VISUAL RESOURCES

Introduction

Forest activities that have major effects on visual resources include the development of new concentrated recreation areas, alpine ski area development, geothermal development, timber harvest, and facilities construction.

Indicators

Consequences of these activities are assessed in terms of the following elements of the visual resource management system (for a more detailed discussion of each element, see Chapter III):

1. Recommended Visual Quality Objectives
2. Future Visual Condition
3. Change in visual condition
4. Visual Quality Index.

Basis of Comparison: These indicators compare the alternatives to two baselines: Initial Visual Quality Objectives and Existing Visual Condition. Visual Quality Objectives (VQOs) in general set standards for future landscape appearance. Initial Visual Quality Objectives were derived from an inventory of physical and social environmental factors; they set preliminary objectives for acceptable amounts of landscape alteration based on those factors. Existing Visual Condition measures and describes the present appearance of the landscape.

The Initial Visual Quality Objectives and Existing Visual Condition of a given area are not necessarily the same since the former sets a preliminary standard for the future, and the latter displays the current condition. However, the landscape appearance described by the six VQO levels correspond to the six visual condition levels.

Recommended Visual Quality Objectives: Recommended VQOs are based on the theme of the alternative and the resulting mix of Management Prescriptions and resource program direction. The acreage recommended for each VQO by variety class are displayed by alternative in Table 89. Variety Class A lands are the most interesting, and therefore important as a visual resource; Variety Class C lands are the least important. Initial Visual Quality Objective acreages are also shown, in order to illustrate the distribution of acres by variety class that will maintain an acceptable level of landscape alteration based solely on the factors considered by the Initial Visual Quality Objective inventory.

Future Visual Condition: Future Visual Condition describes the projected appearance of the landscape from natural to altered under each alternative by the fifth decade. Table 90 displays the acreage estimated for each visual condition class by variety class by alternative. Acreages for Existing Visual Condition by variety class are shown as a basis for comparison between the present situation and future situations under different alternatives and

as an indicator of the relative importance of predicted alteration, using variety class as an indicator of importance.

Predictions of Future Visual Condition are based for the most part on the projected visual impacts of alpine ski area development, energy development, and timber harvest in stands that are not yet accessible by road. As these impacts will affect less than 2.5 percent of the Forest land base, Future Visual Condition shows little change, even under the most commodity-oriented alternatives.

Change in Visual Condition: Changes between Existing Visual Condition and Future Visual Condition are based on changes in the human alteration of lands in each Existing Visual Condition level. The acres in each Existing Visual Condition level will either remain the same in the Future Visual Condition, or they will shift to a lower level though alteration or a higher level through rehabilitation. The degree of change can be determined by comparing the Existing Visual Condition level of a given area with the Future Visual Condition level to which it will evolve. The largest drop in visual condition (41,410 acres) represents only 2.1 percent of total Forest acres.

Visual Quality Index: The Visual Quality Index (VQI) is a composite rating of visual quality for the entire Forest. The VQI varies little from one alternative to another.

Table 89
Recommended Visual Quality Objectives by Variety Class
(M acres)

VQO	Variety Class	Initial VQO	Alternatives					
			PRF	CUR	RPA	CEE	AMN	AMB
Preservation*	A	364.7	453.4	445.6	371.5	552.4	628.4	493.2
	B	212.0	235.9	238.7	205.2	353.5	439.5	297.8
	C	3.3	3.3	3.3	3.3	5.3	11.0	8.5
Retention	A	290.9	327.2	286.0	283.6	198.4	175.6	306.6
	B	38.8	304.1	172.1	45.6	108.6	250.0	339.7
	C	0	29.6	13.8	3.6	18.0	78.7	37.9
Partial Retention	A	176.3	51.4	100.2	176.7	81.0	27.8	32.1
	B	410.2	276.6	410.8	514.6	280.5	195.2	228.9
	C	59.7	100.1	112.7	124.0	54.5	46.7	88.7
Modification	A	0	0	0	0	0	0	0
	B	223.5	89.9	82.6	139.0	159.8	20.7	39.3
	C	41.3	13.2	16.2	14.8	67.1	9.2	11.1
Maximum Modification	A	0	0	0.2	0.2	0.2	0.2	0.2
	B	22.2	0	2.4	2.2	4.1	1.2	0.8
	C	41.8	0	0.3	0.5	1.3	0.5	0

*The Initial Visual Quality Objective inventory applies the Preservation VQO only to lands classified or proposed for Wilderness or Research Natural Area designation.

Table 90
Future Visual Condition by Variety Class
(M acres)

Visual Condition	Variety Class	Existing Visual Condition	Alternatives					
			PRF	CUR	RPA	CEE	AMN	AMB
		(1982)			(fifth decade)			
Level I	A	732.5	734.2	731.2	702.4	735.7	754.8	728.2
	B	639.5	637.7	631.7	633.4	655.0	675.7	638.6
	C	58.6	57.9	59.4	58.6	60.8	66.7	67.2
Level II	A	30.2	41.1	42.8	29.1	25.6	89.7	47.5
	B	95.4	109.8	110.9	86.3	81.3	97.3	133.5
	C	43.5	53.7	44.9	43.7	42.5	50.7	46.6
Level III	A	38.1	29.6	29.1	41.4	35.1	21.5	28.6
	B	117.8	111.8	108.2	115.3	111.1	93.2	90.5
	C	31.9	25.3	30.7	30.0	29.3	24.9	27.8
Level IV	A	22.3	26.4	27.1	56.3	31.9	25.1	26.0
	B	39.4	42.0	49.7	64.6	51.3	36.9	39.7
	C	9.2	7.4	8.8	11.6	11.1	2.7	3.3
Level V	A	8.1	0.8	1.8	2.7	3.5	0.9	1.8
	B	10.2	5.2	5.4	6.0	5.5	3.1	4.3
	C	1.1	0.6	0.6	0.6	0.8	0	0.1
Level VI	A	0.9	0	0	0.2	0.2	0	0
	B	4.2	0	0.7	1.0	2.3	0.2	0
	C	2.0	1.4	1.8	1.7	1.8	1.2	1.2

Consequences Common to all Alternatives

The Inyo National Forest includes 1,884,700 acres outside the Mono Basin National Forest Scenic Area. The Scenic Area is not considered in the visual resource analysis because inventories for that area are not complete, and because planning for that area will be conducted outside of the Forest planning process. Of that total, 565,100 acres (30 percent) are designated wilderness and 873,000 acres (51 percent) are currently unroaded and undeveloped. Consequently, more than 81 percent of the Forest is currently natural in appearance.

Natural-appearing acreage will not change significantly under any alternative. Except for the Monache and San Joaquin areas, unroaded lands are mostly steep and lacking in resource development opportunities. Potential impacts will be associated mainly with scattered mineral exploration. Most of the potential visual impacts on the Forest are site specific. Taken together, they will change the visual condition on less than 2.5 percent of the Forest.

Existing concentrated recreation areas will appear the same in the fifth decade as they do today. Although some areas will be more intensively developed with recreation facilities, the overall visual character of those areas will not change substantially.

Shrub vegetation treatments for wildlife habitat and range improvement will not affect visual condition to a degree that will be noticeable to the casual observer, especially as seen in middleground or background distances. Any visual impacts that did occur will be short in duration (one to five years) with negligible effects over the 50 years. In contrast, mechanical vegetation treatment in pinyon-juniper ("chaining") could have a more short-term visual impact. On the Inyo, however, the acres affected will be negligible, (less than 50 acres/year) and can therefore be considered common to all alternatives.

Increased alpine ski area development on Mammoth and June Mountains is common to all alternatives, and the visual impacts of that development and associated community growth will also be common to all alternatives. About 1,500 acres over the current level will be affected. These acres now range from natural-appearing to moderately disturbed condition classes. After development, they will range from moderate to major disturbance classes. Proposed developments will dominate middleground views as seen from U.S. 395 and some foreground views along State Highways 203 and 158. Visual condition could fall below assigned VQOs.

New hydroelectric projects have been proposed adjacent to and within the foreground zones of many Sensitivity Level 1 roads, recreation sites, and concentrated recreation areas. The likelihood of specific projects developing is considered common to all alternatives, as the decision to construct is made outside of the Forest planning process. These projects could fail to meet assigned VQOs and will always change the visual condition from natural appearing or minor disturbances to major disturbances as viewed in foreground and middleground zones.

Consequences That Vary by Alternative

PRF: (Preferred) This alternative will improve visual quality on 3.3 percent, maintain current visual quality levels on 95.8 percent, and reduce visual quality on 0.9 percent of the Inyo National Forest. The Visual Quality Index will increase 0.31 (0.2 percent).

Most foreground zones along Sensitivity Level 1 roads and trails will be natural appearing. Exceptions include existing facilities related to community development such as the Mammoth-June Lake airport and the existing waste treatment plant, existing and new recreation developments in concentrated recreation areas, new powerline corridors north and east of Mammoth, and alpine ski area facilities.

Alpine ski area and geothermal development will create dominant structural and/or vegetation patterns in middleground and background views. Both types of development will create changes of several condition classes, converting natural-appearing lands to disturbed conditions. Community growth toward Sherwin Bowl could also affect lands that now appear natural.

