portion of the reef geologic formation within the area) for wilderness. This was visualized as a northern extension of Area 2914 on the Wyoming side. Residents of Cooke City and others with interests in snowmobiling have expressed a strong desire for no additional wilderness in this area.

E. Contributions to the National Wilderness System

The Reef area would contribute about 2/3 of its area to the wilderness system in the form of subalpine fir habitat series. ABLA-PIAL/VASC is best represented. The remainer of the area is rock.

III. Alternatives and Environmental Consequences

A. Management Emphasis By Alternatives

Environmental effects in Roadless Area 1914 will vary depending on which of the alternatives are selected for future management of the area. Table C-12 displays the acreage within the Reef roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Designation: Wilderness
Management Emphasis: Wilderness

All 2,170 acres of Reef are recommended for wilderness in Alternatives 5, 8, and 9. In Alternatives 1 and 4, 400 acres are proposed for wilderness.

A wilderness recommendation for this area would depend on the Shosone National Forest's recommendation for its 16,760 acre portion of the roadless area in Wyoming. The area recommended for wilderness would be an addition to the North Absaroka Wilderness on the Shoshone National Forest. If the Shoshone portion is recommended for wilderness, a 427 acre portion on the Gallatin would be a logical inclusion rather than stopping at the state boundary.

The alternative would preserve the wilderness character of the area. There are patented mining claims in the area that would detract from wilderness, especially if they became active again.

Nonpriced values that are affected are as follows:

- motorized use would be excluded
- public acceptance in the Cooke City area would be low
- minerals development outside the patented claims would be forgone

2. Designation: Nonwilderness
   Management Emphasis: Nonroaded
   Management Prescriptions: Big game, timber

The nonroaded prescriptions vary from 2,170 acres to 1,300 acres in the nonwilderness alternatives. This type of management would continue current uses. No timber management would take place.

Some of the nonpriced values affected are:

- the roadless resource would be retained
- the wilderness character would be maintained
- minerals development would be more available
- recreation opportunity would be more diverse

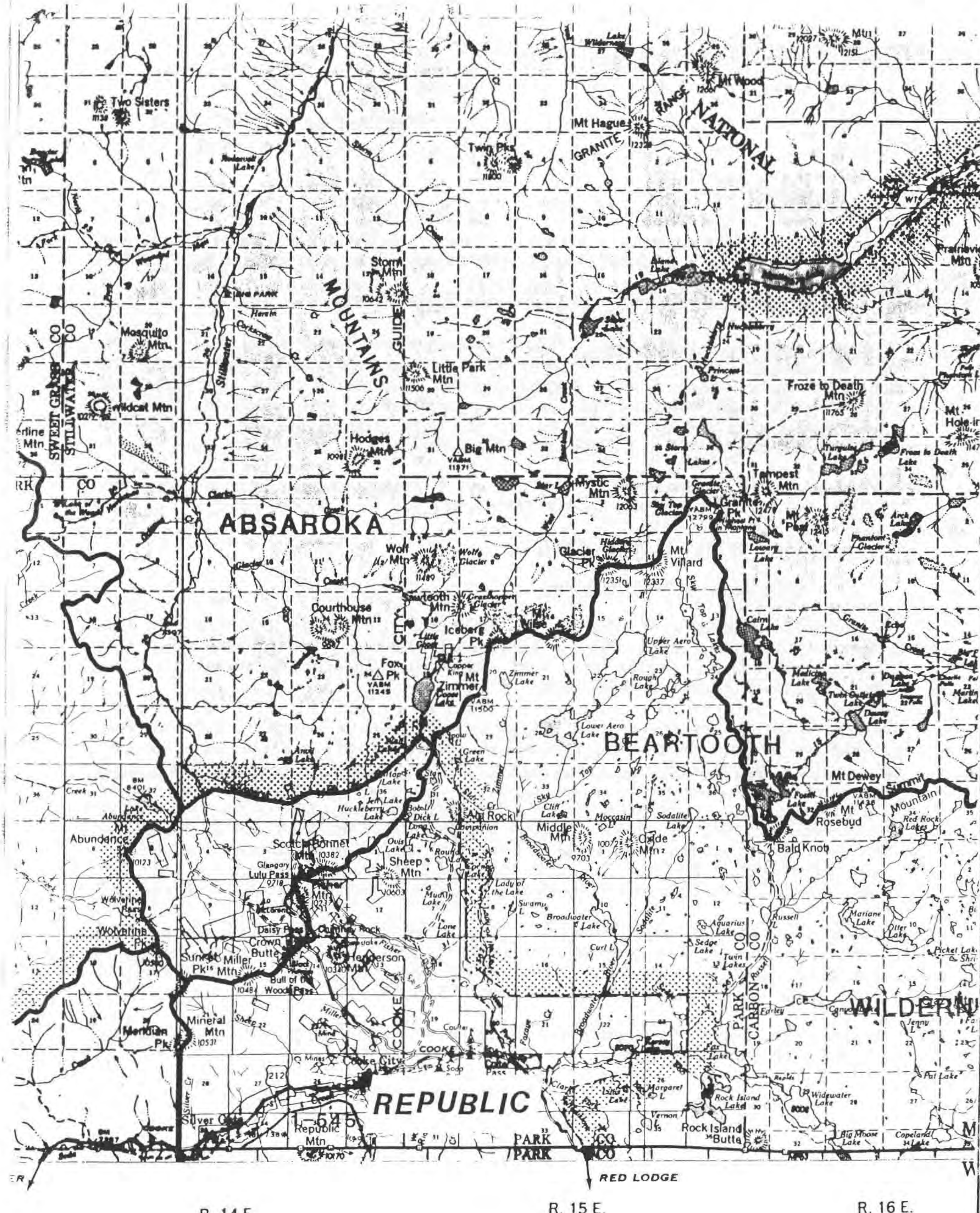
3. Designation: Nonwilderness
   Management Emphasis: Roaded
   Management Prescriptions: Big game, timber

Six alternatives assign 400 acres to roaded prescriptions. This represents the amount of suitable timber land that would be roaded. Approximately 3.2 MMBF of standing volume would be available for harvest.

Some nonpriced values affected are:

- habitat diversity would be increased,
- greater accessibility to the area would occur
- grizzly security would decrease
- minerals development would be more available
- some wilderness value would be lost

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	0.4	0.4	0	0	0	0	0	0	0	0	0	0.4
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0.4	0	0	0.4	0	0	0.4	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	0.9	0	0	0	0	0	0	0	0	0
Dispersed Rec/ Wildlife	1.4	1.8	1.4	1.4	0	2.2	2.2	0	0	1.8	1.3	0
Livestock Range	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Level	0	0	0	0	0	0	0	0	0	0	0	2.2
WILDERNESS--	0.4	0	0	0.4	2.2	0	0	2.2	2.2	0	0	0
SUMMARY												
Developed -												
Decade 1	0	0	0	0	0	0	0	0	0	0		
Decade 2	0	0	0	0	0	0	0	0	0	0		
Roadless -												
Decade 1	1.8	2.2	2.2	1.8	0	2.2	2.2	0	0	2.2		
Decade 2	1.8	2.2	2.2	1.8	0	2.2	2.2	0	0	2.2		
Wilderness -	0.1	0	0	0.4	2.2	0	0	2.2	2.2	0		
TOTAL ACREAGE -	2.2											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Mt Hague
GRANITE
RANGE
NATIONAL
Twin Pks
Storm Mtn
MOUNTAINS
GUIDE
Mosquito Mtn
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Wildcat Mtn
SWEET GRASS CO
STILLWATER CO
Hodges Mtn
Big Mtn
Prairieview Mtn
Froze to Death Mtn
Mt Hole-in
Tempest Mtn
Mystic Mtn
Granite Pk
Mt Peal
ABSAROKA
Wolf Mtn
Glacier Pk
Mt Villard
Courthouse Mtn
Sawtooth Mtn
Iceberg Pk
Fox Pk
Zimmer
Upper Aero Lake
Rough Lake
Lower Aero Lake
BEARTOOTH
Mt Dewey
Summit
Mountain
Mt Rosebud
Bald Knob
Abundance
Scotch Bonnet Mtn
Lulu Pass
Sheep Mtn
Middle Mtn
Oxide Mtn
Broadwater Lake
Wolverine Pk
Daisy Pass
Crown Butte
Sunset Pk
Miller Mtn
Henderson Mtn
Bull of the Woods Pass
Mineral Mtn
Meridian Pk
CITY
COOKE
Cooke City
PARK CO
CARBON CO
WILDERN
REPUBLIC
Republic Mtn
Silver Gate
Rock Island Lake
Rock Island Butte
PARK
CO
RED LODGE
R. 14 E.
R. 15 E.
R. 16 E.

REPUBLIC MOUNTAIN ROADLESS AREA (1545)

Acreage:		Gross Acres	Net Acres
	Gallatin N.F.	700	700

I. DESCRIPTION

This small roadless area is a possible annex to the North Absaroka Wilderness which borders it on the south. Area 1545 includes the north slope of Republic Mountain but does not include the summit of the mountain. The sight of 10,179-foot Republic Mountain dominates the area visually.

Much of the area is quite steep. Elevation increases about 2,000 feet from the area's northern border near Highway 212 to the southern border along the Montana-Wyoming State line. Rugged terrain, including talus slides, deep ravines, and spur ridges, typifies the approaches to the mountain. Gentler topography prevails near the highway to the north and on the east side of the area along Republic Creek. This fringe contains most of the area's tree cover.

The area is just southwest of Cooke City, Montana, and is well accessed by Highway 212 on the north and by the Irma Mine jeep road on the east.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The Republic area is wild, rugged, and retains its primeval character. It is a comparatively small area, but is significant in that classification of this area as wilderness would lend more consistent natural boundaries to the adjoining North Absaroka Wilderness.

Natural integrity of the area is affected by old mine workings in a few places, generally in the form of exploration pits, drill holes, and the like. An arm of private land causes an irregularity in the boundary from the east; this intrusion shows evidence of minerals activity and includes a mine adit and an old milling site. Generally, impacts from previous mining are confined to the flatter areas along the north and east boundaries of the area and do not extend to the steeper slopes. These affected areas could be separated to leave an unaffected core. The area contains one water transmission line on the west side, but the course of the line is well vegetated and not visually obtrusive.

Natural appearance is impaired very little. The nearby highway is evident from most of the area. The community of Cooke City is visible from parts of the area and is located only about 1/2 mile from the boundaries. The community of Silver Gate is visible about 1/2 mile west of the area.

The area can meet size criteria for wilderness consideration because it adjoins the North Absaroka Wilderness.

Recreation use is probably not more than 250 RVD's per year. The area has no trail system and no recreational destination points, such as lakes. There is some casual hiking use and some mountain climbing. The entire area is classified as suitable for semiprimitive nonmotorized recreation; the proximity of the Beartooth Highway eliminates the possibility of primitive recreational classification.

Opportunity for solitude is limited by the proximity of the Beartooth Highway and the visibility of neighboring towns. Mountain climbers would encounter a degree of challenge and risk in attempting the mountain's north slope. The presence of Situation 1 grizzly bear habitat would also lend challenge and risk to most outdoor activities conducted in this area.

B. Manageability

The area would be managed as part of the North Absaroka Wilderness if it were ever to be designated wilderness. The penetration of private land from the east has resulted in boundary adjustments which leave a thin tongue of National Forest land at the area's northeast corner. This portion of the boundary might be adjusted to enhance manageability. There are no inholdings of private land within the boundaries.

C. Resource Values

There is no commercial forestland within this area, and no livestock grazing. Resource values are summarized in Table C-13.

Three unpatented mining claims are located within the area. The entire area is rated "very high" for locatable minerals. The entire area is rated "low" for oil and gas potential.

The entire area is classified for Situation 1 management of the grizzly bear, which means that it receives frequent use by these bears. The area contains some elk, bighorn sheep, mule deer, and moose summer range. There are no lakes and fishery streams.

The area has high scenic values. Republic Mountain is the predominant scenic feature as seen from Cooke City. It is a very massive mountain in appearance, with upper reaches of rugged, sheer rock faces. It never completely loses its snow even in August.

D. Need

The Republic area is about 1/2 mile from the small communities of Silver Gate and Cooke City. It is about 50 miles from Cody, Wyoming, and about 130 miles from both Bozeman and Billings, Montana. Some visitors to the area might be expected from among the large numbers of tourists who travel the Beartooth Highway to and from Yellowstone National Park. The Republic area is tangent to the North Absaroka Wilderness, about 3 miles from the Absaroka-Beartooth Wilderness, and about 1 mile from Yellowstone National Park which has been proposed for wilderness.

Table C-13: Roadless Resource Information for #1545 Republic Roadless Area

Value/Resource	Gallatin N.F.
Gross Acres	700
Net Acres	700
Recreation (RVD's)	
Primitive	0
Semiprimitive Nonmotorized	250
Semiprimitve Motorized	
Range	
Suitable Ac.	0
No. Allotments	0
AUM's of Use	0
Timber	
Tentatively Suitable (Ac.)	0
Standing Volume (MMBF)	0
Wildlife/Fish	
Winter Range Habitat (Ac.)	0
*Grizzly Situation I (Ac.)	700
Species Present	E,BH,D,GB
Stream Fisheries (Mi.)	0
Lake Habitat (Ac.)	0
Water Developments (No.)	1
Locatable Minerals (Potential)	
Very High (Ac.)	550
High (Ac.)	0
Moderate (Ac.)	150
Low (Ac.)	0
Claims & Patents (No.)	3
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	0
Low (Ac.)	700
Leased (Ac.)	0
Lease Applications (Ac.)	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE= Bald Eagle

Interest has been expressed in this area by the public. The Montana Wilderness Association has advocated wilderness designation for the area, including it in their "Alternative W" proposal. For RARE II, 480 acres of the area were recommended by the Forest Service as an extension of the North Absaroka Wilderness. However, the weight of opinion from residents of the immediate area (i.e., Silver Gate, Cooke City, and Red Lodge) is against additional wilderness in the area. This is partly because wilderness designation closes areas to snowmobiling, which is very popular in the area.

E. Contributions to the National Wilderness System

The Republic roadless area would enhance the manageability of the North Absaroka Wilderness as an addition by including all of Republic Mountain in that wilderness. At present, half the mountain is in wilderness and half is not.

In terms of habitat types, this area would contribute aobut 70 percent of its area in alpine fir types, with ABLA-PIAL/VAS the predominant series. The remainder of the area is rock.

III. ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1545 will vary depending on which of the alternatives are selected for future management of the area. Table C-14 displays the acreage within the Republic roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

Alternatives 1, 4, 7, and 10 recommend 480 acres of Republic as wilderness. Alternatives 5, 8, and 9 propose the entire area as wilderness.

The area is adjacent to the North Absaroka Wilderness on the Shoshone National Forest in Wyoming. It is separated only by the State boundary. It would make a logical extension to that wilderness area.

Nonpriced values affected are:

- the manageability of the present wilderness boundary would be improved
- the wilderness character would be preserved
- grizzly security would be maintained
- minerals development would be foregone

Table C-14: Management Emphasis for Roadless Area 1545 Republic Mountain by Alternatives

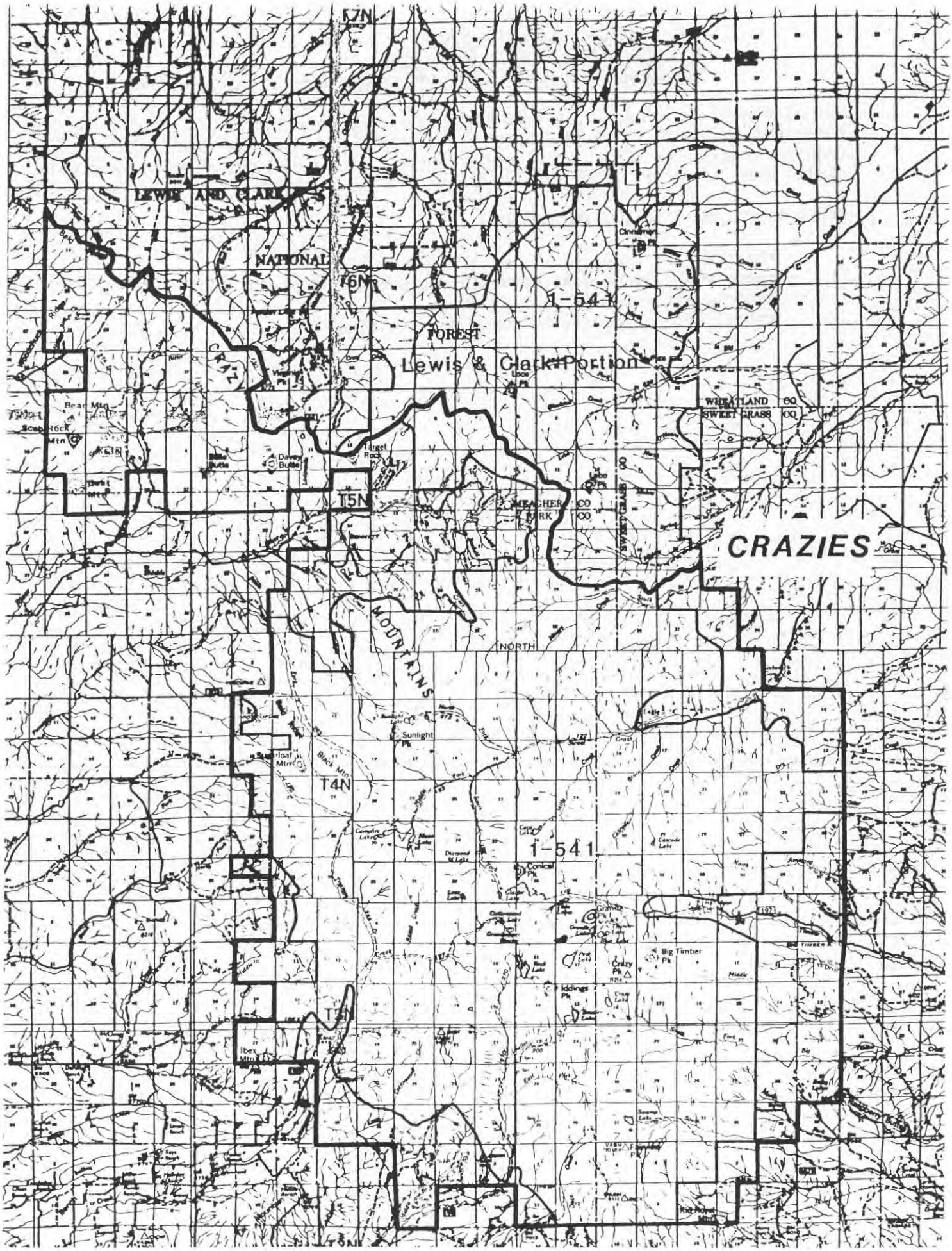
Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	0	0	0	0	0	0	0	0	0	0	0	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0	0	0	0	0	0	0	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	0.5	0	0	0	0	0	0	0	0	0
Dispersed Rec/ Wildlife	0.2	0.7	0.2	0.2	0	0.7	0.2	0	0	0.2	0.7	0
Livestock Range	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Level	0	0	0	0	0	0	0	0	0	0	0	0.7
WILDERNESS--	0.5	0	0	0.5	0.7	0	0.5	0.7	0.7	0.5	0	0
SUMMARY												
Developed -												
Decade 1	0	0	0	0	0	0	0	0	0	0		
Decade 2	0	0	0	0	0	0	0	0	0	0		
Roadless -												
Decade 1	0.2	0.7	0.7	0.2	0	0.7	0.2	0	0	0.2		
Decade 2	0.2	0.7	0.7	0.2	0	0.7	0.2	0	0	0.2		
Wilderness -	0.5	0	0	0.5	0.7	0	0.5	0.7	0.7	0.5		
TOTAL ACREAGE -	0.7											

2. Designation: Nonwilderness
Management Emphasis: Nonroaded
Management Prescription: Dispersed Recreation/Wildlife

The alternatives which do not recommend the area to wilderness, propose it for nonroaded emphasis. The only resource contained in the area which would require roading is a potential for minerals. If development of some of the claims were to occur, some loss of the wilderness character would occur.

Other nonpriced values affected are:

- the roadless resource would be maintained
- there would be greater diversity of recreation
- water quality would be maintained
- grizzly habitat security would be maintained



T7N
LEWIS AND CLARK
NATIONAL
T6N
1-541
FOREST
Lewis & Clark Portion
CRAZY
Bear Mtn
Scab Rock Mtn
Davey Butte
Target Rock
T5N
MEAGHER CO
PARK CO
WHEATLAND CO
SWEET GRASS CO
CRAZIES
MOUNTAINS
NORTH
Sunlight Pk
Black Mtn
T4N
1-541
Conical Pk
Big Timber Pk
Crazy Pk
Iddings Pk
T3N
Ibex Mtn

CRAZY MOUNTAINS ROADLESS AREA (1541)

	Gross Acres	Net Acres
Gallatin NF	107,647	70,498
Lewis & Clark NF	28,900	26,600
	136,547	87,098

I. DESCRIPTION

The Crazy Mountains are an isolated range which rises abruptly from rolling ranchlands on the east and south. To the west the mountains overlook the Shields River Valley. The peaks have been deeply carved by past glacial action and present a jagged, rocky profile. The highest of the central core of peaks is 11,214-foot Crazy Peak. Most ofthe Crazy Mountains Roadless Area is located on the Gallatin National Forest, with part of the area on the Lewis and Clark National Forest.

Area 1541 is popular with hikers and backpackers who enjoy rugged, challenging terrain. Snowmobiling and motorbiking also take place in the area. High mountain lakes with fishing are a popular destination of recreationists. The periphery of the area includes a small amount of foothills on the Gallatin, and somewhat more on the Lewis and Clark.

The roadless area begins 20 miles north-northeast of Livingston, Montana, and 15 miles northwest of Big Timber, and extends about 25 miles northward. The north-facing slopes at the lower elevations are timbered with lodgepole pine and spruce. Douglas-fir is also common. South-facing slopes tend to be either sparsely timbered or covered with grass and brush. The interior of the area is high elevation grassland/rock with pockets of timber.

Road access to the boundaries of this area is limited. The boundaries of 1541 can be reached via the Cottonwood Road from the west and the Big Timber Canyon Road from the east. The area can also be accessed from the Rock Creek Trail, the Porcupine Guard Station, or the Shields River road system. However, the few access points available are not adequate for an area this size. The northern horn of the area under management by the Lewis and Clark National Forest is also poorly accessed; access is limited to a few 4-wheel drive roads.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The Crazy Mountains are presently unaffected to any extent by man's activities except for some livestock grazing. Natural appearance is nearly pristine in most of the area. The area "retains its primeval character and influence, without permanent improvements or human habitation" (Wilderness Act). The area retains a natural appearance; a visitor would find little evidence of man's influence within the boundaries of the area. The size and the shape of the 1541 area is conducive to solitude and to good opportunities for primitive recreation.

Natural integrity at present is mostly unimpaired, but may be affected in future years. A low-standard road to access private land has been constructed in the Cottonwood Creek drainage on the west side of the area. Numerous other private inholdings throughout the area may require further access roading in the future. About 80 acres of trespass timber cutting has occurred adjacent to the roadless area boundary near Sugarloaf Mountain. The Lewis and Clark portion has a few miles of jeep road on private sections, plus some livestock improvements within the boundaries.

Most of the area would meet all criteria for primitive recreation if the area were to be managed as wilderness. Some areas close to roads on the fringes of the area would be classed as suited for semiprimitive nonmotorized recreation.

Activities popular in the area fall into the primitive and semiprimitive categories and include hiking, backpacking, horseback use, fishing the high lakes, and hunting. A considerable amount of motorized use by snowmobiles and motorbikes is also taking place in the area. For example, the trails to Rock, Campfire, and Cottonwood lakes are popular with motorized users. Much of this is motorbike use but there is also snowmobile use. Big game hunting and bird hunting are the chief activities taking place on the Lewis and Clark segment.

Opportunities for solitude are unimpaired in the core of the area except for the upper Shields River area. Moderate to heavy levels of recreational use occur in more easily accessed and popular places, such as areas near Big Timber canyon or camping sites near the more popular lakes.

Natural appearance of the area is mostly unimpaired. Because the area is approximately 11 miles across for most of its length, the sights and sounds of human activities outside the area do not intrude. The rugged terrain also provides topographic screening. No towns or other centers of development are easily seen from much of the area. The Cottonwood Creek and Big Timber Canyon roads could offer some impact of disturbing sights and sounds when in use. Also some mining activity has been taking place close to the area's southeast boundary near Big Timber Canyon, and can be expected to continue off and on in future years. Unpatented mining claims within the area could possibly be developed in future years. Some of the many private inholdings could some day be used for summer homes or other development. Livestock grazing activity is very apparent on the low grasslands of the Lewis and Clark National Forest, and also in the Twin Lakes area at the headwaters of Big Timber Canyon.

Big game populations add to the appeal of the area for recreationists. Elk, mule deer, and mountain goats are found in the area. The Crazy Mountains also contain some distinctive geologic features, including results of glaciation, such as arretes and high cirque lakes. The area also offers a good example of an uncommon geologic feature termed "radiating dikes."

B. <u>Wilderness Manageability</u>

The chief impediment to the area's manageability as wilderness is the presence of 49,449 acres of private land within the boundaries. These private lands occur in a checkerboard pattern that traces back to old 19th century railroad grants. This land is owned by many different individuals and its plurality of ownership would render any future efforts for land exchange very difficult.

The shape of the area, most of which is roughly oval, would lend itself to manageability. The integrity of the area is good; no roads or corridors split the area or otherwise impede management except for some penetration of the Cottonwood Creek road from the west side. Boundaries would have to be located using surveyed lines rather than using topographic features.

The re-inventory of the roadless area done in 1983 eliminated 893 acres because of existing timber sales and roads that had been built to access private land.

C. Resource Values

Area 1541 contains 24,789 National Forest acres inventoried as capable of timber production, with a standing inventory of 172.7 MMBF. About 28 MMBF of this timber is on the Lewis and Clark portion. The area also contains 4,555 acres of suitable livestock range in permitted grazing allotments, with current use amounting to 1,463 AUM's. Of this grazing, 1,427 suitable acres occur on the Lewis and Clark portion in six allotments, producing 600 AUM's use annually. The present management policy on the Gallatin is to retain the unroaded character of the higher elevation lands. Lower, more productive lands are being managed to minimize creation of open roads.