The natural-appearing condition of red fir stands east of San Joaquin Ridge will be retained because these stands will not be entered for timber management during this planning period. New roads and use sites will create new foreground zones and closer middleground views.

The creation of new concentrated recreation areas, with attendant roads and facilities, will change the visual condition in portions of the Owens River and Walker Lake-Sawmill Canyon areas. New Sensitivity Level 1 roads, trails, and recreation developments will change VQOs in foreground zones from Partial Retention to Retention. As these areas already have minor disturbances, visual condition will change only slightly.

CUR: (Current Program) This alternative will improve visual quality on 2.4 percent, maintain current visual quality levels on 97.0 percent, and reduce visual quality on 0.6 percent of the Inyo National Forest. The Visual Quality Index will increase 0.23 from base year, a change of less than 0.2 percent.

Most foreground zones along Sensitivity Level 1 and 2 roads and trails will be natural appearing. Exceptions include existing facilities related to community development (such as the Mammoth-June Lake airport and the existing waste treatment plant), existing recreation developments in concentrated recreation areas, new powerline corridors north and east of Mammoth, and alpine ski area facilities.

The visual condition of red fir stands east of San Joaquin Ridge will change as seen from on-site due to timber activities, as that area will be managed with a primary emphasis on timber production. The timber management disturbances will appear minor in the middleground as seen from most observation points, especially due to the 20-acre limit on opening size. As seen from concentrated recreation areas along upper Deadman creek, however, disturbances will appear moderate. The foreground zones of Sensitivity Level 1 and 2 viewpoints will appear natural.

Geothermal energy development in Lease Blocks I and II will also affect visual quality, but at slightly lower levels than in PRF due to more stringent VQOs. Geothermal developments will appear as a major disturbance in middleground zones.

Alpine ski area development will create dominant structural and/or vegetation patterns in middleground and background views. These impacts will alter the visual condition of approximately 3,900 acres in the Sherwin Bowl, Minaret Summit, and/or Mammoth Knolls areas, converting natural-appearing lands to disturbed conditions. Community growth toward Sherwin Bowl could also affect lands and zones that now appear natural.

Because recreation development and use will continue to operate at low standard levels, some recreation sites will be eliminated, improving visual condition on a small number of acres. The growing amounts of dispersed use will, however, have more importance for visual resource management. Four-wheel drive and OHV use in particular will create highly visible disturbances, particularily near communities and on steeper slopes that are restricted under the current OHV plan. The acres impacted will increase over

time and could change the visual condition on 10 to 30 thousand acres by the fifth decade. Control of current OHV activity adjacent to Mammoth and along the west slopes of the White Mountains east of Bishop is already beyond the capabilities of the Forest.

Finally, wilderness and unroaded lands currently natural in appearance will progressively decline in condition due to the increasing inability of the Forest to enforce regulations, quotas, or management direction.

RPA: (1980 RPA Program) The RPA alternative will improve visual quality on 0.3 percent, maintain current visual quality on 97.6 percent, and reduce visual quality on 2.1 percent of the Inyo National Forest. The Visual Quality Index will decline 1.42 from base year, a one percent change.

This alternative will generate the greatest visual disturbance due to timber activities of any alternative. Timber management in the foreground zones of state-designated scenic highways will meet the VQO of Partial Retention. However, the middeground zones of scenic highways and the foreground zones of other Sensitivity Level 1 travel routes (including trails in the Monache area) will include moderate disturbance. Timber harvest in general will create moderate disturbances on 30- to 60-percent slopes, failing to meet inventoried VQOs. Openings could routinely approach the 40-acre maximum size. Condition classes will be lowered from base year on 13,000 acres in the foreground zones of Level 1 and 2 roads and trails outside of concentrated recreation areas and on 11,000 acres of suitable timber on 30- to 60-percent slopes.

Alpine ski area development will create dominant structural and/or vegetation patterns in the Sherwin Bowl and Minaret Summit areas seen as middleground and background zones. The visual condition of approximately 5,200 acres will be affected. Associated community growth in the Mammoth area could impact 1,500 to 2,500 additional acres south and east of town that are now natural appearing or have only minor disturbances.

Geothermal energy development will affect the visual condition of more than 4,000 acres in Lease Blocks I and II north and northeast of Mammoth. Structures, roads, and powerlines will create changes of several condition classes. Major disturbances will be visible in middleground zones.

New concentrated recreation areas, roads, and recreation facilities will change the visual condition of 1,500 acres in the Buttermilk and Walker Lake-Sawmill Canyon areas.

Designated open-OHV areas could also change the visual condition class slightly on 62,200 additional acres. However, due to the location of these areas, only minor disturbances will be visible on steeper slopes in middleground and background zones of Level 1 roads and trails.

This alternative represents reduced visual condition on the greatest number of acres found in any alternative.

CEE: (Maximize Cost-Efficiency) This alternative will improve visual quality on 2.0 percent, maintain current visual quality levels on 96.7 percent, and reduce visual quality on 1.3 percent of the Inyo National Forest. The Visual Quality Index will decline 0.9 from base year, changing less than 0.6 percent.

Timber management activities will not noticeably affect the natural appearance of the foreground zones of scenic highways. The middlegrounds of scenic highways and the foregrounds of other Sensitivity Level 1 travel routes could be moderately disturbed. Openings could routinely approach the 40-acre maximum size. The visual condition of red fir stands east of San Joaquin Ridge and outside of alpine ski areas will change due to timber activities, as that area will be managed with a primary emphasis on timber production. Timber harvest in the Monache area will create moderate disturbances on lands seen in the middleground from main access and use areas. Initial VQOs for Monache will not be met due to improved road access and changed use.

The greatest amount of visual change will result from full alpine ski area development on 14,000 acres in the Sherwin Bowl, Mammoth Knolls, Minaret Summit, San Joaquin, and White Wing areas. Visual condition on those acres will change from natural-appearing to modified. Assigned VQOs might not be met, especially on slopes with heavy timber in the Mammoth Knolls, San Joaquin Ridge, and White Wing. Base facilities could become dominant structural features in foreground and middleground zones.

Community growth in the Mammoth area will also be the most intensive under this alternative, requiring expansion onto lands that are now in public ownership. Visual impacts will increase significantly on 1,000 to 2,000 acres along the base of Sherwin Bowl and east along Highway 203 into the Shady Rest concentrated recreation area. Natural-appearing areas will become disturbed.

Geothermal development will create dominant structural and/or vegetation patterns in middleground and background views, affecting the visual condition of 4,000 acres or more. This development will create changes of several condition classes, converting natural-appearing lands to disturbed conditions.

Designated open-OHV areas could also change the visual condition class slightly on 45,800 additional acres. However, due to the location of new areas, only minor disturbances will be visible on steeper slopes in the middleground and background zones of Level 1 roads and trails.

The creation of new concentrated recreation areas, with attendant roads and facilities, will change the visual condition on 1,500 acres in the Owens River and Walker Lake-Sawmill Canyon areas. New Sensitivity Level 1 roads and sites will change VQOs from Partial Retention to Retention. As these areas already have minor disturbances, overall visual condition will change only slightly.

AMN: (Maximize All Amenities) This alternative will improve visual quality on 6.9 percent, maintain current visual quality levels on 92.6 percent, and

reduce visual quality on 0.5 percent of the Inyo National Forest. The Visual Quality Index will increase by 1.24 from base year, a change of 0.9 percent.

The least amount of new visual disturbance and the greatest amount of visual rehabilitation are found under this alternative. Timber management activities will meet the Retention VQO on more then 7,000 acres of foreground zones along Sensitivity Level 2 roads, eventually raising the visual condition to natural appearing. Openings will be limited to twenty acres in size or smaller. There will be no timber harvest or road building into the Monache area. Many recreational facilities will also be rehabilitated to reduce visual impacts in foreground zones.

Geothermal development in Lease Blocks I and II will create structural disturbances which could dominate certain middleground views. The visual condition will change several classes on more than 4,000 acres.

The fact that this alternative has the least acreage in open-OHV areas will also contribute to improved visual condition.

AMB: (Emphasize Wildlife and Recreation) This alternative will improve visual quality on 4.7 percent, maintain current visual quality levels on 94.5 percent, and reduce visual quality on 0.8 percent of the Inyo National Forest. The Visual Quality Index will increase 0.56 from base year, a 0.4 percent change.

There will be no timber harvest or road building into the Monache area. Moderate timber harvest impacts in red fir will create some minor disturbances as seen in middleground on the more visible lower slopes of San Joaquin Ridge, but opening size will be limited to ten acres or less in that area.

Geothermal development in Lease Blocks I and II will create structural disturbances that dominate certain middleground views. The visual condition will change several classes on more than 4,000 acres.

Visual condition will change on approximately 8,100 acres due to additional alpine ski area development in the Mammoth Knolls, Minaret Summit, and White Wing areas. These areas will change from natural appearing to highly modified. Ski area developments, especially those resulting in vegetation changes on the forested slopes of Mammoth Knolls and White Wing, could fail to meet assigned VQOs. Community growth south of Mammoth Lakes could also affect lands that now appear natural.

WATERSHED: SOILS

Introduction

Forest activities that have major effects on the soils resource include timber management, facilities construction, OHV use, recreation development, minerals and energy development, range management, fire management, watershed management, and fish habitat management.