About 74,600 acres of the National Forest portion of the area are leased for oil and gas development and another 2,000 acres are under lease application. Most of the private ownership has been leased for oil and gas. Most of the area is rated moderate or high for oil and gas potential and low for locatable minerals potential. There are presently about 80 unpatented mining claims presently exist within the area, with the prospect of more in future years.

Little big game winter range exists within the area. A population of mountain goats resides in the area year long. Only about 1300 acres of elk and mule deer winter range are within the boundaries of this area. Of this, 940 acres are along the northeastern border of the Lewis and Clark portion between Bear Springs and Cinnamon Springs. Generally, the big game animals summer in the area and move out to lower elevation lands to winter.

About 17 percent of the estimated 25,000 RVD's of recreation that now take place annually are classified as primitive, and about 77 percent are classified as semiprimitive nonmotorized. Area 1541 contains 48 miles of fishery streams on National Forest lands. The area has 14 named lakes with fisheries.

Scenic values of the area are part of its appeal to recreationists. Presently, impacts to the visuals from human activities are unnoticed or nonexistent.

Resource values for this area are displayed in Table C-15.

D. Need

The nearest wilderness to the Crazy Mountains is the Absaroka-Beartooth, about 24 miles away. The area is also about 54 miles from the newly created Lee Metcalf Wilderness. Yellowstone National Park is about 62 miles from the area.

Table C-15: Roadless Resource Information for #1541 Crazy Roadless Area

Value/Resource	Gallatin N.F.	LEWIS & CLARK N.F.
Gross Acres	107,647	28,900
Net Acres	70,498	16,600
Recreation (RVD's)		
Primitive	4,300	0
Semiprimitive Nonmotorized	19,400	1,000
Semiprimitve Motorized	1,300	800
Range		
Suitable Ac.	3,128	1,327
No. Allotments	6	16
AUM's of Use	863	600
Timber		
Tentatively Suitable (Ac.)	21,091	4,489
Standing Volume (MMBF)	146.9	28.3
Wildlife/Fish		
Winter Range Habitat (Ac.)	360	940
*Grizzly Situation I (Ac.)	0	0
Species Present	E,D,MG	E,D
Stream Fisheries (Mi.)	40	8
Lake Habitat (Ac.)	152	0
Water Developments (No.)	0	5
Socatable Minerals (Potential)		
Very High (Ac.)	0	0
High (Ac.)	0	0
Moderate (Ac.)	2,880	0
Low (Ac.)	67,267	16,000
Claims & Patents (No.)	30	0
Oil and Gas (Potential)		
Very High (Ac.)	0	0
High (Ac.)	16,152	0
Moderate (Ac.)	47,840	0
Low (Ac.)	6,155	16,600
Leased (Ac.)	70,498	4,100
Lease Applications (Ac.)	2,000	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE= Bald Eagle

The Crazy Mountains are about 20 miles from Livingston and Big Timber, Montana, about 40 miles from Bozeman, and about 100 miles from Billings. The area is about 130 miles from Butte.

A number of individuals and groups have expressed concern about the future management of Area 1541. The chief issue centers around management for recreation versus possible future development and roading. Other issues involve need for improved public access and some conflict between semiprimitive nonmotorized and motorized recreationists. Individuals and groups interested in additional wilderness for this area have supported wilderness designation for the Crazies. For instance, the area has been advocated for wilderness under Alternative W as proposed by the Montana Wilderness Association.

Over 250 people commented on the Crazies during public comment period for the proposed Forest Plan. Most of that input was for wilderness designation for the Crazies. Other comments expressed concern about development and roading of the area.

E. Contributions to the National Wilderness System

Area 1541 would contribute the following habitat types to the National Wilderness System:

1. Alpine fir series (chiefly ABLA-PIAL/VAS and ABLA/VAGL), about 45,000 acres.

2. Douglas-fir series (Chiefly PSME/SYAL-CAR), about 8,000 acres.

3. Grasslands (chiefly MTN GRASSLANDS and MTN MEADOWS), about 14,000 acres.

The remainder of the National Forest System acreage in the area tends to be rocklands or scattered small pockets of other habitat types.

III. ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

A. Management Prescription Assignment by Alternatives

Environmental effects on Roadless Area 1541 will vary depending on which of the alternatives are selected for future management of the area. Table C-16 displays the acreage within the Crazy roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

The area is managed by both the Gallatin National Forest and the Lewis and Clark National Forest. Alternatives were developed for both portions of the roadless area which were common to each other.

The Lewis and Clark alternatives which correspond to the Gallatin alternatives are as follows:

Gallatin Alternatives	1	2	3	4	5	6	7	8	9	10
Lewis & Clark Alternatives	Current	A	C,D	B,E	H,K	F,I,J	G	H,K	H,K	G

Table C-16. Management Emphasis for Roadless Area 1541 Crazy Mountains by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	20.5	21.3	4.4	17.9	0	1.5	11.5	0	0	11.5	17.9	0
	(1.7)	(3.2)	(2.9)	(4.1)			(7.3)			(7.3)		
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0	0	0	0.1	0	0	0.1	0	0
							(0.3)			(0.3)		
NONROADED--												
Dispersed Rec/ Nonroaded	0	37.5	38.5	39.2	0	42.5	25.9	0	0	25.9	39.2	0
		(1.7)	(2.7)	(0.9)		(2.7)						
Dispersed Rec/ Wildlife	5.7	10.0	26.9	7.6	0	19.5	7.7	0	0	7.7	7.6	0
	(2.0)	(4.9)	(3.2)	(1.6)		(2.1)	(2.0)					
Livestock Range	12.8	6.2	4.9	8.2	0	7.6	9.0	0	0	9.0	8.2	0
	(4.9)	(3.8)	(3.2)	(4.9)		(5.1)	(4.8)			(4.8)		
Minimum Level	48.1	12.1	12.4	14.2	0	15.9	32.9	0	0	32.9	14.2	70.5
	(8.0)	(3.0)	(4.6)	(5.1)		(7.1)	(2.2)			(2.2)		
WILDERNESS--	0	0	0	0	87.1	0	0	87.1	87.1	0	0	0
						(16.6)		(16.6)	(16.6)			
SUMMARY												
Developed -												
Decade 1	11.7	11.7	0	11.7	0	0	7.1	0	0	7.1		
Decade 2	11.7	11.7	0.8	11.2	0	0	7.1	0	0	7.1		
Roadless -												
Decade 1	58.8	58.8	70.5	59.3	0	70.5	63.4	0	0	63.4		
Decade 2	58.8	58.8	70.5	59.3	0	70.5	63.4	0	0	63.4		
Wilderness -	0	0	0	0	70.5	0	0	70.5	70.5	0		
TOTAL ACREAGE -	70.5											

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

All of Roadless Area 1541 is recommended for wilderness in Alternatives 5, 8, and 9. No other alternatives propose the area for wilderness.

Wilderness disignation would protect the area from additional roading or development. Use of motorized trail vehicles, such as motorbikes or snowmobiles, would cease within the area's boundaries.

The 24,789 acres of capable timberlands within the area would not be accessed or harvested. Timber killed by the mountain pine beetle could not be salvaged. Downfall following the peaking of the mountain pine beetle epidemic could block trails and impede the movement of big game. Fire hazards would increase in timber stands following the pine beetle epidemic.

Livestock grazing use would be allowed to continue under wilderness designation. No new range improvements would be allowed but existing improvements could be maintained. Maintenance would have to be accomplished without the use of motorized vehicles or equipment.

Oil and gas exploration or development would not be allowed and new leases would not be issued. The 30 mining claims within the area could still be developed if commercial minerals potential were established, but no additional exploratory work could take place.

Wildlife habitat would not be significantly affected under a wilderness prescription since little big game winter range presently exists in the area. Opportunities for increasing habitat variety, such as by timber harvest or prescribed fire, would be foregone. Harassment of wildlife would be reduced due to the elimination of motorized traffic. Hunting would still be allowed. Habitats would change only through natural ecological succession.

Primitive recreational opportunities would increase slightly, particularly in areas adjacent to trails presently receiving motorized use.

A major land acquisition program would be needed to bring the 49,449 acres of private inholdings in the checkerboard into Federal ownership. Because there are over 30 owners of the private inholdings, acquisition of all private lands within the boundaries could pose difficulties. It is likely that some of the private landowners would be unwilling to sell their properties. The existing oil and gas leases on private and public lands in the area are pre-existing valid contracts and could not be waived if the lease owners wanted to explore for and develop oil or gas. The roaded corridor located in the Cottonwood drainage would likely remain and continue to impact wilderness values even after wilderness designation of the area.

Other nonpriced benefits would be affected as follows:

- Diversity of recreation opportunity would be somewhat reduced since wilderness designation would curtail some kinds of use now being enjoyed.

- Existing visual conditions would be maintained and man's activities would be unnoticed by the average visitor.
- Wilderness would increase.
- Existing elk security would be maintained.
- Diversity would tend towards old-growth, but could be improved by letting fire play a more natural role.
- Water quality and fisheries would be maintained at their present levels.

2. Designation: Nonwilderness
Management Emphasis: Nonroaded
Management Prescriptions: Minimum level, dispersed recreation/ wildlife, dispersed recration nonroaded, and range

All alternatives, except Alternatives 5, 8, and 9, would assign a large percent of the Crazy Mountains Roadless Area to range, wildlife, dispersed recreation, and minimum level management under a roadless designation. Alternative 3 awards most of the area to roadless management.

Management for range, wildlife, wildlife/range, and minimum management would not effect the wilderness attributes. These management prescriptions limit new road construciton. Since there would be no roads and scheduled timber harvest, there would be no long term changes in the wilderness attributes in much of the area. The area would be open to mineral entry with the use of standard stipulations to protect other resources. Mineral development would affect the wilderness attributes.

The nonpriced costs and benefits are as follows:

- Existing visual conditions would change and man's activities might be noticed by the average visitor.
- Semiprimitive and wilderness attributes would be retained.
- Elk security would be maintained.
- Age class distribution and diversity would be dominated by old-growth; young age classes would be minimal.
- Water quality and fisheries would not be affected.

3. Designation: Nonwilderness
Management Emphasis: Roaded
Management Prescriptions: Recreation roaded, big game, and timber

All alternatives, except 5, 8, and 9, assign some of the Crazy Mountains Roadless Area to timber management. Under Alternative 1, 2, 3, 4, and 7 between 25 and 38 percent of the area would be developed. Alternative 6 develops 2 percent of the area.

Timber management would forego the possibiity of wilderness disignation. Lodgepole pine and Douglas-fir stands would be accessed with roads and harvest would be scheduled starting the first decade. About 3,100 acres would be developed during the first decade. About 84,000 acres would be available for wilderness re-evaluation during the next planning period.

Timber harvest in the Crazy Mountains could be shifted to other parts of the Lewis and Clark and Gallatin National Forests.

The nonpriced costs and benefits are as follows:

- Existing visual conditions would change and man's activities might dominate portions of the landscape.
- Semiprimitive recreation opporunities would be foregone by the end of the fifth decade in a portion of the area.
- Wilderness characteristics would also be compromised on the developed areas within 50 years.
- Elk security would be reduced due to roading and timber harvest, but forage for elk and cattle would be optimized.
- Diversity would tend towards younger age classes, with less mature trees.
- Water quality and fisheries would be affected slightly by roading and timber harvest.
- These alternatives would provide for the greatest number of jobs, mainly in the wood products industry.

Economic and social effects would not be significant since about 2 percent of the Forest's suitable timber base and about 2 percent of the land suitable for wilderness occurs in this roadless area.

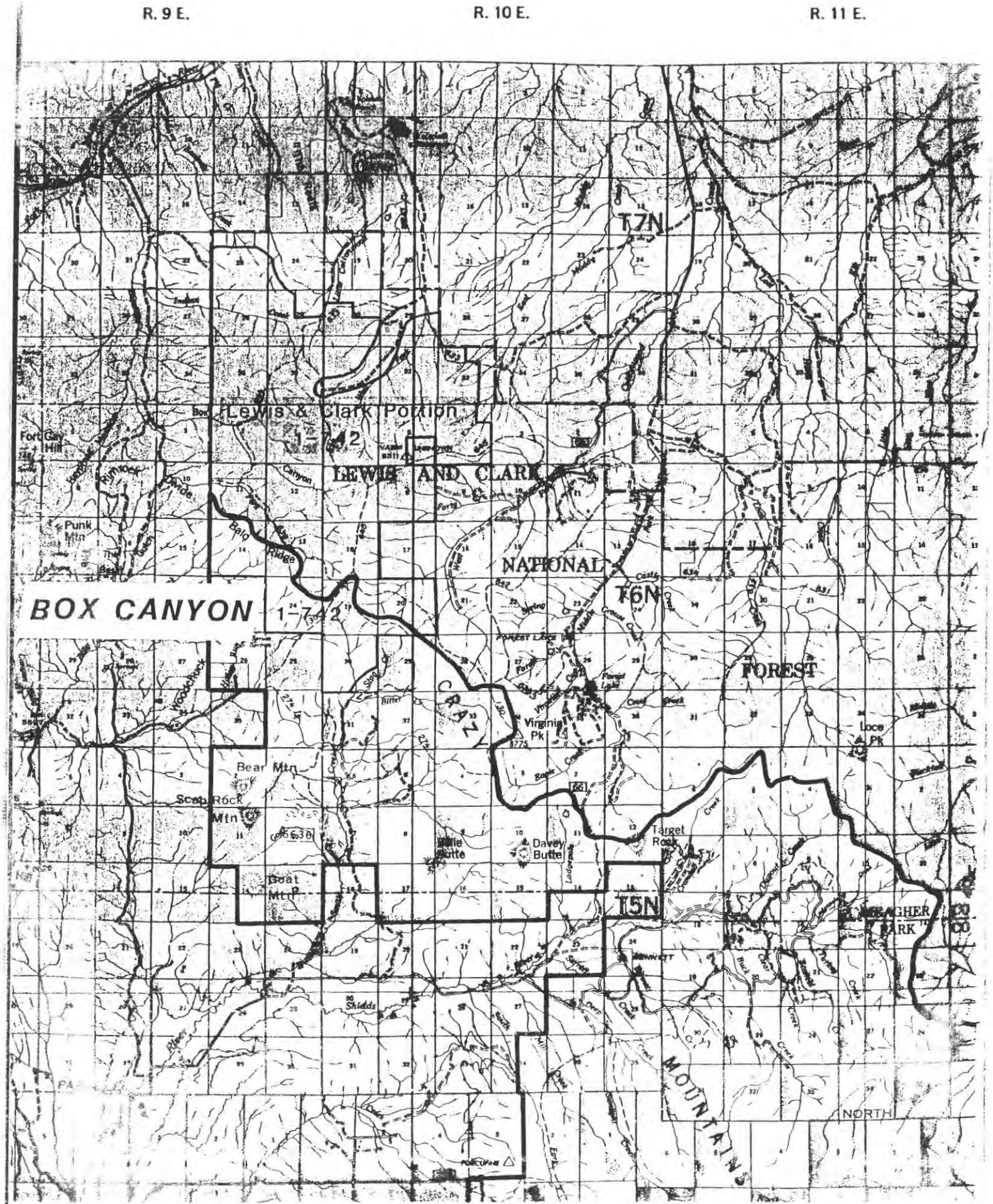
4. **Designation: Developed**
Management Emphasis: Range, Wildlife, Range/Wildlife, and Minimum Level

All alternatives except 5, 8, and 9 assign some of the Crazy Mountains Roadless Area to range, wildlife, and minimum level management.

Because part of the roadless area would be developed for timber management purposes, the above prescriptions would be carried out in a developed environment. Under these prescriptions there would be additional range improvements and burning to increase forage production.

The nonpriced costs and benefits of this management are:

- Existing visual conditions would change and man's activities could dominate portions of the landscape.
- Semiprimitive and wilderness attributes would be foregone on the developed areas in 50 years.
- Elk security would be reduced, but forage for elk and cattle would be optimized.
- Water quality and fisheries would be affected, but not substantially.


R. 9 E.
R. 10 E.
R. 11 E.
T7N
Lewis & Clark Portion
1-742
LEWIS AND CLARK
NATIONAL
FOREST
T6N
BOX CANYON
1-742
Fort Gay Hill
Punk Mtn
Bald Ridge
Virginia Pk
Loco Pk
Bear Mtn
Scab Rock Mtn
Davey Butte
Target Rock
Goat Mtn
T5N
MEAGHER PARK
MOUNTAINS
NORTH

BOX CANYON ROADLESS AREA (1742)

	Gross Acres	Net Acres
Lewis and Clark N.F.	10,740	9,900
Gallatin N.F.	2,180	1,747
	12,920	11,647

I. DESCRIPTION

The Box Canyon Roadless Area is in the northwest corner of the Crazy Mountains of south central Montana. This area is about 20 air-miles southeast of White Sulphur and 40 miles north of Livingston, and is located in Meagher County. The northern portion of the area, on the Lewis and Clark National Forest, has no public access. Access from the south, from the Gallatin National Forest, is by the Sixteen Mile Road. A primitive private road penetrates the Forest boundary on the north side. Other two wheel track roads cross private land to reach the Forest. Access by trail also crosses private land, with no public right-of way.

The Crazies are in two National Forests--the north half is in the Lewis and Clark and the south half in the Gallatin National Forest. The Box Canyon Roadless Area is also in both Forests.

Most of the northern portion is in Federal ownership. However, the southern part has checkerboard ownership--Federal, private ownership alternating by section--which is typical of most of the Crazies.

The northern and western boundaries are the proclaimed Forest boundaries. Checkerboard ownership within the Forest's proclaimed boundary are along the south and east boundaries. The area bordering the forest boundary is agricultural land used for livestock, grazing, and wheat farming.

Elevations range from 6,000 to 8,500 feet. The roadless area is mainly one ridge running north-south, with deeply incised canyons dropping to the east and west. Most of the canyon bottoms have intermittent streams.

The higher elevations are broad open ridges with stringers of Douglas fir and lodgepole pine on the north slopes and in the draws. Most of the timber is of commercial size, but it is scattered and low quality for harvest. Most of the south facing slopes are grassland and sagebrush slopes.

Most recreation use in the area is from hunters and snowmobilers. However, use is restricted because of poor public access.

About one-third of the area is used for cattle grazing. There is a moderate potential to increase AUMs by increasing the size of existing allotments.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

The natural integrity and appearance of the area is disturbed by cattle grazing with its ensuing developments and by about 3 miles of low-standard road to access private land. The Colstrip powerline runs east to west adjacent to the northern boundary. Towers on the utility corridor stand 100 feet tall and are visible for several miles.

The private land to the east and south has been developed mostly through timber harvest. Because of the landform and vegetation, the development of adjacent private agricultural and timber land is visible.

The solitude one could find in the area is compromised by adjacent development which is visible from most openings at the higher elevations. The steep canyons are isolated, but overall the area is visible to and influenced by outside development. A primitive road, which only has private access, cuts north-south through the area.

There is little opportunity for primitive recreation because the terrain gives little challenge to the hiker, nor does the area have unique or spectacular scenery. The major primitive recreation opportunity is big game hunting.

B. Manageability

Box Canyon Roadless Area is a contiguous parcel, but about half of it is in cherkerboard ownership. Most of the boundaries follow surveyed section lines which would be easy to locate.

The amount and distribution of private land makes it unmanageable to exclude the private land and keep any roadless area. One hundred twenty acres of the Gallatin National Forest's portion of the roadless area was deleted in the 1983 re-inventory because of an existing road.

C. Resource Values

Hunting and snowmobiling are the major recreation uses. However, no public access limits use of the area.

About four miles of brook trout fishery are present. The area provides habitat for elk, mule deer, whitetail deer, moose, black bear, and grouse. Nearly a third of the northern half of the area is elk winter habitat.

Cattle allotments cover about one-third of the roadless area. Four permittees graze cattle in two allotments. There are 13 spring improvements and about four miles of fence.

About a third of the Forest land is suitable for growing timber, with 33 million board foot standing volume. Principle limitations to harvest are steep slopes, low quality timber sites, and necessary coordination with wildlife needs. The area is capable of a harvest of 0.36 million board feet annually.

The area contains some of the headwaters of the main fork of the Musselshell River which is the source for Martinsdale Reservoir. This is a key reservoir for irrigation and fisheries.

The area has a high potential for oil and gas. Three large anticlines present under the volcanic cover may contain significant volumes of hydrocarbons. The entire area is leased for oil and gas exploration and development. The potential for metallic minerals is low.

Table C-17: Roadless Resource information for 1742 Box Canyon Roadless Area

Value/Resource	Gallatin N.F.	Lewis and Clark N.F.
Gross Acres	2,180	10,740
Net Acres	1,747	9,900
Recreation (RVDs)		
Primitive	0	0
Semi-primitive nonmotorized	0	800
Semi-primitive motorized	100	1000
Range		
Suitable Acres	680	3733
No. allotments	1	2
AUMs use	200	2375
Timber		
Tentatively Suitable (Ac.)	771	3455
Standing Volume(MMBF)	6.1	26.5
Wildllife/Fish		
Winter Range Habitat (Ac.)	0	3816
Grizzly Situation I (Ac.)	0	0
Grizzly Situation II (Ac.)	0	0
Species Present	D,E,M	D,E,M
Stream Fisheries (Mi.)	0	2
Lake habitat (Ac.)	0	0
Water Developments		
Number	0	13
Locatable Minerals (Potential)		
Very High (Ac.)	0	0
High (Ac.)	0	0
Moderate (Ac.)	0	0
Low (Ac.)	0	0
Claims and Patents (no.)	0	0
Oil and Gas (Potential)		
Very High (Ac.)	1,747	9,900
High (Ac.)	0	0
Moderate (Ac.)	0	0
Low (Ac.)	0	0
Leased (Ac.)	1,747	9,900
Lease Application (Ac.)	0	0

Code for wildlife species: D =Mule Deer; E = Elk; BH = Bighorn Sheep; GB = Grizzly Bear; MG =Mtn. Goat; M = Moose; BE = Bald Eagle.

D. Need

The nearest wilderness to the Crazy Mountains is the Absaroka Beartooth, about 30 miles away. The area is also about two hours drive from the newly created Lee Metcalf Wilderness. Yellowstone National Park is within two hours' drive.

The Box Canyon Roadless Area is about 90 miles southeast of Great Falls, 70 miles northeast of Bozeman and 100 miles northwest of Billings. There are 12 classified wildernesses containing 4.1 million acres within one day's drive of Great Falls, and 23 classified wildernesses containing 9.4 million acres within one day's drive of Bozeman.

E. Contribution to National Wilderness Preservation System

Area 1742 does not have any threatened or endangered plants or animals. The area has had little public interest in or support for wilderness classification. During the 1977 public review, 1,631 comments were recieved, and during the 1983 re-inventory, 2 comments were received. Most comments supported nonwilderness.

III. ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1743 will vary depending on which of the alternatives are selected for future management of the area. Table C-18 displays the acreage within the Box Canyon roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

Box Canyon is recommended for wilderness in Alternative 9. This is the only alternative that the total area or any portion is proposed for wilderness.

Wilderness designation could enhance the area's wilderness attributes. Motorized activities associated with range management and trail maintenance would be eliminated.

The 4,226 acres of land tentatively suitable for timber production would not be available under wilderness management. This would remove about 33 million board feet of standing volume with a yearly harvest of up to .356 million board feet.

Current livestock grazing, 2,575 AUMs, could continue on the allotments involved but management practices would probably change to use nonmotorized means of travel. Programs to control tree and shrub encroachment and to maintain or enhance forage production would be forgone. Over the long run grazing would be reduced by 386 AUMs because of a reduction of available forage.

Table C-18: Management Emphasis for Roadless Area 1742 Box Canyon by Alternatives

Management Emphasis	Alternatives/Benchmarks											
	1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	1.6	2.8	1.8	3.1	3.1	2.1	1.2	1.8	0	1.2	3.1	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0	0	0	0	0	0	0	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	0.8	0	0	0.6	0.3	0.8	0	0.3	0	0
Dispersed Rec/ Wildlife	1.2	2.8	3.2	1.5	1.5	1.3	0.7	3.2	0	0.7	1.5	0
Livestock Range	3.2	2.3	2.1	2.5	2.5	2.8	3.7	2.1	0	3.7	0	0
Minimum Level	5.1	3.8	3.6	4.5	4.5	4.9	5.7	3.6	0	5.7	4.5	1.7
WILDERNESS--	0	0	0	0	0	0	0	0	11.6	0	0	0
SUMMARY												
Developed -												
Decade 1	1.7	1.7	0	1.7	1.7	0	1.7	0	0	1.7		
Decade 2	1.7	1.7	0	1.7	1.7	0	1.7	0	0	1.7		
Roadless -												
Decade 1	0	0	1.7	0	0	1.7	0	1.7	0	0		
Decade 2	0	0	1.7	0	0	1.7	0	1.7	0	0		
Wilderness -	0	0	0	0	0	0	0	0	1.7	0		
TOTAL ACREAGE -	1.7											

Big game habitat would be similarly effected since much of the forage produced on this area is from lands that will support stands of trees. Thus, cover/forage relationships would change over time and winter range would decrease.

Areas classified as wilderness would be withdrawn from all forms of mineral entry subject to valid, existing rights.

Under this prescription, recreation use would be dominated by hunting.

The nonpriced costs and benefits of this management are:

--Existing visual conditions would be maintained and man's activities would be unnoticed by the average visitor.
--Wilderness would increase
--Existing elk security would be maintained.
--Diversity would tend towards old-growth without wildfire but could be improved by letting fire play a more natural role.
--Water quality and fisheries would be maintained at their present levels.

Economic and social effects would be slight since the area represents less than 1 percent of the Forest's suitable timber base. Grazing would be reduced by about 15 percent from the current level. Costs of livestock operations would increase because of nonmotorized means of travel. User conflict with grazing would arise because the area would attract an influx of people interested in recreation and naturalness. Other resource values such as hunting would be retained.

The less than 1 percent loss in timber volume in this roadless area can be mitigated by practicing intensive forestry elsewhere on the Lewis and Clark and Gallatin National Forests.

2. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Roadless</u>
<u>Management Prescription: Range, Dispersed Recreation/Wildlife Dispersed Recreation Nonroaded, and Minimun Level</u>

Alternatives 1, 2, 4, 5, and 6 assign part of the Box Canyon Roadless Area to range, wildlife and minimum level management under a roadless designation.