Consequences of these activities are assessed in terms of soil productivity. Accelerated erosion reduces soil productivity; watershed improvement restores lost or threatened productivity by arresting the erosion process.

Indicators

1. Timber management (site preparation)
2. Road and trail construction
3. New alpine ski area development
4. New summer recreation development
5. New off-road vehicle (OHV) use
6. Wildfire
7. Livestock grazing
8. New mineral and energy development
9. Watershed restoration and fish habitat improvement.

Machinery used for timber site preparation disturbs the fragile and fertile soil surface layer. Vegetation is also removed during site preparation, so that competition between grass or brush and young trees is minimized. The combination of disturbance by machinery and the removal of vegetation can easily lead to accelerated erosion and a consequent loss of soil productivity. Timber harvest itself is not generally a problem for soils on the Inyo because most harvest is conducted over the snow in winter.

The building of new roads and trails also disturbs the soil and removes the vegetation, resulting in high potential for soil erosion.

Alpine ski areas are especially subject to accelerated erosion because vegetation is removed from the runs, the slopes are steep, and it is difficult to reestablish protective vegetation as runs are frequently reshaped by heavy equipment.

Recreation developments (such as campgrounds, restrooms, and parking areas) disturb the soil and accelerate erosion by mechanical removal of vegetation and reshaping of the soil. Large structures and parking lots cover large areas of soil, taking it out of production.

Off-highway vehicle (OHV) use compacts and displaces the soil. These effects are especially destructive when they occur on large open areas, rather than being restricted to designated roads and trails.

Wildfire has the potential to increase soil erosion and is difficult to mitigate. High intensity fires remove all vegetation, create an impermeable soil layer at or near the surface, and can affect large areas.

Livestock affect the soil resource by trampling the soil and by removing protective vegetation. The loss of vegetative cover can expose the soil to accelerated erosion, with a consequent loss in soil productivity.

The development of mining sites involves shaping, vegetation removal, and other soil disturbances that increase the potential for accelerated erosion and loss of soil productivity.

Energy development also entails soil shaping, vegetation removal, displacement (by covering with buildings or other structures), and other soil disturbance. Geothermal development entails the building and maintaining of one or more power plants, numerous drilling pads, miles of pipeline and power lines, and a complex of associated roads. Wind farms include a network of windmill pads, powerlines and roads. Hydroelectric development entails the installation of pipelines and transmission lines. In addition, as water diversion will result in a lower density of vegetative cover, more soil will be exposed to the forces of erosion.

Activities that restore and protect the soil resource include those that protect or restore vegetative cover, arrest accelerated erosion, and rebuild the soil. Watershed restoration arrests soil erosion and loss of productivity using structural and vegetative means; fish habitat improvement projects often include the planting of vegetation on stream terraces and reseeding of exposed streambanks.

Assumptions

All of the alternatives are analyzed with the assumption that Forest-wide Standards and Guidelines and Management Prescription direction provide for the *maintenance of long-term soil productivity*.

Only new soil-disturbing activities are used as indicators of environmental consequences. Existing disturbance represents the basis of comparison for changes under the various alternatives.

Vegetation treatment for range and wildlife will have minimal effects on the soil resource, as such projects are conducted under controlled conditions including environmental analysis and mitigation.

Consequences Common to All Alternatives

The likelihood of energy development is assumed to be the same under all alternatives; for planning purposes, development scenarios based on current agreements are common to all alternatives.

Consequences that Vary by Alternative

Tables 91 and 92 display indicators of potential impacts on the soil resource under each alternative. Table 91 displays potential adverse and beneficial effects of the indicators by alternative in the first decade. The adverse effects reflect the acres which will be exposed to accelerated soil erosion under each alternative; the beneficial effects represent the number of acres which will be restored under each alternative. The net potential effect represents the difference of the acres disturbed minus those restored. Table 92 displays the net potential effect by alternative by decade for five decades, the 50-year annual average, and the relative effect rating.

Table 91
Indicators of Effects on Soil Productivity by Alternative
(first decade - average annual acres)

	Alternatives					
Indicator	PRF	CUR	RPA	CEE	AMN	AMB
Activities that have potential adverse effects:						
Timber site preparation	200	817	714	307	32	96
New roads and trails	4	5	11	10	7	8
New alpine ski areas	44	44	44	44	44	44
New nonalpine recreation development	16	0	16	16	0	10
New open summer OHV areas	0	0	1,244	916	0	0
Wildfire	918	1,011	918	1,134	927	918
New grazing	0	0	193	0	0	0
New mineral development	105	105	117	81	51	78
TOTAL	**1,287**	**1,982**	**3,257**	**2,508**	**1,061**	**1,154**
Activities that have potential beneficial effects:						
New watershed restoration and fish habitat improvement	593	42	189	503	504	505
Net Potential Effect						
(adverse minus beneficial)	694	1,940	3,068	2,005	557	649

Table 92
Net Effects on Soil Productivity by Decade
(average annual net effect in acres)

	Alternatives					
Decades	PRF	CUR	RPA	CEE	AMN	AMB
Decade 1	694	1,940	3,068	2,005	557	571
Decade 2	525	1,280	2,761	2,027	586	655
Decade 3	790	1,377	3,293	2,129	745	770
Decade 4	899	1,513	3,672	2,305	905	860
Decade 5	947	1,804	3,935	3,039	1,021	1,283
Total net effect (5 decades)	**38,550**	**77,914**	**167,290**	**115,050**	**38,140**	**41,390**
Relative effect rating	LM	LM	H	M	L	L

PRF: (Preferred) Under this alternative, the potential degradation of the soil resource over the next fifty years will be low-moderate. These effects will result from a moderate level of timber site preparation, a large amount of new road and trail construction, a moderate level of new alpine ski area development, a large amount of new recreation development, a high level of projected mineral activity, and a moderate amount of wildfire. There will be no new open OHV acreage and no new areas managed for grazing. The large amount of watershed restoration and fish habitat improvement will offset some of the adverse effects on a Forest-wide basis.

CUR: (Current Program) Under this alternative, the relative potential degradation of the soil resource over the next fifty years will be low-moderate. These effects will result from a high level of timber site preparation, a small amount of new road and trail construction, a moderate level of new alpine ski area development, a high level of projected mineral activity, and a large amount of projected wildfire. There will be no new non-alpine recreation development, new open OHV acreage, or new areas managed for grazing. The small amount of watershed restoration and fish habitat improvement will only slightly offset the adverse effects.

RPA: (1980 RPA Program) Under this alternative, the relative potential degradation of the soil resource over the next fifty years will be the highest of any alternative. These effects will result from a very high level of timber site preparation, a large amount of new road and trail construction, large acreage in new alpine ski area development, a high level of projected mineral activity, and a moderate amount of projected wildfire, considerable new acreage managed for grazing, and substantial additions of open OHV acreage. The moderate level of watershed restoration and fish habitat improvement will only slightly offset the adverse effects on a Forest-wide basis.

CEE: (Maximize Cost-Efficiency) Under this alternative, the relative potential degradation of the soil resource over the next fifty years will be second only to RPA. These effects will result from a moderate level of timber site preparation, a large amount of new road and trail construction, maximum new alpine ski area development, a large amount of new recreation development, a moderate level of projected mineral activity, a large amount of wildfire, and substantial new open OHV acreage. There will be no new areas managed for grazing. Full implementation of watershed restoration and fish habitat improvement opportunities will offset some of the adverse effects on a Forest-wide basis.

AMN: (Maximize all Amenities) Under this alternative, the relative potential degradation of the soil resource over the next fifty years will be the lowest of any alternative. These effects will result from a low level of timber site preparation, a small amount of new road and trail construction, minimal new alpine ski area development, a low level of projected mineral activity, and a moderate amount of wildfire. There will be no new nonalpine recreation development, new open areas managed for grazing, or new open OHV acreage. Full implementation of watershed restoration and some fish habitat improvement opportunities will offset many of the adverse effects on a Forest-wide basis.

AMB: (Emphasize Wildlife and Recreation) The relative potential degradation of the soil resource over the next fifty years will be the second-lowest under this alternative. These effects will result from a low level of timber site preparation, a moderate amount of new road and trail construction, a high level of new alpine ski area development, a moderately high level of new nonalpine recreation development, a moderate level of projected mineral activity, and a moderate amount of wildfire. There will be no new open areas managed for grazing or new open OHV acreage. Full implementation of watershed restoration and moderate fish habitat improvement will offset many of the adverse effects on a Forest-wide basis.

WATERSHED: WATER

Introduction

Forest activities that have major effects on water quality and water yield include timber management, road construction, recreation use, minerals and energy development, range management, watershed management, and fish habitat management.

Consequences of these activities are assessed in terms of overall watershed condition as reflected in water quality and water yields, including cumulative effects.

Data sources for this analysis include water resources records for the Inyo National Forest (1929 to the present), professional literature, personal communications with adjacent National Forests, and professional judgment.

Indicators

1. Timber management (site preparation)
2. Road and trail construction
3. New summer recreation development
4. Mineral and energy development
5. Alpine ski area development
6. OHV use
7. Livestock grazing
8. Wildfire
9. Watershed and fish habitat improvement

Activities associated with the first eight indicators all affect water quality by disturbing, exposing, and/or compacting soils and channelizing water, providing an opportunity for soil to erode and to enter streams as sediment. Sedimentation can reduce reservoir capacity; lower water quality for irrigation, hydropower and domestic use; and reduce fish habitat quality. Acres of soil disturbed are used to quantify the relative impacts of the alternatives on overall watershed condition. The assumed relationship is that the more acres disturbed, the greater the effects on watershed condition.

Water yield is also altered by land-disturbing activities because soil disturbance triggers changes in the hydrologic regime (the timing, volume and quality of runoff). As runoff volumes during the spring increase with increased soil disturbance, the duration of runoff decreases. Increased runoff volumes over a shorter time period result in less soil water for plant growth, a lower recharge rate for groundwater basins due to reduced percolation through the soil mantle, and increased stream channel erosion.

Increases in water yield are generally of benefit to municipal water users but the tradeoff of increased sediment yield impacting beneficial water uses can be high. Alternatives which emphasize activities that increase water yield also increase the potential for sedimentation.

Machinery used for timber site preparation disturbs the soil structure and protective vegetation. The results can include reduced infiltration rates and capacity, water channelization, overland water flow, and increased susceptibility of the soil to detachment and displacement under the impact of raindrops. Ground disturbance is the first step in a process that eventually leads to soil movement and reduction of water quality from sedimentation. In general, suitable timber lands on the Forest lie away from bodies of water. Only those timber activities on lands that could contribute to water quality problems are used as an indicator. Timber harvest itself is not an indicator, as logging on the Inyo is conducted in winter over the snow to minimize soil disturbance.

Road and trail construction, OHV use, non-alpine recreation development, and mineral and energy development all disturb the soil in much the same way as that described above for timber activities.

Alpine ski area development has especially high potential to increase water yield, produce sediment, and reduce water quality. Ski runs lie on steep

slopes and are cut parallel to the slope, causing severe water channelization; they are compacted, altering soil permeability; and nearly all the vegetative cover is removed, causing a drastic shift in the hydrologic cycle. As ski areas are managed to maximize skiing opportunities even with minimal snow cover, slopes are sculptured to eliminate rough projections and to follow the fall line as uniformly as possible. Such conditions facilitate soil erosion and consequent sedimentation. Finally, ski areas lie in areas with high levels of precipitation, at high elevations with short growing seasons, and on infertile soils. Conditions are not, therefore, favorable for establishing protective vegetation once native shrubs and trees have been removed.

Livestock spend a disproportionate amount of time in wet meadows and other riparian areas. Grazing animals can impact water quality by trampling streambanks, compacting soils, reducing vegetative cover, and increasing sedimentation. Past grazing has impacted approximately 23,500 acres of meadows on the Forest. Continued grazing, while not generally increasing sedimentation, may well slow the course of natural recovery. Although the effects of grazing on water quality can be mitigated by various measures such as herding, salting, water development, and delaying the grazing season, fencing will be the only effective mitigation measure for grazing in certain sensitive streamside zones.

Wildfires typically remove or reduce protective vegetation, create water-repellant soils, increase runoff, and accelerate soil erosion, affecting both water yield and water quality.

Watershed restoration includes the construction of erosion control structures, stabilization of gullies and channels, obliteration of unneeded roads and trails, and planting of vegetative ground cover. These measures help to arrest soil erosion, thereby reducing sedimentation of streams and retarding runoff. Fish habitat improvement work includes such practices as willow planting and soil rehabilitation to stabilize stream channels and reduce sediment production. Acres of watershed and fish habitat improved are used to quantify the beneficial effects these activities by alternative.

Assumptions

Water quality on the Inyo National Forest is primarily affected by sediment production. Although Forest activities are managed to minimize impacts on watersheds, sediment yields will increase as new ground disturbing activities occur.

Although sediment yield corresponds broadly to the amount of ground disturbed Forest-wide, the relationship varies from one location to another depending on soil characteristics, the presence or absence of streams, streambank characteristics, slope, precipitation, vegetation type, and other physical and biological factors.

Vegetation treatment for range and wildlife will have minimal effects on water quality, as treatments occur under carefully controlled conditions.

All alternatives include Forest-wide Standards and Guidelines and Management Prescription direction which protect or restore watershed condition. For

example, Best Management Practices (BMPs), a comprehensive set of guidelines designed to minimize adverse impacts on water quality, will be applied under any alternative.

Consequences Common to All Alternatives

Approximately 7,000 acre-feet of surface water per year are presently needed for Forest activities. This amount will be expected to increase by less than 70 acre-feet over the next fifty years under any alternative; consequently, the Forest's need for additional water rights is considered common to all alternatives.

Increased ski area capacity is expected to result in community growth, which will in turn result increased demands for municipal water supplies. Mono County land use plans project a 100 to 200 percent increase in the demand for water. As the competition for water uses is intense, these conditions will be expected to result in water rights adjudications under any alternative.

Consequences that Vary by Alternative

Table 93 displays the relative indicators of impacts on water quality for each alternative for the first decade. The potential adverse effects reflect the potential number of acres disturbed, which could in turn impact water quality. The potential beneficial effects represent the number of acres that will be restored under each alternative. The net potential effect is the difference of the projected disturbed minus restored acreage.

Table 94 displays the net potential effect of each alternative, by decade, over the next fifty years, the fifty-year total effect, and the net effect rating.

Table 95 displays anticipated increases in water yield in the first decade. This figure was calculated primarily on the basis of acres of vegetation removal for timber harvest and ski area development.

Table 93
Indicators of Effects on Water Quality
(first decade - average annual acres)

Indicators	Alternatives					
	PRF	CUR	RPA	CEE	AMN	AMB
Activities that have potential adverse effects:						
Timber site preparation (only on lands near water)	30	65	131	24	1	13
New roads and trails	4	5	11	10	7	8
New alpine ski areas	44	44	44	44	44	44
New non-alpine recreation development	16	0	16	16	0	10
New OHV open areas	0	0	1,244	916	0	0
Wildfire	918	1,011	918	1,134	927	918
New grazing	0	0	193	0	0	0
New mineral/energy development	30	65	131	24	1	13
TOTAL	**1,042**	**1,190**	**2,688**	**2,168**	**980**	**1,006**
Activities that have potential beneficial effects:						
New watershed restoration and fish habitat work	593	42	189	503	504	505
Net potential effect (adverse minus beneficial) effects	449	1,148	2,499	1,665	476	501

Table 94
Net Effects on Water Quality by Decade
(average annual acres)

	Alternatives					
	PRF	CUR	RPA	CEE	AMN	AMB
Decade 1	695	1,148	2,499	1,665	476	501
Decade 2	837	1,228	2,645	1,782	557	619
Decade 3	941	1,225	2,746	1,904	559	726
Decade 4	1,011	1,235	2,847	2,033	559	735
Decade 5	1,085	1,234	2,910	2,258	538	1,026
Total net effect (5 decades)	**4,569**	**6,070**	**13,647**	**9,642**	**2,689**	**3,607**
Relative effect rating	LM	LM	H	M	L	L

Table 95
Projected Increases in Water Yield by Decade
(M acre-feet)

	Alternatives					
	PRF	CUR	RPA	CEE	AMN	AMB
Decade 1	7.0	11.0	15.0	7.0	0	1.7
Decade 2	0.2	4.0	0	0	0	0.5
Decade 3	0	0	0	0	0	0.5
Decade 4	0	3.0	0	0	0	0.5
Decade 5	0	0	0	0	0	0.5

Consequences Other than Cumulative Watershed Impacts

PRF: (Preferred) This alternative represents a low-moderate level of potential adverse impacts on water quality. These effects will result from a moderate level of timber site preparation, large acreage in new roads and trails, moderate new alpine ski area development, and moderate mineral development opportunity. The high level of watershed restoration and stream habitat improvement will offset some of these potential adverse effects on a Forest-wide basis.

CUR: (Current Program) This alternative represents a low-moderate level of relative potential impacts on water quality. These effects will result from a high level of timber site preparation, a low level of new road and trail construction, a moderate level of new alpine ski area development, and a moderate level of opportunity for new mineral development. The moderate level of watershed restoration and fish habitat improvement will offset some of the potential adverse effects on a Forest-wide basis.

RPA: (1980 RPA Program) This alternative represents the highest level of potential adverse impacts on water quality of any alternative. These effects will result from a high level of timber site preparation, a high level of new road and trail construction, a high level of new alpine ski area development, a high level of new grazing, many new open OHV acres, and high-level opportunities for new mineral development. The moderate level of new watershed restoration and fish habitat improvement will do little to offset the potential adverse impacts of commodity production under this alternative.

CEE: (Maximize Cost-Efficiency) This alternative represents a moderate relative level of potential adverse impacts on water quality. These effects will result from a moderate level of timber site preparation, a high level of new roads and trails, a high level of new alpine ski area development, many new open OHV acres, and a moderate level of new mineral development opportunity. The high level of watershed restoration and fish habitat improvement will offest some of these potential adverse effects on a Forest-wide basis.