Range, wildlife, dispersed recreation, and minimum level management in a roadless designation would not affect the wilderness attributes. These management prescriptions limit new road construction. Timber harvest is not scheduled, but tree mortality can be salvaged. Since there would be no roads and scheduled timber harvest, there would be no long term changes in the wilderness attributes of this area. The area would be open to mineral entry with the use of standard stipulations to protect other resources. Mineral development may affect the wilderness attributes.

The nonpriced costs and benefits are as follows:

--Existing visual conditions would change and man's activities may be noticed by the average visitor.
--Semiprimitive and wilderness attributes would be retained.
--Elk security would be maintained.
--Age class distribution and diversity would be dominated by old-growth, young age classes would be minimal.
--Water quality and fisheries would not be affected.

3. **Designation: Nonwilderness**
Management Emphasis: Roaded
Management Prescription: Timber/ Timber/Range, Timber/Wildlife/Visual and Timber/Range/Wildlife/Visual

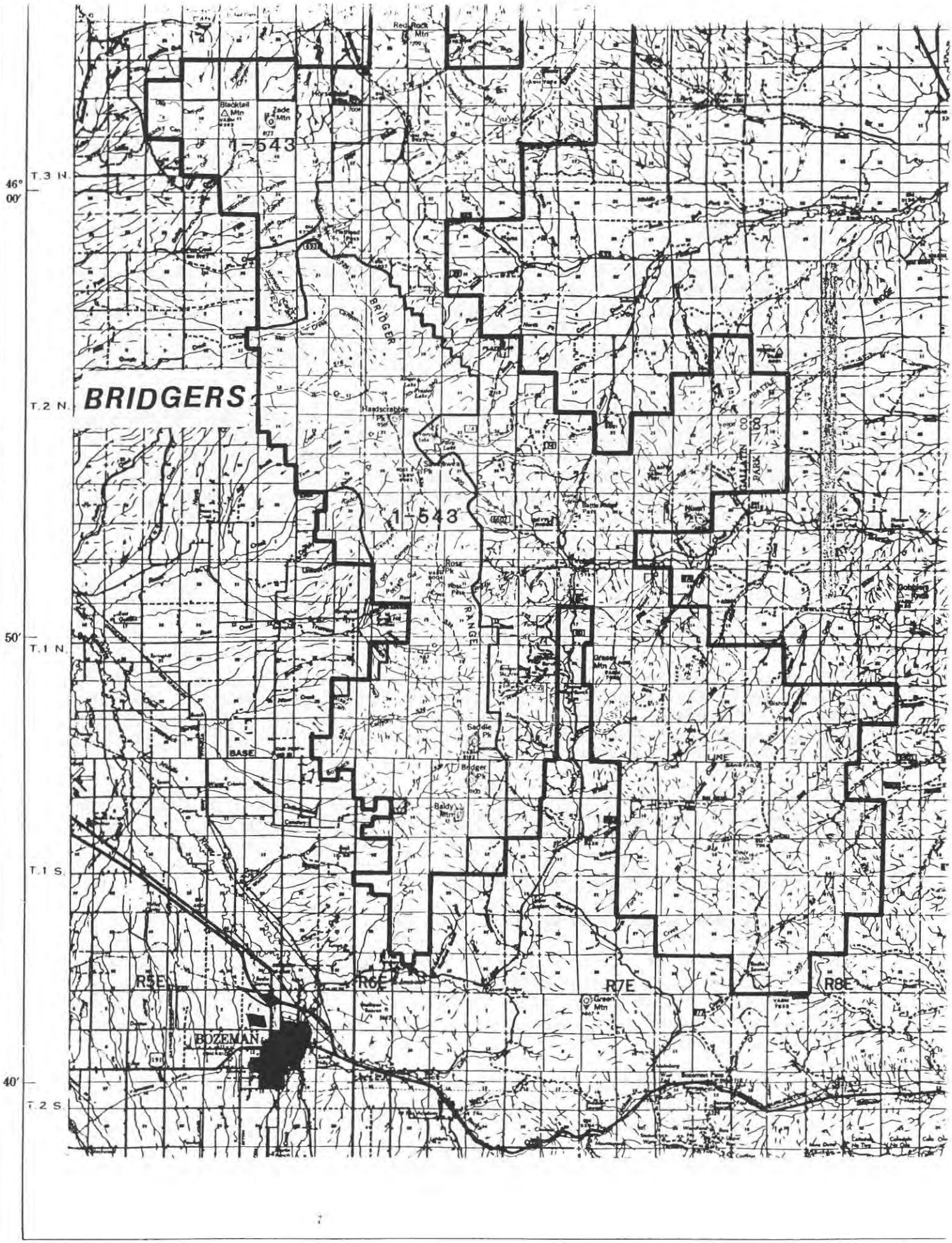
All alternatives, except 9 assign some of Box Canyon Roadless Area to timber.

Timber management would forgo the possibility of wilderness on the developed area. Lodgepole pine and Douglas fir stands would be accessed with roads and harvest would be scheduled starting in the first decade. About 650 acres would be developed during the first decade. About 11,000 acres would be available for wilderness reevaluation during the next planning period.

The nonpriced costs and benefits are:

--Existing visual conditions would change and man's activities may dominate portions of the landscape.
--Semiprimitive recreation opportunities would be forgone by the end of
--the fifth decade.
--Wilderness characteristics would also be compromised within 50 years.
--Elk security would be reduced, due to roading and timber harvest, but forage for elk and cattle would be optimized.
--Diversity would tend towards younger age classes, with less mature trees.
--Water quality and fisheries would be affected slightly by roading and timber harvest.
--These alternatives would provide for the greatest number of jobs, mainly in the wood products industry.

Economic and social effects would not be significant since about 1 percent of the Forest suitable timber base and about 1 percent of the land suitable for wilderness occurs in this roadless area.



BRIDGERS
1-543
1-543
BRIDGER
RANGE
BASE
LINE
GALLATIN CO
PARK
BATTLE
Red Rock Mtn
Blacktail Mtn
Zade Mtn
Haadscrabble Pk
Rose Pk
Saddle Pk
Bridger Pk
Baldy Mtn
Green Mtn
BOZEMAN
T.3 N.
T.2 N.
T.1 N.
T.1 S.
T.2 S.
46° 00′
50′
40′
R5E
R6E
R7E
R8E

BRIDGER ROADLESS AREA (1543)

	Gross Acres	Net Acres
Gallatin N.F.	47,512	45,402

I. DESCRIPTION

The Bridger Roadless Area comprises most of the higher elevation lands in the Bridger Mountains. The Bridgers are a steep, narrow range with peaks up to 9,700 feet elevation. The roadless area is likewise long and narrow, seldom more than 3 miles wide. Sacajawea Peak, highest point in the range, is popular with hikers and climbers. Ross Peak, a 9,004-foot limestone tower, is a prominent landmark.

This roadless area begins about 3 miles northeast of Bozeman, Montana, and from that point extends about 23 miles northwards. The area is broken into two separate roadless parcels by the Flathead Pass Road and a related powerline corridor. The northern portion extends from Flathead Pass north to Blacktail Mountain. This portion represents about 20 percent of the area. The other portion extends south from Flathead Pass to take in all the major peaks in the range.

Lower elevation slopes within the area are timbered with lodgepole pine, Douglas-fir, and spruce. This timber grades into alpine tundra and bare rock at the highest elevations. The area has native populations of elk, mule deer, black bear, moose, and mountain goats.

The area is valued by the public for its recreational opportunities and scenic values, in part because of its proximity to the City of Bozeman. The range comprises a scenic backdrop to the city on the north. Hiking, hunting, mountain climbing, and cross-country skiing accounted for most of the 16,000 RVDs of use that occurred in the area last year.

The area is accessed from the east along its entire length by Highway 293. The Forest Service has obtained 4 or 5 access points along the west side of the range, but access is poor for the portion north of Flathead Pass.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

Natural integrity of the area is high with a few exceptions. An electronics site is located at the eastern edge of the boundary. Some helicopter skiing is presently taking place in the area. There is also considerable noise impact at times in the winter due to avalanche control artillery fire from the Bridger Bowl Ski Area nearby.

Natural appearance of the area is impeded somewhat by lack of topographic screening. The narrowness of the area allows views of the City of Bozeman or the residential developments of the adjacent valley lands to the west to be visible from the divide south of Sacajawea Peak. The Bridger Bowl Ski Area is readily apparent along the divide from Saddle Peak to points 4 miles north.

Clearcuts at lower elevations outside the roadless area are visible along the east side, as is clearcutting across the canyon in the Bangtail Range.

Solitude is more available in some parts of the area than in others. Popular trails, including one National Recreation Trail, tend to follow the crest of the range. The Sacajawea-Hardscrabble Trail receives very heavy use from July to September. During summer, encounters with other hikers on these trails are highly likely. The physical characteristics of the area make it difficult to spread out recreational use. Sights of human activities outside the area are hard to avoid.

Primitive recreation opportunities are somewhat impaired by the narrowness of the area, which causes virtually the entire area to fail to meet the primitive recreation criterion of remoteness. The area is only 2 miles wide or less at several points. There is one wide point east of Cottonwood Creek where the area reaches a width of about 6 miles. At this point there would be a greater degree of remoteness attainable. Recreational activities of primitive or semiprimitive character are popular in the area, such as mountain climbing, horseback riding, backpacking, and cross-country skiing. Because the area is close to Bozeman, a high percentage of recreation is day use. Some activities pose significant challenge and risk--for example, winter users encounter significant avalanche hazard in many parts of the area.

A feature significant to the area, and one that has emerged as a public issue in the past, is the big game of the area and the winter range to support them (see "Resources Values").

B. **Wilderness Manageability**

The almost solid National Forest ownership of this roadless area would enhance manageability. Two isolated parcels of private land totaling 1,000 acres might be acquired by exchange or purchase. However, the division of the area by the Flathead Pass road would somewhat complicate manageability.

The size of the area would be adequate for wilderness, but the long narrow shape would probably limit enjoyment of some wilderness values. This is because human activities adjacent to the area are apparent to users, and with the growth of nearby Bozeman, these activities can only increase over the years.

C. Resource Values

The area contains 16,664 acres of suitable timber, and has a standing inventory estimated at 139.7 MMBF. Timber in the Bridgers has been infested by an epidemic of the mountain pine beetle in recent years.

Mortality has ranged from 30 to 70 percent in the affected stands. The southern portion of the range has been most affected. Wilderness designation would result in the epidemic running its natural cycle without salvage logging or other interference by man. Some limited salvage logging presently occurring near the southern borders of the area could be extended past the boundaries in future years if the lands were available.

The area contains about 1,500 acres of winter range for elk, 4,000 acres for mule deer, and 900 acres for moose. There are 3,700 acres of resident habitat for the present population of about 60 mountain goats. Appreciation of the wildlife is an attraction of the area. This area has nesting pairs of prairie falcons and golden eagles, and also has a native population of wolverine. This roadless area contains about 32 miles of fishery streams but no lakes.

The area presently has 30,000 acres that are under lease for oil and gas development, with an additional 14,000 acres under lease application. The area is rated high for oil and gas potential for 9,229 acres, and medium for 36,173 acres.

About 20 percent of the area is rated moderate for locatable minerals potential. The remainder of the area is rated low. Past mining activity has occurred near the boundaries of the area--in the Johnson Canyon area, for one example.

The Bridger roadless area presently has about 1,046 AUMs of livestock use annually on 4,326 acres of permitted grazing allotments. Resource values for this area are displayed in Table C-19.

D. Need

Major population centers within 1 day's travel time of the Bridger area include Missoula, Great Falls, Helena, Butte, Billings, and Bozeman, Montana

The Bridger area is near several wildernesses or proposed wildernesses. It is about 24 miles from the Lee Metcalf Wilderness, about 24 miles from the Abasaroka-Beartooth Wilderness, and about 42 miles from the Yellowstone National Park proposed wilderness.

Some important public issues have surfaced in the Bridger Area in recent years, but these have not been related to any controversy over wilderness designation. Public concern seems to center more on ensuring adequate access and on disputes over retaining wildlife winter range versus development of homesites outside the roadless area.

There was very little comment on the Bridgers during the comment period for the Draft Forest Plan. Some people were concerned about trails in the area. No one expressed a desire to have the Bridgers become wilderness.

E. Contributions To the National Wilderness System

Area 1543 would contribute the following habitat types to the National Wilderness System:

1. Alpine fir series (chiefly ABLA/VAGL, ABLA/CLPS, and ABLA-PIAL/VAS), about 20,000 acres.
2. Douglas-fir series (chiefly PSME/SYAL-CAR and PSME/SYAL), about 12,000 acres.
3. Grasslands (chiefly MTN GRASSLANDS and MTN MEADOWS), about 10,000 acres.

The remaining National Forest System acreage in the area is scattered over a variety of other habitat types.