AMN: (Maximize All Amenities) This alternative represents the lowest level of potential impacts on water quality of any alternative. These effects will result from a low level of timber site preparation, a low level of new roads, a moderate level of new trails, a moderate level of new ski area development, and a low level of opportunity for new mineral development. The high level of watershed restoration and stream habitat improvement will offset most of these adverse effects on a Forest-wide basis.

AMB: (Emphasize Wildlife and Recreation) This alternative represents a very low level of potential adverse effects on water quality. These effects will result from a low level of timber site preparation, a moderate level of new roads and trails, a high level of new alpine ski area development, and a low level of new mineral development opportunity. The high level of watershed and fish habitat improvment will offest most of these potential effects on a Forest-wide basis.

Cumulative Watershed Effects (CWE)

The Inyo National Forest does not have a CWE methodology. A specific CWE assessment was not, therefore, made on the two watersheds of concern (discussed below). The Pacific Southwest Region is currently developing a CWE methodology. When it is available, the Forest will apply the methodology on a project-by-project basis.

Twenty of the twenty-two watersheds on the Forest are fairly stable, experiencing only localized, small-scale water quality problems. The Mammoth Creek-Hot Creek watershed and the South Fork Kern River watershed will be vulnerable to cumulative watershed effects under certain alternatives.

The South Fork of the Kern River will be subject to new timber harvest under CUR, RPA, and CEE. Not only will actual timber site preparation affect water quality, but access into and through the area will improve with construction of a paved road. The amount of vehicle use will increase, with corresponding water quality impacts. In addition, the Monache Meadows area is a potential site for increased cattle grazing with corresponding water quality impacts. Grazing will increase moderately under PRF and CEE; it will increase substantially under RPA. Finally, the area is subject to OHV impacts. Approximately five miles of existing OHV routes are serious erosion problems, and illegal use off established routes is a potential source of additional damage.

The Mammoth Creek-Hot Creek watershed will be subject primarily to the impacts of ski area area development and associated community development. Ski areas and community facilities will increase under all alternatives. The growth will be lowest in AMN; higher in PRF, CUR, AMB, and RPA; and highest in CEE. The lower reaches of Hot Creek are suitable for increased cattle grazing. Grazing will increase moderately under alternatives PRF and CEE, and substantially under the RPA alternative. The RPA and CEE alternatives will introduce high-level timber harvest into this watershed and the impacts of new timber management will be similar to those discussed above for the South Fork of the Kern. However, the cumulative effects will be greater due to the addition of timber and grazing impacts to ski area and community growth. This watershed is also subject to the effects of geothermal development in Lease Block II or on private land. Finally, the potential for impacts in this watershed is greater because considerable acreage within the watershed is privately owned. The Forest Service has little influence over the type of development or methods used and their consequences on water quality.

Cumulative watershed effects in either of the above-mentioned watersheds have the potential to affect municipal water supply quality and resident trout habitat including state-designated wild trout waters in Hot Creek.

The application of BMPs by the Forest and urban development guidelines currently proposed by the Lahontan Water Quality Control Board to the community should mitigate adverse impacts on water quality and could actually result in improved water quality over the long run. Allotment management plans will include stipulations for water quality protection measures in livestock management, and grazing impacts can be monitored using the streambank stability rating system described in Chapter III. When CWE methodologies are available, they will be applied wherever appropriate. In lieu of CWE analysis, non-regenerable acres

have been removed from the suitable timber base and Riparian Area Standards and Guidelines limit streamside disturbance to 5 percent per decade.

WILD AND SCENIC RIVER CANDIDATE

Introduction

Forest activities that could have major effects on wild and scenic rivers include off-highway vehicle use, timber management, and range management. The North Fork of the Kern River and the South Fork of the Kern River have recently been designated by Congress as Wild and Scenic Rivers. The Middle Fork of the San Joaquin is surrounded by wilderness and concentrated recreation areas. This river is unlikely to be affected by off-highway vehicle use, timber management, or range management under any alternative.

Consequences of those activities are assessed in terms of their potential effects on a river's suitability for wild and scenic designation. Although the lead role for evaluating the three candidate wild and scenic river on the Inyo is held by the Sierra National Forests, the management scenario envisioned under alternatives considered by the Inyo National Forest could affect a river's suitability for wild and scenic designation.

WILDERNESS

Introduction

Forest activities that have major effects on wilderness resources include: (1) activities associated directly with wilderness, such as wilderness recommendations, recreational attractions, trails/trailheads, and outfitter-guide opportunities; and (2) activities associated with non-wilderness management and land uses on lands adjoining wilderness, such as developed recreation, timber harvest, and non-wilderness trail construction.

Consequences of these activities are assessed in terms of the wilderness experience provided to users and the effects of Forest activities on wilderness resources. Data sources used for this analysis include approved wilderness management plans for the Hoover, Ansel Adams (formerly Minarets), John Muir, and Golden Trout Wilderness, and the approved environmental assessment for golden trout habitat improvement on the Kern Plateau.

Indicators

1. Overnight developed recreation use
2. Wilderness use
3. New wilderness recommendations
4. Other attractions within wilderness
5. New trails outside wilderness
6. Opportunities for new outfitter-guide services
7. Timber harvest

The amount of day use in wilderness is closely associated with the amount of developed site use on lands within a reasonable distance of wilderness trailhead areas.

Overall wilderness use is an indicator of the degree to which the Forest is meeting projected demand under an alternative. New additions to wilderness would increase overall wilderness recreation opportunities on the Forest in response to increasing demand.

Other wilderness-related attractions include wild and scenic river designation and new trail and trailhead construction. Wild and scenic rivers attract use by virtue of special designation. Trails and trailheads disperse use, increasing use in areas made more accessible and reducing crowding in other areas.

New trail construction outside of wilderness offsets the demand for wilderness day-use, reducing crowding in wilderness and increasing opportunities for solitude.

Outfitter-guide services would increase the opportunity for non-hikers to visit and enjoy the wilderness, while also increasing the potential for conflict between stock users and backpackers.

Timber harvest in the Monache area would entail the construction of a paved, two-wheel drive road into country now accessible only by four-wheel drive. One result would be improved access to wilderness trailheads for the Golden Trout and South Sierra Wildernesses, with a resultant increase in overnight and day use of those wildernesses. Outfitter-guide opportunities and other stock use opportunities would also increase with improved access for horse trailers.

Assumptions

The demand for wilderness use will exceed the supply available before the fifth decade under any alternative. The Inyo does not have enough existing or potential wilderness to meet projected demand if wilderness use is managed within capacity limitations.

Smoke from wildfire could occasionally affect air quality in wilderness; however, smoke management plans will be developed in conjunction with Fire Management Action Plans to minimize this impact, especially on Class I wilderness. The impacts of prescribed burning will be minimized by developing smoke management plans for prescribed fires and by burning only when air quality conditions favor smoke dispersion.

Forest-wide Standards and Guidelines and the Wilderness Management Prescription assure that, under all alternatives, wilderness would be managed to maintain basic wilderness characteristics: natural ecological integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation.

Consequences Common to All Alternatives

All wildernesses would be managed within established capacity limitations, including the application of trailhead quotas where necessary. All wildernesses would be used to capacity during peak use seasons by the fifth decade.

The administration of legitimate livestock grazing in wilderness and motorized access to private land inholdings represent potential conflicts with the expectations of wilderness users under all alternatives.

Designation of the Middle Fork of the San Joaquin River as a Wild and Scenic River would attract visitors to the Ansel Adams Wilderness under all alternatives.

Thirteen miles of new trail would be constructed in existing wilderness under all alternatives, improving dispersal and resource protection.

Consequences That Vary by Alternative

The following table displays the effects of alternatives on wilderness resources and opportunities.

Table 96
Indicators of Wilderness Consequences that Vary by Alternative
(end of the fifth decade)

	Alternatives					
Indicator	**PRF**	**CUR**	**RPA**	**CEE**	**AMN**	**AMB**
Developed summer recreation use (M RVDs)	2900	1940	2901	2903	1944	2675
Wilderness recreation use (M RVDs)	788	639	771	838	863	837
Recommended wilderness (M acres)	172.6	107.6	0	339.8	510.8	222.7
New trails in recommended wilderness (miles)	36.0	15.0	0	60.0	66.0	56.0
New trails outside wilderness (miles)	180	0	180	180	80	120
Improved road access for timber harvest in Monache	No	Yes	Yes	Yes	No	No
Increased outfitter-guide opportunities	Yes	Yes	No	Yes	Yes	Yes

PRF: (Preferred) A 57 percent increase in developed site use will increase day use in adjacent wildernesses, resulting in more encounters within five miles of trailheads. The areas of greatest impact will be trails originating from the Mammoth Lakes Basin, Reds Meadow, Rock Creek, and Bishop Creek. New developments in the Walker Lake area will increase day use of the Bloody Canyon-Mono Pass trail.

The effects of increased developed recreation use on wilderness will be offset somewhat by an additional 180 miles of trail outside of wilderness. However, the attractions available only in wilderness will continue to attract many day users.

Further Planning Areas proposed for wilderness designation under this alternative total 172,600 acres. The greatest overall increase in wilderness recreation opportunities (due to a combination of large size, relative ease of access, and moderate-to-high wilderness attractions), will be seen in the White Mountains area. Most of the new trail and trailhead facilities will serve that area as well. The Tioga Lake area, while high in attraction, is too small to offer much increased overnight opportunity. Increases will result primarily from day use associated with developed sites in the Tioga Lake area.

The remaining acreage in recommended wilderness will represent a low level of increased wilderness recreation opportunity due to a lack of water, a lack of recreational attractions, difficulty of access, and/or small size.

Timber will not be harvested in the Monache area. Without development of this resource, there will be no new road access or trailhead development for the southern portions of the Golden Trout and South Sierra Wildernesses. Recreation use of these wildernesses will increase, but at a much slower rate than under alternatives with improved access.

Outfitter-guide opportunities will increase due to the new wilderness and associated trails and trailheads in the White Mountains.

CUR: (Current Program) Existing overcrowding by day users will continue within five miles of trailheads, especially on trails out of the Mammoth Lakes Basin, Reds Meadow, Rock Creek, and Bishop Creek areas. This overcrowding will not be expected to increase significantly, as there will be little increase in neighboring developed site use; nor will the pressure be offset elsewhere, as no non-wilderness trails will be developed.

Further Planning Areas proposed for wilderness designation under this alternative total 107,600 acres. The greatest overall increase in wilderness recreation opportunities (due to a combination of large size, relative ease of access, and moderate-to-high wilderness attractions), will be seen in the White Mountains area. Most of the new trail and trailhead facilities will serve that area as well. The Paiute area will represent a low level of increased wilderness recreation opportunity due to a lack of water, a lack of recreational attractions, and difficulty of access. Both recommended wildernesses represent Great Basin ecological types not yet represented by wilderness on the Inyo.

Timber harvest in Monache will increase use in the Golden Trout and South Sierra Wildernesses, but opportunities for trailhead development will be limited by budget.

Construction of new trails in the White Mountains will increase the opportunity for additional outfitter-guide services in this area. Improved access into the Monache area will provide an opportunity for new stock-oriented outfitter-guide services for neighboring wildernesses.

RPA: (1980 RPA Program) A 57 percent increase in developed site use will increase pressure by day users on existing wilderness. Loss of solitude and increased encounters between users will be greatest within five miles of trailheads in the Mammoth Lakes Basin, Reds Meadow, Rock Creek, and Bishop Creek areas. Development of recreation facilities in the Buttermilk area will impact the Horton Lakes trail and, to a lesser extent, the Bishop Creek trailheads. New developments in the Walker Lake area will increase day use of the Bloody Canyon-Mono Pass trail.

Construction of an additional 180 miles of trails outside wilderness will mitigate the increased pressure for day use in wilderness. However, the water and scenic attractions of wilderness will continue to draw day users.

Since no Further Planning Areas are proposed for wilderness, there will be no new wilderness recreation opportunities.

Timber harvesting in Monache will improve access to trailheads for the Golden Trout and South Sierra wildernesses. Trailhead facilities will attract stock users and increase outfitter-guide opportunities in these two wildernesses.

CEE: (Maximize Cost-Efficiency)

A 57 percent increase in developed site use will increase day use in adjacent wildernesses, resulting in more encounters within five miles of trailheads. The areas of greatest impact will be trails originating from the Mammoth Lakes Basin, Red's Meadow, Rock Creek, and Bishop Creek. New developments in the Walker Lake area will increase use of the Bloody Canyon-Mono Pass trail. Developments in the Buttermilk area will affect the Horton Creek trail.

The effects of increased developed recreation use on wilderness will be offset somewhat by an additional 180 miles of trail outside of wilderness. However, the attractions available only in wilderness will continue to attract many day users.

Further Planning Areas proposed for wilderness designation under this alternative total 338,900 acres. The greatest overall increases in wilderness recreation opportunities (due to a combination of large size, relative ease of access, and moderate-to-high wilderness attractions), will be seen in the Coyote Southeast and White Mountains areas. Most of the new trail and trailhead facilities will serve those areas as well.

The Hall area, although very high in wilderness attractions and recreation potential, will represent only moderate increases in wilderness use opportunity;

the area is an established Research Natural Area, and overnight use of the area is prohibited. The Tioga Lake area, while high in attraction, is too small to offer much increased overnight opportunity; increases will result primarily from day use associated with developed sites in the Tioga Lake area.

The Log Cabin-Saddlebag and Laurel-McGee areas will offer moderate increases in wilderness recreation; they include water, scenic values, and destination points, but much of the acreage in each area is steep and inaccessible.

Improved access for timber harvest in the Monache area will increase wilderness use and new trailhead development opportunities in the southern part of the Golden Trout and South Sierra wildernesses.

Opportunities for outfitter-guide services will increase in the South Sierra and Golden Trout wildernesses due to improved access, and in the White Mountains due to new trails and trailheads.

AMN: (Maximize All Amenities) This alternative will not substantially increase developed recreation use on the Forest. Day users originating from campgrounds and private resorts will continue to use wilderness for hiking, fishing and viewing outstanding scenery. However, the pressure on wilderness trails will be lowered as a result of constructing 80 miles of new trails outside wilderness.

Further Planning Areas proposed for wilderness designation under this alternative total 510,800 acres. The greatest overall increases in wilderness recreation opportunities (due to a combination of large size, relative ease of access, and moderate-to-high wilderness attractions), will be seen in the Coyote Southeast and White Mountains areas. Most of the new trail and trailhead facilities will serve those areas as well.

The Hall area, although very high in wilderness attractions and recreation potential, will represent only moderate increases in wilderness use opportunity. The area is an established Research Natural Area, and overnight use of the area is prohibited. The Tioga Lake area, while high in attraction, is too small to offer much increased overnight opportunities. Increases will result primarily from day use associated with developed sites in the Tioga Lake area.

The Log Cabin-Saddlebag and Laurel-McGee areas will offer moderate increases in wilderness recreation; they include water, scenic values, and destination points, but much of the acreage in each area is steep and inaccessible. The remaining acreage in recommended wilderness will represent a low level of increased wilderness recreation opportunity due to a lack of water, a lack of recreational attractions, difficulty of access, and/or small size.

Timber will not be harvested in the Monache area. Without development of this resource, there will be no new road access or trailhead development for the southern portions of the Golden Trout and South Sierra Wildernesses. Recreation use of these wildernesses will increase, but at a much slower rate than under alternatives with improved access.

There will be potential for new outfitter-guide services in the White Mountains wilderness, but not in the Monache area.

AMB: (Emphasize Wildlife and Recreation) This alternative will increase developed site use approximately 44 percent over the next fifty years, resulting in a moderate increase in the number of day users on wilderness trails. Encounters will increase and crowding will result on the first five miles of trail out of trailheads in the Mammoth Lakes Basin, Reds Meadow, Rock Creek, and Bishop Creek areas.

The construction of 120 miles of new trails outside of wilderness will offset some of the effects of increased day use. However, the attractions present only in wilderness will still tend to attract the day user, and will tend to result in the impacts noted above.

Further Planning Areas proposed for wilderness designation under this alternative total 222,700 acres. The greatest overall increases in wilderness recreation opportunities (due to a combination of large size, relative ease of access, and moderate-to-high wilderness attractions), will be seen in the Coyote Southeast and White Mountains areas. Most of the new trail and trailhead facilities will serve those areas as well. The Tioga Lake area, while high in attraction, is too small to offer much increased overnight opportunity; increases will result primarily from day use associated with developed sites in the Tioga Lake area.

The Log Cabin-Saddlebag and Laurel-McGee areas will offer moderate increases in wilderness recreation. They include water, scenic values, and destination points, but much of the acreage in each area is steep and inaccessible. The remaining acreage in recommended wilderness will represent a low level of increased wilderness recreation opportunity due to a lack of water, a lack of recreational attractions, and difficulty of access. The White Mountains and Paiute areas represent Great Basin ecological types not yet represented in wilderness on the Forest.

Lack of timber harvest and improved access in Monache will result in slower increases in use of adjoining wilderness than under those alternatives with timber harvest.

There will be new opportunities for outfitter-guide services in the White Mountains, but not in the Monache area.

WILDLIFE

Introduction

Forest activities that have major effects on wildlife habitat include wildlife, range, recreation, timber, fire and wilderness management and energy development.

The consequences of alternatives on wildlife habitats are the result of land uses, management prescription applications, management Standards and Guidelines, and wildlife habitat improvement. These consequences are measured in terms of habitat capability for Management Indicator Species, and projected animal population numbers. The methodology used to project habitat capability and animal numbers is retained in the planning records.

Data sources for this analysis include wildlife management principles, research and management literature, and habitat capability models developed for selected indicator species.

Indicators

Approximately 400 species of wildlife occupy habitat on the Forest during some stage of their life cycle. A vast array of vegetation components and physical features combine to meet specific wildlife needs. Vegetation type, abundance, seral stage, and distribution are important factors affecting the capability of habitats to support wildlife. The availability of physical features, such as water, snags, rock outcrops, and cliffs are also important wildlife habitat components. Wildlife populations vary in response to changes in habitat capability, which changes in response to Forest activities.

Certain wildlife species and key habitat types were chosen as indicators of the effects of alternatives on wildlife. Harvest, threatened and endangered (T&E), sensitive, and special interest species were chosen on the basis of issues and concerns regarding the species. Key habitats were chosen on the basis of the likelihood that they will be affected by Forest activities. Management Indicator Species (MIS) for those habitats were chosen to represent other species with similar habitat needs.