Table C-19: Roadless Resource Information for #1543 Bridger Roadless Area

Value/Resource	Gallatin N.F.
Gross Acres	47,512
Net Acres	45,402
Recreation (RVD's)	
Primitive	0
Semiprimitive Nonmotorized	13,785
Semiprimitve Motorized	2,829
Range	
Suitable Ac.	4,326
No. Allotments	17
AUM's of Use	1,046
Timber	
Tentatively Suitable (Ac.)	16,664
Standing Volume (MMBF)	139.7
Wildlife/Fish	
Winter Range Habitat (Ac.)	6,400
*Grizzly Situation I (Ac.)	0
Species Present	E,D,MG,M
Stream Fisheries (Mi.)	32
Lake Habitat (Ac.)	0
Water Developments (No.)	0
Locatable Minerals (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	500
Low (Ac.)	44,902
Claims & Patents (No.)	0
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	9,229
Moderate (Ac.)	36,173
Low (Ac.)	0
Leased (Ac.)	30,000
Lease Applications (Ac.)	14,000

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle.

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1543 will vary depending on which of the alternatives are selected for future management of the area. Table C-20 displays the acreage within the Bridger Roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
Management Emphasis: Wilderness

Alternatives 8 and 9 recommend the two separate parcels of the entire roadless area to wilderness. These alternatives would maintain the wilderness character of the Bridgers. They would however,produce a small wilderness in the portion north of Flathead Pass. Because of the narrowness of the area, very little primitive recreation would occur. The motorized use that does occur now would be forgone.

Grazing would continue in wilderness. No additional capacity would be developed in the future, however. Grazing improvements such as fences and water structures would be maintained.

The timber resource on 16,660 acres of tentatively suitable lands would be forgone. This land has the potential of producing about 1 MMBF annually. Because there would be no timber harvest or road construction, the visual quality of the area would be maintained.

Oil and gas leases do exist on 30,000 acres. Seismic exploration has been occurring and would continue. The noise and disruption of this activity could distract from the solitude the area offers. If development occurs and roads and drill pads are constructed, large blocks of land would lose their wilderness character. Due to the steepness of the terrain, roads and drilling sites could only be constructed on the more level land at the periphery of the area in most instances. Even so the roads and drill sites would be easily visible and within hearing distance of most of the high peaks and ridges.

Wilderness designation would help maintain the habitat security for deer and elk. These populations are increasing and the hunting opportunity that now exists would become somewhat more difficult without the availability of motorized access. In this regard Wilderness designation may hinder the ability of hunting to keep big game in balance with the available winter range.

Other nonpriced resources affected are:

--water quality would remain high.
--wilderness experience close to Bozeman would result.
--helicopter skiing would be eliminated.

2. Designation: Nonwilderness
Management Emphasis: Nonroaded
Management Prescription: Minimum level, dispersed recreation/ wildlife, dispersed recreation nonroaded, range.

In all the alternatives except for 8 and 9 at least 70% of the area is assigned to nonroaded prescriptions. Under these prescriptions and emphasis, the Bridgers would be managed essentially as they are currently. The roadless character would be maintained except where oil and gas development might occur. The amount and timing of this activity cannot be predicted now. Likewise the existing visual condition and the existing recreation uses of the area would continue.

Under this management emphasis there would be no timber management on lands tentatively suitable. The timber resource would remain available if in future Forest planning it was determined to be suitable. The grazing use that now exists would remain. Increases in forage output could be made along with range improvement.

Wildlife habitat security would be maintained unless large scale oil and gas development were to occur. In that case, mitigation measures could be used to reduce the impacts on big game. Roads could be closed to public use during the development period and obliterated after their use is completed. Seasons of use could be controlled in key winter range and calving areas.

Other nonpriced values affected are:

--diversity of recreation opportunity would be maintained.
--wilderness character would be maintained.
--habitat security would be maintained.
--risk of fire and insects would not be reduced.

3. Designation: Nonwilderness
Management Emphasis: Roaded
Management Prescriptions: Roaded recreation, big game and timber.

Five alternatives prescribe substantial amounts of tentatively suitable timberlands to roaded prescriptions. Alternative 2 has 13,800 acres, Alternative 4 has 8,400 acres, and Alternatives 7 and 10 have 8,300 acres going to this emphasis. A potential annual harvest of 1 MMBF annually could be sustained if all 16,600 acres of tentatively suitable timberlands were awarded to these prescriptions. Lesser amounts would be produced by these alternatives.

Timber management would capture the volume available and would produce new timber stands. Diversity of age classes in these areas would improve. This diversity would help reduce the risk of fire and disease and would also create more habitat for wildlife species dependent on younger timber age classes.

Road construction would provide more opportunity for roaded and motorized recreation use. Easier access for hunting would become available. Hunting opportunity could change over time with possibly more animals killed in the

early weeks of hunting season if roads remain open. Open roads reduce the habitat security for big game.

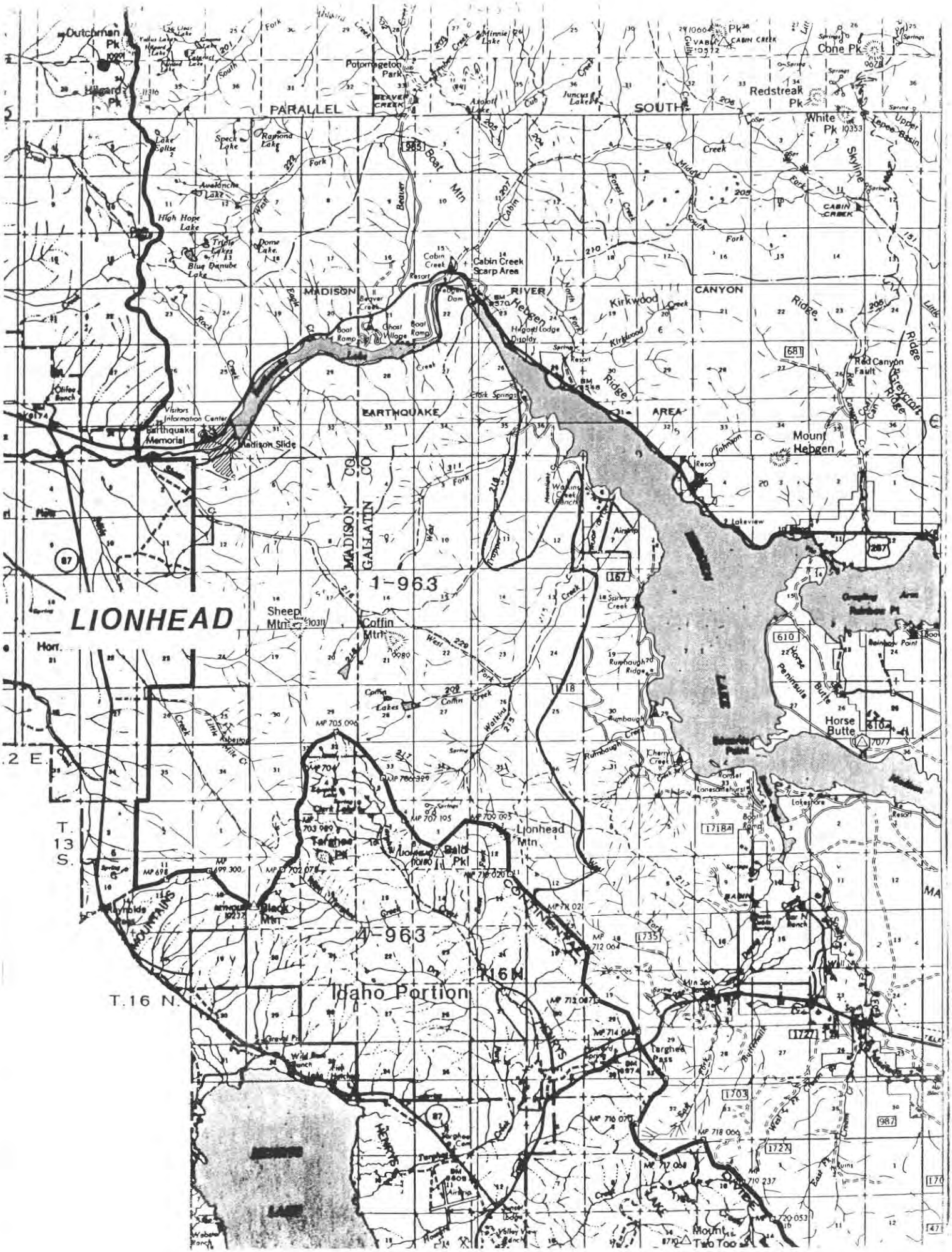
Road construction for timber activities would also make it easier for oil and gas exploration and may have the effect of hastening development. Road construction and timber activities would generally be on the periphery of the Bridgers, but would effect wilderness characteristics such as solitude for much of the area because of its narrowness. Other effects of road construction are a reduction of water quality caused by sedimentation in the first two years after a road is built.

Other nonpriced values affected are:

--the roadless resource would be reduced.
--existing visual conditions would change.
--habitat diversity would increase.
--risks of fire and insects would be reduced.
--oil and gas activities would be made easier.

Table C-20: Management Emphasis for Roadless Area 1543 Bridger by Alternatives

Management Emphasis	Alternatives/Benchmarks											
	1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	9.1	13.8	0	7.7	5.5	0	6.8	0	0	6.8	6.1	0
Dispersed Rec/ Roaded	0	0	0	0	0	0	0.1	0	0	0.1	0	0
Big Game	0	0	0	0.7	0.6	0	1.4	0	0	1.4	1.4	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	19.2	26.1	19.5	18.7	19.7	17.0	0	0	17.0	18.7	0
Dispersed Rec/ Wildlife	8.3	4.2	17.5	9.3	12.4	17.5	14.3	0	0	14.3	10.9	0
Livestock Range	8.2	8.2	1.8	8.2	8.2	8.2	5.7	0	0	5.7	8.2	0
Minimum Level	19.8	0	0	0	0	0	0	0	0	0	0	45.4
WILDERNESS--	0	0	0	0	0	0	0	45.4	45.4	0	0	0
SUMMARY												
Developed -												
Decade 1	0.7	1.0	0	0.6	0.4	0	0.6	0	0	0.6		
Decade 2	2.0	2.0	0	0.6	0.4	0	0.6	0	0	0.6		
Roadless -												
Decade 1	44.7	44.4	45.4	44.8	45.0	45.4	44.8	0	0	44.8		
Decade 2	43.4	43.4	45.4	44.8	45.0	45.4	44.8	0	0	44.8		
Wilderness -	0	0	0	0	0	0	0	45.4	45.4	0		
TOTAL ACREAGE -	45.4											



PARALLEL
SOUTH
MADISON
RIVER
CANYON
EARTHQUAKE
AREA
LIONHEAD
1-963
4-963
Idaho Portion
T. 13 S.
T. 16 N.
MADISON CO
GALLATIN CO
Cabin Creek Scarp Area
Hebgen Dam
Hebgen Lake
Earthquake Memorial
Madison Slide
Visitors Information Center
Mount Hebgen
Sheep Mtn
Coffin Mtn
Lionhead Mtn
Bald Pk
Targhee Pk
Black Mtn
Targhee Pass
Mount Two Top
Horse Butte
Rainbow Pt
Outcrop Pk
Hilgard Pk
Potomageton Park
Redstreak Pk
White Pk
Cone Pk
Boat Mtn
Kirkwood
Red Canyon Fault
Greycroft Ridge
Skyline
High Hope Lake
Blue Danube Lake
Dome Lake
Speck Lake
Lake Eglise
Olifea Ranch
Lakeview
Lonesomehurst
Lakeshore
Airstrip
Rumbaugh Ridge
Cherry Creek
Coffin Lakes
Watkins Creek Ranch
Hebgen Lodge Display
Clark Springs
Reynolds Pass
Wild Bunch Ranch
Fish Hatchery
Gravel Pit
Valley View Ranch
Horse Peninsula
Grayling Arm
Rainbow Point
Madison

LIONHEAD ROADLESS AREA (1963)

	Gross Acres	Net Acres
Gallatin NF	32,780	32,780
Targhee NF	15,400	15,400
	48,180	48,180

I. DESCRIPTION

The Lionhead Roadless Area straddles the Continental Divide where it forms the boundary between Idaho and Montana, and between the Gallatin and Targhee National Forests. The Gallatin National Forest in Montana administers the part of the area north of the Continental Divide, and the Targhee Forest in Idaho the part south of the Divide. The Gallatin is the lead Forest in conducting the roadless re-inventory of this area. Lionhead is approximately halfway between Idaho Falls, Idaho, and Bozeman, Montana, with each community being about 100 miles from this roadless area. The community of West Yellowstone lies some 10 miles to the east.

The north aspects of west- and east-facing slopes at the lower elevations generally support dense stands of trees, while the south-facing lower slopes are open grass and brushlands. Bare rockland, talus, and mountain grasslands make up the higher elevations from 9,000 feet to 10,311 feet, giving the Lionhead area high scenic value. The Lionhead area's high country dominates the Hebgen Lake Basin and Henry's Lake Flat.

The area is accessed by a number of trails which radiate in all directions from the central core. The area is within 1 mile of highways 191, 87, and 287. The upper basins of the area contain several high elevation lakes; of these, only the Coffin Lakes have good fishing. Parts of the area receive heavy hunting and snowmobiling use. Hiking, backpacking, cross-country skiing, and trailbike riding round out the recreation uses in this area.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

Generally, capability of the area for wilderness is high. Few evidences of man's hand are apparent in the area. Natural ecological processes proceed undisturbed. The drainages are steep and forested, adding to the sense of remoteness. The area is primarily classified as suitable for primitive recreation, with portions of the area near the portal areas and lower valleys classified as semiprimitive nonmotorized and semiprimitive motorized. Opportunity for primitive recreation is high. The area meets size requirements for wilderness capability.