1. Harvest species: mule deer, blue grouse, sage grouse
2. Threatened and endangered (T&E) species: bald eagle, peregrine falcon
3. Sensitive species: fisher, Sierra Nevada red fox, goshawk, pine marten, great gray owl, spotted owl, Sierra Nevada mountain sheep, wolverine
4. Special interest species: golden eagle, tule elk, prairie falcon, Nelson mountain sheep
5. Riparian areas: yellow warbler
6. Snags: hairy woodpecker, Williamson sapsucker
5. Early-middle seral stages of brush: sage grouse
6. Older seral stages of coniferous forest: goshawk.

Forest activities affecting mule deer include primarily ski area development, timber management, geothermal development, livestock grazing, riparian area protection, and deer habitat improvement.

As most of the deer on the Forest migrate from summer range west of the Sierra Nevada crest to winter range in the Owens and Mono Basins, the very presence of deer on the Forest (and on adjoining BLM deer winter range) is determined by their ability to migrate into the area.

Ski area development and geothermal development are the activities with the greatest potential to affect deer migration routes. Either type of development could both physically obstruct those routes and eliminate or reduce the productivity of vegetation used by migrating animals. Facility development such as ski runs, lifts, and base facilities, geothermal power plants, wellsites, and pipelines; improved access; and concentrated human use will all contribute to these effects.

Timber harvest can also affect habitat for migratory deer, primarily because of the increased human disturbance (including poaching) associated with improved

access. Timber harvest in the Monache area and the red fir forest east of San Joaquin Ridge will have the greatest potential effects on deer populations.

Ski area development and approved geothermal exploration and development in Lease Blocks I and II, has the potential for major cumulative impacts on deer migration. The Buttermilk, Sherwin, and Casa Diablo herds all migrate through the area between Mammoth Lakes and Glass Creek. This area is subject to geothermal and ski area development.

Livestock grazing affects deer habitat capacity where deer and cattle compete for forage, primarily on key deer winter range, and where cattle browse in deer fawning areas, reducing forage and cover needed for fawns and does.

As deer fawning habitat is typically found in riparian areas, any activities that affect riparian condition may affect deer as well. The degree to which watershed improvement work arrests accelerated erosion varies by alternative. The untreated wet meadow acreage subject to continued erosion is an indicator of mule deer fawning habitat capability.

Deer habitat improvement increases forage production and habitat capacity by rejuvenating decadent bitterbrush stands. Improvements on deer winter range are far more important for overall habitat capacity on the Forest than on summer range, as most deer on the Forest spend the summer elsewhere.

Bald eagles and peregrine falcons are not subject to major conflicts with any Forest activities. These species are managed for recovery, and recovery levels will be met for every alternative. Peregrine falcons, a species recently reintroduced to the Forest, are managed to exceed recovery in alternatives with additional reintroductions.

Sierra Nevada mountain sheep are subject to conflicts with domestic livestock and concentrated human use. These conflicts are not major ones, however, and are essentially common to all alternatives. The primary activity affecting this species is the introduction of new herds into historic unoccupied habitat.

Species such as the goshawk, which are dependent on older seral stages of forest, are affected by timber management. Commercial timber lands are managed for maximum wood productivity that is attained in early to middle successional stages. While older stages are less productive in terms of wood, they are extremely productive in terms of wildlife.

Snags or standing dead trees are subject to the effects of timber management and public fuelwood gathering. The public considers snag wood among the most desirable for fuel. Although the taking of snags for that purpose is prohibited, illegal snag cutting occurs wherever lands are accessible by vehicle. The effects of public woodcutting on snag-dependent wildlife will be roughly proportional to the amount of timber harvest, as the size of the timber cut is an indication of improved vehicle access to forested lands.

Riparian areas are extremely important to wildlife, and are subject to many conflicts with Forest activities. Geothermal and hydroelectric development, municipal water use, concentrated recreation use, and livestock grazing all have the potential to affect the amount and condition of riparian habitat. On the other hand, watershed improvement and stream rewatering have the potential

to restore and protect riparian habitat. Although minimum management requirements limit the impacts new activities will have on riparian habitat, losses of wet-meadow riparian habitat due to past overgrazing will continue to some degree unless the full program of watershed improvement is implemented.

Early to middle seral stages of brush are subject to decadence with age. As the amount of decadent brush increases over time, shrub habitat diversity and the diversity of animal species associated with early seral stages decline. Wildfire rejuvenates brush naturally, and vegetation treatment can be used to approximate natural rejuvenation. Acres of wildfire and vegetation treatment are, therefore, indicators of effects on this habitat type.

Assumptions

Effects on indicator species are representative of effects on all native vertebrate species on the Forest.

Species associated with late successional stages of brush and early successional stages of timber are not of concern, since neither stage is expected to be in short supply.

All alternatives include Forest-wide Standards and Guidelines and Management Prescription direction which provide that wildlife habitats will be managed at levels necessary to ensure that viable populations of Management Indicator Species are maintained.

The impacts of ski area development, geothermal development, and timber harvest will depend on the extent of development and the effectiveness of mitigation. Precise development scenarios are impossible to predict at this time. Possible mitigation measures include seasonal road closures, soundproofing of facilities, providing a full-time warden during periods when deer are present, and locating facilities away from known fawning habitat and migration corridors.

The impacts of livestock grazing on deer winter range can be mitigated by limiting or reducing livestock numbers. Impacts on fawning areas can be mitigated by deferring grazing in fawning areas until after the fawning season; or by herding, salting, or otherwise directing livestock movements away from fawning areas.

Habitat capability for riparian area-dependent species and snag-dependent species can be estimated in general terms. The data needed for accurate population estimates of Management Indicator Species for those habitat types is not available at this time.

Threatened and endangered species will be managed in accordance with existing recovery plans and in cooperation with California Department of Fish and Game, the appropriate recovery team, and the U.S. Fish and Wildlife Service.

Wilderness management policy does not currently allow for vegetation management for timber, range, or wildlife purposes. This policy favors species dependent on late seral stages of all vegetation types. Whereas species dependent on early seral stages of brush and on wet meadows will decline, those dependent on old growth forest, snags, and down logs will increase over time.

The sum of the separate factors affecting wildlife, and deer in particular, may in some cases exceed the whole. For example, estimated deer population losses due to the obstruction of migration routes may duplicate those ascribed to competition with livestock on deer winter range, where in fact the deer in both cases are the same deer subject to both impacts. Projected population numbers should be viewed only as rough estimates of the relative effects of alternatives based on the management program for those alternatives.

Consequences Common to All Alternatives

Only the single existing bald eagle winter roosting area will be maintained under all alternatives. No opportunities for increasing bald eagle habitat have been identified. A local bald eagle management plan will be developed and implemented.

At least two pairs of peregrine falcons, representing the recovery level, will be reintroduced under all alternatives. Additional pairs will be reintroduced under alternatives with an amenity emphasis.

Emphasis animals such as Nelson mountain sheep, blue grouse, tule elk, golden eagle, and prairie falcon are subject more to natural ecological processes (such as drought or poor nesting weather), than by Forest management. In addition, any project-level activities that did conflict with the needs of these species will be mitigated under the Forest-wide Standards and Guidelines. For these reasons, potential effects on these species are considered common to all alternatives.

The amount of projected geothermal development under approved environmental documents is common to all alternatives (an estimated six power plants in Lease Blocks I and II north and northeast of Mammoth Lakes). Any geothermal proposals not currently approved will be subject to site-specific environmental analysis and mitigation under all alternatives.

The likelihood of new hydroelectric development is common to all alternatives; there are presently 33 applications for new hydroelectric projects.

Consequences that Vary by Alternative

Tables 97 and 98 display the consequences of alternatives on wildlife. Table 97 displays percent change in habitat capability for the key habitat types (those most likely to be affected by Forest management activities). Table 98 displays animal numbers for those Management Indicator Species for which population estimates can reasonably be made.

Table 97
Habitat Capability for Key Habitats by Alternative
(percent change from 1982 - end of the fifth decade)

	Alternatives					
Indicator Species	PRF	CUR	RPA	CEE	AMN	AMB
Mule deer habitat	-2	-4	-47	-14	+20	+18
Peregrine falcon nesting habitat	0	0	0	0	+100	+100
Sierra Nevada mountain sheep habitat	+22	+22	0	0	+122	+122
Existing old-growth in suitable timber	-27	-91	-92	-86	-38	-59
Snag habitat in suitable timber	0	0	0	0	+30	+30
Early & middle seral stages of brush	-69	-75	-69	-67	-71	-71
Riparian habitat in wet meadows	0	-58	-35	0	0	0

Table 98
Animal Numbers for Management Indicator Species
Based on Habitat Capability
(end of the fifth decade)

		Alternatives					
Indicator Species	1982	PRF	CUR	RPA	CEE	AMN	AMB
Mule Deer*							
(total - M animals)	20.2	19.9	19.6	9.6	17.4	22.6	22.2
(FS - M animals)	12.0	11.8	11.5	5.9	10.3	14.4	14.0
Peregrine falcon (pairs)	2	2	2	2	2	4	4
Sierra Nevada mountain sheep	300	550	550	450	550	1000	1000
Goshawk pairs in suitable timber	15	15	15	9	9	15	15
Sage grouse	1500	1500	750	1500	1500	990	1200

* Total deer include those that migrate across the Forest but neither summer nor winter on Forest lands; FS deer are those that summer and/or winter on the Forest.