Primitive roads, presently under closure restrictions, extend into the roadless area from U.S. 191 into the Targhee and Dry Fork drainages from the south side and in Watkins and Trapper Creek on the east side. Trapper Creek shows evidence of old logging activity which includes roads and a clearcut. There is an old irrigation dam by the lake at the head of Sheep Creek.

The rugged topography provides adequate screening to create a sense of solitude. Vegetative screening also contributes to the opportunity for solitude in much of the area. The area offers some risk to winter travelers from avalanches and winter storms. Cliffs in the area offer challenging rock climbing.

This roadless area includes occupied grizzly bear habitat. The Gallatin Forest portion is Situation 2 habitat while the Targhee Forest area south of the Continental Divide is classified Situation 1 habitat.

B. **Wilderness Manageability**

There is no private land within the roadless area boundaries. Primitive roads at Watkins, Trapper, Targhee, and Dry Fork creeks would return to a natural state over time. A high degree of boundary irregularity northwest of Watkins Creek could probably be rendered more manageable by some boundary adjustments. An additional 10,380 acres of roadless area was added to the original RARE II area during the 1983 re-inventory.

C. **Resource Values**

The Lionhead Roadless Area supports Douglas-fir, subalpine fir, Englemann spruce, lodgepole pine, and some whitebark pine timber. Over two-thirds of the area is classed as nonforest and unproductive forest land. Moreover, some of the one-third which is classified as capable commercial forest land supports scattered, poor quality timber on steep, high elevation slopes. Some stands are located on the steep unstable slopes overlooking Earthquake Lake. Such areas, although capable of growing commercial timber, would not be considered suitable for scheduled timber harvests. The Gallatin Forest portion of the area has 7,200 acres classed as capable of timber production with a standing inventory of 52.3 MMBF of timber. The Targhee Forest has about 6,500 acres of tentatively suitable timber with a standing inventory of about 48.1 MMBF.

There are 2,030 acres of suitable livestock range with permitted livestock grazing on the Gallatin portion of the Lionhead roadless area. This range produces some 590 AUMs of grazing annually. The Targhee portion of the Lionhead area provides about 600 AUMs of permitted livestock grazing.

The Lionhead area receives an estimated 3,000 recreation visitor days (RVD's) of use annually. Of this total, 17 percent is classed as primitive recreation, 70 percent is semiprimitive nonmotorized, and 13 percent is semiprimitive motorized. About two-thirds of the recreation use is on the Montana side and about one-third on the Idaho side.

Some 5,620 acres of the Lionhead roadless area are included in oil and gas lease applications. One 10-year lease, covering 902 acres of the roadless area was issued on 9-1-82. This lease is located outside of the RARE II boundary but within the roadless area in the Sheep Creek drainage. About 6,400 acres of the area are rated as having "moderate" oil and gas potential,with the remainder of the area rated "low." The entire area is considered to have low potential for locatable mineral discovery. The area contains quality phosphate deposits but it is doubtful that they will be utilized because there are abundant supplies of this mineral at more easily accessed locations.

Grizzly bear, elk, moose, mule deer, and bighorn sheep are native to this area. Osprey and bald eagle are also found in the area, primarily along Earthquake Lake. One bald eagle nest is located within the boundary on the south shore of Earthquake Lake. Also, peregrine falcons have been released in the Idaho portion of the Lionhead in an effort to establish breeding pairs. The success of this effort is not yet clear.

Elk and mule deer winter range has been inventoried on 2,300 acres of the area. Another 340 acres are bighorn sheep winter range. The Upper and Lower Coffin Lakes are the only lakes with a fishery--the others are barren. Upper Coffin Lake has been graveled to provide spawning beds for the introduction of golden trout, scheduled for 1984. The area has 6 miles of fishery streams, the best of which are Watkins Creek on the Gallatin National Forest and Targhee Creek on the Targhee National Forest. Targhee Creek is also important spawning habitat for Henry's Lake cutthroat trout. Resource values for this area are displayed in Table C-21.

D. Need

The Lionhead area is about 2 miles south of the newly designated Lee Metcalf Wilderness, 10 miles from the Red Rock Wilderness, and 32 miles west of the Absaroka-Beartooth Wilderness. It is about 10 miles from Yellowstone National Park Recommended Wilderness. The area is approximately equidistant between Idaho Falls, Idaho, and Bozeman, Montana, at a highway distance of about 100 miles from each community. It is 9 miles west of West Yellowstone.

The Lionhead area was included in the wilderness proposals of both the Idaho and Montana conservation groups in the past. This position has been restated in the Montana Wilderness Association July 1983 "Alternative W Wilderness" proposal for the Gallatin National Forest. However the timber industry as well as area snowmobilers are not in favor of wilderness designation.

At one point, there was a high level of interest in wilderness classification for the Lionhead, resulting in wilderness recommendation by the Forest Service under RARE II. The Targhee National Forest reports a high present level of interest in wilderness classification resulting from a recent public survey. The Governor of Idaho recently expressed interest in some form of roadless management for the Idaho Lionhead, while the Governor of Montana has recommended a large portion of the area for wilderness.

Because this area was recommended for wilderness it received a lot of comment during the public review period of the Draft Forest Plan. Two hundred ninety (290) people commented on it. Most of the comments dealt with wilderness. Several local people in the West Yellowstone area were concerned about the effects of wilderness on the local economy because motorized vehicles could not longer use the Lionhead.

Table C-21: Roadless Resource Information for #1963 Lionhead Roadless Area

Value/Resource	Gallatin N.F.	Targhee N.F.
Gross Acres	32,780	15,400
Net Acres	32,780	15,400
Recreation (RVD's)		
Primitive	333	167
Semiprimitive Nonmotorized	1,400	700
Semiprimitve Motorized	267	133
Range		
Suitable Ac.	2,030	2,470
No. Allotments	3	1
AUM's of Use	590	600
Timber		
Tentatively Suitable (Ac.)	7,200	6,500
Standing Volume (MMBF)	52.3	48.1
Wildlife/Fish		
Winter Range Habitat (Ac.)	2,300	--
*Grizzly Situation I (Ac.)	--	15,400
Species Present	E,D,M,GB BH,BE	E,D,M,GB BH
Stream Fisheries (Mi.)	3.5	2.5
Lake Habitat (Ac.)	30	--
Water Developments (No.)	1	--
Locatable Minerals (Potential)		
Very High (Ac.)	0	0
High (Ac.)	0	0
Moderate (Ac.)	0	0
Low (Ac.)	32,780	15,400
Claims & Patents (No.)		
Oil and Gas (Potential)		
Very High (Ac.)	0	0
High (Ac.)	0	0
Moderate (Ac.)	4,220	2,174
Low (Ac.)	28,557	13,226
Leased (Ac.)	910	--
Lease Applications (Ac.)	4,500	1,120

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle.

E. Contributions To the National Wilderness System

The Lionhead area would contribute the following habitat types to the National Wilderness System:

Subalpine fir series (mostly ABLA-PIAL/VASC; ABLA/CARU; and ABLA/VAGL)--about 60 percent of the area.

Douglas-fir series (mostly PSME/SYAL-CARU)--about 8 percent of the area.

Whitebark pine habitat type (PIAL/ABLA)--about 2 percent of the area.

The remainder of the area is mountain grasslands, sagebrush, rocklands, talus, and open water.

III. Alternatives and Environmental Consequences

A. Management Emphasis by Alternative

Environmental effects on Roadless Area 1963 will vary depending on which of the alternatives are selected for future management of the area. Table C-22 displays the acreage within the Lionhead Roadless Area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives. The acreages in parentheses represent the Targhee National Forest's portion of the total roadless area.

B. Environmental Consequences

1. Consequences Common to All Alternatives

Approximately 1,000 acres in the northwest corner of the Lionhead have been leased for oil and gas exploration. Exploration and development activities could take place under any alternative and could irretrievably effect the wilderness character.

2. Designation: Wilderness
Management Emphasis: Wilderness

Seven alternatives recommend all or major portions of the Lionhead for wilderness. Wilderness classification would protect the existing wilderness character while allowing all recreation uses that now occur except for snowmobiling and motorcycling. The 2,600 RVD's of primitive and semi-primitive nonmotorized use would be maintained. The 400 RVD's of motorized use would be eliminated.

Table C-22: Management Emphasis for Roadless Area 1963 Lionhead by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	5.7	7.6	0.1	0.8	0.5	0.9	6.3	0	0	6.3	2.8	0
Dispersed Rec/ Roaded	0	15.4 (15.4)	0	0	0	0.2 (0.2)	0	0	0	0	0	0
Big Game	0	0	0	0	0	0	1.3	0	0	1.3	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	12.0	6.4 (0.7)	4.2	4.5	20.8	3.4 (0.7)	0	0	3.4 (0.7)	30.6 (15.4)	0
Dispersed Rec/ Wildlife	1.6	6.5	1.5	9.4	1.5	0	0	0	0	1.5	8.1	0
Livestock Range	0.9	6.6	0.2	3.2	1.6	0.6	0	0	0	0.6	6.6	0
Minimum Level	0	0	24.6	0	0	0	0	0	0	0	0	32.8
WILDERNESS--	39.8 (15.4)	0	14.7 (14.7)	39.8 (15.4)	39.8 (15.4)	15.2 (15.2)	37.2 (14.2)	48.2 (15.4)	48.2 (15.4)	37.2 (14.4)	0	0
SUMMARY												
Developed -												
Decade 1	1.3	1.7	0	0.2	0	0.2	1.7	0	0	1.7		
Decade 2	1.5	1.7	0	0.4	0.2	0.2	1.7	0	0	1.7		
Roadless -												
Decade 1	6.9	31.1	32.8	8.0	8.2	32.6	8.3	0	0	8.3		
Decade 2	6.7	31.1	32.8	7.8	8.0	32.6	8.3	0	0	8.3		
Wilderness -	24.6	0	0	24.6	24.6	0	22.8	32.8	32.8	22.8		
TOTAL ACREAGE -	32.8											

Existing vegetation would follow its natural succession. A potential of 13,700 acres of commercial timberland would not be harvested or managed for timber production. The existing wildlife now in the area would be maintained. Security for the grizzly bear would be maintained or enhanced under the wilderness alternative. Possible mitigation measures such as trail closures might have to be used in the future. A very small amount of winter range exists and would be unavailable for improvement to increase big game populations.

The few primitive roads would remain closed and eventually disappear. An old irrigation dam that is present in Sheep Creek could be maintained, but not by motorized means.

Oil and gas lease applications on 4,500 acres of the Lionhead would not be granted. Even though there is a lease for exploration and development on 1,000 acres, there are some options to maintain the wilderness character. The leases could be honored until expiration and then not reissued. The lease could be bought back through Congressional initiative, or negotiations might be made with the lease holder to relinquish the lease or accomodate the wilderness resource to the extent possible.

Some of the nonpriced benefits affected are:

--Visual quality would be maintained.
--water quality would remain high.
--Stream fisheries would be maintained.
--there would be little opportunity to reduce insect and fire risk.
--opportunity for minerals, oil and gas exploration would be curtailed.

3. <u>Designation: Nonwilderness</u>
<u>Management Emphasis: Nonroaded</u>
<u>Management Prescriptions: Minimum level, dispersed recreation/ wildlife, dispersed recreation nonroaded, and range.</u>

Alternative 6 assigned nearly all of the Gallatin National Forest portion of the Lionhead to nonroaded prescriptions. All alternatives propose at least 85 percent of the area to either nonroaded or wilderness prescriptions.

This type of emphasis would keep most of the area managed as it currently is being managed. Existing uses would continue with little change. Motorized recreation uses would continue along with primitive and other semi-primitive recreation uses.

Livestock grazing use would continue at current or increased levels. Some of the primitive roads might continue to be used for grazing administration. Timber volumes would not be lost to future harvest under these prescriptions. However, in the next decade or more, no volume would be harvested in this alternative and, consequently, no roads would be constructed. The wilderness character of the area would be essentially preserved.

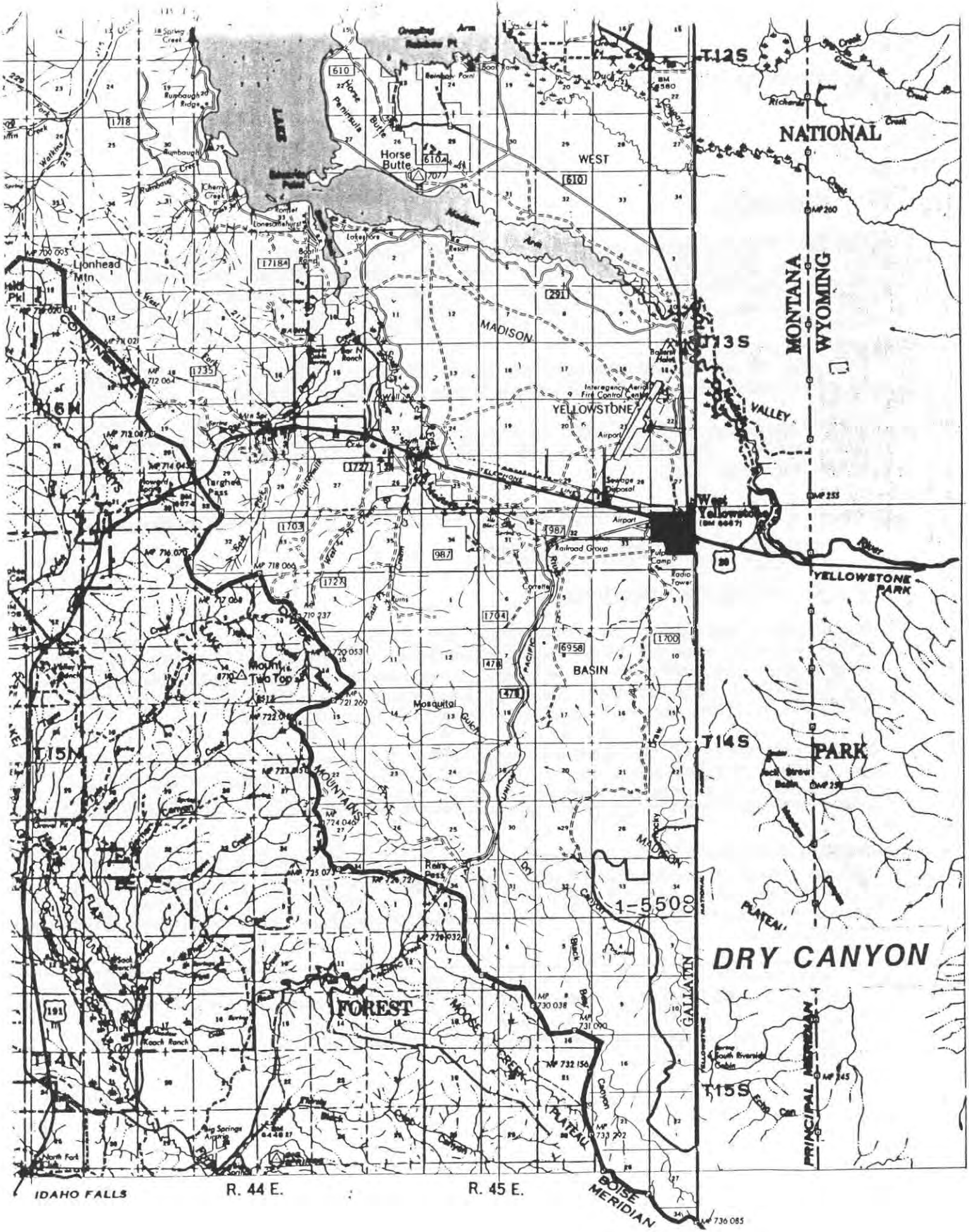
Some of the nonpriced resource volumes affected are:

--Visual quality would be maintained,
--Water quality would remain high.
--Forage for wildlife and livestock could be improved,
--Prescribed fire could be used to reduce both fire and insect risk,
--Opportunity for a wide variety of recreation would remain,
--Change from the current direction would be minimal.

4. **Designation: Nonwilderness**
Management Emphasis: Roaded
Management Prescriptions: Dispersed recreation roaded, big game, and others

Only four alternatives assign significant portions of the tentatively suitable timberlands to these prescriptions. These are Alternatives 1, 2, 7. and 10. Acreage awarded to these prescriptions ranges from 7,600 acres down to zero acres. This acreage is wholly on the east side of the roadless area adjacent to Hebgen Lake. The wilderness character of this portion would be forgone.

Under this management emphasis up to 7,600 acres would be managed for timber. Besides the timber volume gained from these lands, additional roaded recreation and increased forage for big game would also result. Security for the grizzly bear would decrease as more roads are built into the area.



T12S
NATIONAL
MONTANA
WYOMING
T13S
VALLEY
YELLOWSTONE PARK
T14S
PARK
DRY CANYON
T15S
T16N
T15N
T14N
FOREST
MADISON
YELLOWSTONE
West Yellowstone
BASIN
Mount Two Top
Mosquito
Horse Butte
Lionhead Mtn
Targhee Pass
Rainbow Point
Interagency Aerial Fire Control Center
Airport
Railroad Group
Pulp Camp
Radio Tower
Sewage Disposal
Mosquito Gulch
Reins Pass
Koach Ranch
Big Springs Airstrip
North Fork Club
South Riverside Cabin
Echo Can
1-5500
GALLATIN CO
PRINCIPAL MERIDIAN
IDAHO FALLS
R. 44 E.
R. 45 E.
BOISE MERIDIAN

DRY CANYON ROADLESS AREA (1550)

	Gross Acres	Net Acres
Gallatin N.F.	2,160	2,160

I. DESCRIPTION

The Dry Canyon roadless area is mostly flat plateau country entirely covered with lodgepole pine. Parts of the area have gentle slopes; there are some fairly steep breaks into drainages. The area has no landmarks or notable scenic values. Elevation in the Dry Canyon area range from 7,500 to 8,000 feet.

This area is about 8 miles directly south of West Yellowstone, Montana, and borders recommended wilderness within Yellowstone National Park.

About 75 percent of the timber in the area has been impacted by the mountain pine beetle. Recreation use is light; it includes some hunting and cross-country skiing.

The South Plateau Road provides good access to the area from West Yellowstone.

II. ANALYSIS OF WILDERNESS SUITABILITY

A. Wilderness Characteristics

Dry Canyon's wilderness characteristics are influenced by its 5-mile common border with Yellowstone Park. The proximity of the Park enables this small area to meet size criteria for wilderness consideration if adjacent Park lands are classified as wilderness. The Park's presence also allows the Dry Canyon area to qualify in part for primitive recreation classification.

Natural integrity of the area is unimpaired. The area shows no evidences of man's work. Natural appearance is affected by some clearcutting visible along the northern and western borders at three different points. Otherwise, no sights or sounds of man would be apparent within the area.

The area is close to West Yellowstone but can be considered remote because of lack of human activity within the boundaries. Opportunity for solitude is high because the area is seldom visited. The acreage that is screened from roads --about 85 percent of the area--would qualify for primitive ROS classification.

The area possesses an ecological feature of interest: It is classified as Situation 2 occupied grizzly bear habitat. Bears pass through the area but it is not vital to grizzly bear recovery. Elk and mule deer are also found in the area. Some element of challenge or risk could result from an occasional encounter with a grizzly.

B. Wilderness Manageability

Although Dry Canyon is a small roadless area, the proximity to Yellowstone Park, a recommended wilderness, gives the area potential for primitive recreation and wilderness manageability. There are no parcels of private land within the boundaries of Area 1550. During the 1983 re-inventory of roadless areas, 920 acres of an existing timber sale were subtracted.

C. Resource Values

The Dry Canyon area supports an estimated 15.7 MMBF of standing timber on 2,150 acres of productive forest land. The recent mountain pine beetle epidemic has killed 75 to 80 percent of the trees in this area.

There is no grazing of domestic livestock in the Dry Canyon area. There is no big game winter range in the area. No fishing streams or lakes are found there.

The Dry Canyon area presently receives an estimated 200 RVDs use per year. Of this total, some 150 RVDs are semiprimitive motorized use and the remainder are classed as semiprimitive nonmotorized. Recreation use generally consists of light hunting use, an occasional snowmobile or dirt bike, and some cross-country skiing.

The Yellowstone Known Geothermal Resource Area (KGRA) includes the whole of the Dry Canyon area. No leases have been offered in the KGRA, pending a determination by the Secretary of Interior that leasing and development of geothermal resources would not jeopardize the hydrothermal resources of Yellowstone National Park.

The Dry Canyon area is rated "moderate" for oil and gas potential, and is rated "low" for hardrock minerals potential. Resource values for this area are in Table C-23.

D. Need

This area is adjacent to some 2 million acres of recommended wilderness in Yellowstone National Park. It is within 20 miles of the newly designated Lee Metcalf Wilderness.

This area is approximately 110 miles from Idaho Falls, Idaho, and 100 miles from Bozeman, Montana.

No interest has been expressed in this area by any groups either favoring wilderness designation or favoring other management uses.

Table C-23: Roadless Resource Information for #1550 Dry Canyon Area

Value/Resource	Gallatin N.F.
Gross Acres	2160
Net Acres	2160
Recreation (RVD's)	
Primitive	0
Semiprimitive Nonmotorized	50
Semiprimitve Motorized	150
Range	
Suitable Ac.	0
No. Allotments	0
AUM's of Use	0
Timber	
Tentatively Suitable (Ac.)	2152
Standing Volume (MMBF)	15.7
Wildlife/Fish	
Winter Range Habitat (Ac.)	0
Grizzly Situation I (Ac.)	0
*Grizzly Situation II (Ac.)	2160
Species Present	E,D,,GB
Stream Fisheries (Mi.)	0
Lake Habitat (Ac.)	0
Water Developments (No.)	0
Locatable Minerals (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	2160
Low (Ac.)	
Claims & Patents (No.)	0
Oil and Gas (Potential)	
Very High (Ac.)	0
High (Ac.)	0
Moderate (Ac.)	2160
Low (Ac.)	0
Leased (Ac.)	0
Lease Applications (Ac.)	0

* Code for wildlife species: D = Mule Deer; E = Elk; BH = Bighhorn Sheep; GB = Grizzly Bear; MG = Mtn. Goat; M = Moose; BE = Bald Eagle.

E. Contributions To the National Wilderness System

Area 1550 is primarily in the subalpine fir/grouse whortleberry (ABLS/VASC) habitat type. This is the most common habitat type found in the lower subalpine zone on the Gallatin Forest.

I. ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

A. Management Emphasis By Alternatives.

Environmental effects on Roadless Area 1550 will vary depending on which of the alternatives are selected for future management of the area. Table C-24 displays the acreage within the Dry Canyon roadless area that would be managed as developed, nonroaded, and wilderness in the 10 alternatives.

B. Environmental Consequences

1. Designation: Wilderness
   Management Emphasis: Wilderness

Alternatives 8 and 9 recommend the entire area as wilderness. Even though the area by itself is not large enough to qualify for wilderness it is adjacent to Yellowstone National Park recommended wilderness. It would, therefore, be an addition to that large area if the Park lands are classified as wilderness.

Under this alternative, grizzly bear habitat security would be maintained. No timber management would occur and no oil and gas exploration or developemnt would take place. Approximately 15.7 MMBF of timber would be lost from production.

Other nonpriced values affected are:

--the wilderness character would be maintained,
--fire hazard would be high because of the beetle killed timber,
--grizzly bear security would be maintained,
--motorized recreation use, mostly snowmobiling, would be lost.

2. Designation: Nonwilderness
   Management Emphasis: Nonroaded
   Management Prescription: Dispersed recreation/wildlife.

The area is entirely assigned to this prescription in Alternatives 3, 5, and 6. Along with the nonroaded emphasis, the grizzly bear would also be given emphasis.

No timber harvest would be scheduled in the near future. Much of the dead timber would not be salvaged. The tentatively suitable timberland would not be irretrievaby lost, however, as it could be managed in the future.

The roadless character would be maintained. There is moderate potential for oil and gas development in the future however.

Other nonpriced values are:

--Grizzly habitat security would be maintained.
--Oil and gas exploration and development could occur.
--Fire risk would be high.
--A diversity of recreation is available.

3. **Designation: Nonwilderness**
Management Emphasis: Roaded
Management Prescription: Big game, timber

In Alternatives 1, 2, 7 and 10 the area is assigned to this emphasis. In Alternatives 7 and 10 the big game prescription gives co-emphasis to grizzly and timber. Much of the dead timber could be salvaged in this alternative and mitigation measures could assure that grizzly/man conflicts would be miminized. New stands of timber would provide for more wildlife habitat diversity.

Nonpriced values affected are:

-Visual quality would decrease.
-The roadless resource would be lost.
-Water quality would decrease.
-Habitat diversity would increase.
-Accessibility for oil and gas development would increase.

Table C-24: Management Emphasis for Roadless Area 1550 Dry Canyon by Alternatives

Management Emphasis	Alternatives/Benchmarks 1	2	3	4	5	6	7	8	9	10	MAX PNV	MIN LVL
	Thousands of Acres											
DEVELOPED--												
Timber	2.2	2.2	0	0.8	0	0	0	0	0	0	0	2.2
Dispersed Rec/ Roaded	0	0	0	0	0	0	0	0	0	0	0	0
Big Game	0	0	0	0.3	0	0	2.2	0	0	2.2	0	0
NONROADED--												
Dispersed Rec/ Nonroaded	0	0	0	0	0	0	0	0	0	0	0	0
Dispersed Rec/ Wildlife	0	0	2.2	1.1	2.2	2.2	0	0	0	0	0	0
Livestock Range	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Level	0	0	0	0	0	0	0	0	0	0	0	2.2
WILDERNESS--	0	0	0	0	0	0	0	2.2	2.2	0	0	0
SUMMARY												
Developed -												
Decade 1	0.6	0.6	0	0.6	0	0	0.6	0	0	0.6		
Decade 2	0.6	0.6	0	0.6	0	0	0.6	0	0	0.6		
Roadless -												
Decade 1	1.6	1.6	2.2	1.6	2.2	2.2	1.6	0	0	1.6		
Decade 2	1.6	1.6	2.2	1.6	2.2	2.2	1.6	0	0	1.6		
Wilderness -	0	0	0	0	0	0	0	2.2	2.2	0		
TOTAL ACREAGE -	2.2											

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