PRF: (Preferred)

Mule Deer: Decisions regarding new ski area development will be made through site-specific analyses and environmental documents.

The Monache herd will not be adversely affected under this alternative, as there will be no timber harvest or improved access into the Monache area. The type and amount of recreation use in that area will not change much over fifty years.

The relationship of deer and livestock on winter range and fawning areas will change very little from the base year situation. Increased livestock grazing will not occur.

Deer habitat improvement on key winter range will somewhat offset losses on a Forest-wide basis. The net change in Forest-wide mule deer habitat capability will be a two percent loss.

Old Growth and Snags: In areas that are under the Timber Prescriptions 10 percent of the acreage will be managed for old growth seral stage characteristics. A portion of this can be met using sites that are unsuitable for timber management due to factors such as access, slope and visual constraints. These stands are interspersed among areas that contain suitable timber. The remainder of the old growth allocation would be taken from the suitable timber component.

On the Inyo there are approximately 75,200 acres in the timber component that are allocated for harvest and designated as "suitable". To meet old growth allocation requirements, approximately 4,060 acres will be managed for old growth characteristics. The remainder of the old growth can be met by allocating approximately 6,000 acres of timber lands that will not be harvested for timber but are interspersed in the 75,200-acre base.

Decreases in old growth will occur primarily in lodgepole pine and mixed red fir/Jeffrey pine stands within areas extensively managed for timber. Stands of old growth Jeffrey pine have already been liquidated for the most part as a result of historic logging. Declines in old growth red fir stands are not anticipated as these areas will not be managed for timber production during this planning period.

An old growth allocation plan will be developed that provides direction for the long-term allocation of stands managed for old growth characteristics within areas managed for timber production.

Riparian Areas: Riparian areas will be managed with an emphasis on recovering these areas. Meadow restoration work will be done on 23,500 acres and livestock managed in a way to improve riparian dependent vegetation communities.

Early - Mid Successional Brush: The habitat capability of early and mid-successional brush will continue to decrease over the planning period. Approximately 11,500 acres will be treated for range and wildlife purposes. These will be areas that have existing perennial herbaceous understories to ensure success of vegetation treatments.

Species dependent on early-mid successional stages will continue to decline. Wildfires will burn an additional 53,190 acres. In most cases these areas will be invaded by undesirable shrub or annual species and will not be beneficial to early-mid successional shrub-dependent species.

Methods of improving shrub habitat will be explored and tested to reverse trends in these habitats. These will be coordinated with other state and federal agencies and interested organizations.

CUR: (Current Program)

Mule Deer: Ski area development under this alternative calls for 8,000 SAOT beyond full development of Mammoth and June Mountains. The specific area (or areas) on which added capacity will be generated is not specified. If development occurred in the Sherwin and San Joaquin areas, migration routes for the Buttermilk, Sherwin, and Casa Diablo herds will be impacted. As the same general area will also include timber harvest and geothermal development for Lease Blocks I and II, deer populations could decline by as many as 2,200 animals. If, however, developments avoided migration corridors and strict mitigation were applied, that loss could be considerably lower. Decisions regarding new ski area development will be made through site-specific analyses and environmental documents.

The Monache herd will be affected by timber harvest and improved access with corresponding increases in recreation use. An estimated 17 percent of the Monache herd could be lost without proper mitigation. Strict mitigation measures could reduce the loss of deer to 4 percent below current levels.

The relationship of deer and livestock on winter range and fawning areas will change very little from the base year situation. Increased livestock grazing will occur only to the degree compatible with deer habitat needs.

Deer habitat improvement on key winter range will only slightly offset habitat losses elsewhere, as the budget limitation of this alternative will limit the amount of improvement work accomplished.

Watershed improvement work will also be limited. Approximately 21,500 acres of wet meadow habitat could be lost or degraded over 50 years due to damage from past grazing. Consequences on deer fawning habitat for the Monache herd could be severe.

The net change in mule deer habitat capability will be a four percent reduction Forest-wide.

Old Growth and Snags: The Forest will maintain no suitable timber in older seral stages. However, not all of the remaining suitable timber will be reduced to earlier seral stages in the first fifty years. Approximately 5,000 acres of existing old growth will remain by the end of the fifth decade, representing a 91 percent reduction in habitat capability relative to 1982. The greatest reduction will occur in red fir stands that have not yet been harvested and in the Jeffrey pine forest due to the large acreage managed.

The impacts of timber harvest on old growth-dependent wildlife will be mitigated by leaving snags in suitable timber to meet 40 percent of the natural snag-dependent wildlife density and by limiting the size of openings to 20 acres in size or smaller. However, improved access will substantially increase the likelihood of illegal snag removal by public fuelwood gatherers.

Riparian Areas: Riparian habitat capability in wet meadows will decline 58 percent due to continuing accelerated erosion on 21,500 acres. A more detailed discussion is found under the heading of Riparian Areas.

Early - Mid Successional Brush: The habitat capability of early and mid-successional brush will decrease 75 percent by the fifth decade. Approximately 85,600 acres of brush will be treated for range and wildlife purposes. Another 52,900 acres of land, most of it brush, will be burned by wildfire. As the treated and burned acres will represent the only early and mid-successional brush by the fifth decade, wildlife dependent on those seral stages will be expected to decline.

RPA: (1980 RPA Program)

Mule Deer: Ski area development under this alternative calls for the development of the Sherwin, Minaret Summit, and Mammoth Knolls potential ski areas. The red fir and Jeffrey pine forests will be managed for maximum timber production. The same general area will also include geothermal development for Lease Blocks I and II. As migration routes for the Buttermilk, Sherwin, and Casa Diablo herds will be impacted, deer populations could decline by as many as 2,200 animals. The extent of development and intensified management found in this alternative will be difficult to mitigate.

The Monache herd will be affected by high-level timber harvest and improved access with corresponding increases in recreation use. An estimated 17 percent of the Monache herd could be lost without proper mitigation; strict mitigation measures could reduce the loss of deer to 4 percent below current levels.

The relationship of deer and livestock on winter range and fawning areas will change considerably from the base year situation. Livestock grazing will increase on deer winter range, displacing wildlife. There will be no provision for mitigating livestock impacts on fawning areas.

Watershed improvement work will be limited. Approximately 13,600 acres of wet meadow habitat could be lost or degraded over fifty years due to damage from past grazing. Consequences on deer fawning habitat, especially for the Monache herd, could be severe.

The net effect of this alternative on Forest-wide deer habitat capability will be a 47 percent reduction. There is no way of meeting the RPA goal for mule deer habitat with the intensity of commodity production found in this alternative.

Old Growth and Snags: The Forest will maintain no suitable timber in older seral stages; however, not all of the remaining suitable timber will be reduced to earlier seral stages in the first fifty years. Approximately 4,270 acres of existing old growth will remain by the end of the fifth decade, representing a

92 percent reduction in habitat capability relative to 1982. The greatest reduction will occur in red fir stands that have not yet been harvested and in the Jeffrey pine forest due to the large acreage managed.

The impacts of timber harvest on old growth wildlife will be mitigated by leaving snags in suitable timber to meet 40 percent of the natural snag-dependent wildlife density and by limiting the size of openings to 40 acres in size or smaller. However, much-improved access will dramatically increase the likelihood of illegal snag removal by public fuelwood gatherers.

Riparian Areas: Riparian habitat capability in wet meadows will decline 65 percent due to continuing accelerated erosion on 13,600 acres of wet meadow. Additional impacts on riparian vegetation will result from major increases in recreation and livestock grazing. A more detailed discussion is found under the heading of Riparian Areas.

Early - Mid Successional Brush: The habitat capability of early and mid-successional brush will decrease 69 percent by the fifth decade. An estimated 118,500 acres of brush will be treated for range and wildlife purposes and another 53,190 acres of land, most of it brush, will be burned by wildfire. As the treated and burned acres will represent the only early and mid-successional brush by the fifth decade, wildlife dependent on those seral stages will be expected to decline.

CEE: (Maximize Cost-Efficiency)

Mule Deer: Ski area development under this alternative calls for full development of identified potential, including the Sherwin, Minaret Summit, Mammoth Knolls, San Joaquin, and White Wing areas. Under this development scenario, migration routes for the Buttermilk, Sherwin, and Casa Diablo herds will be impacted. As the same general area will also include timber harvest and geothermal development for Lease Blocks I and II, deer populations could decline by as many as 2,200 animals. The extent of development projected under this alternative will be difficult to mitigate.

The Monache herd will be affected by timber harvest and improved access with corresponding increases in recreation use. An estimated 17 percent of the Monache herd could be lost without proper mitigation. Strict mitigation measures could reduce the loss of deer to 4 percent below current levels.

The relationship of deer and livestock on winter range and fawning areas will change very little from the base year situation. Increased livestock grazing will occur only to the degree compatible with deer habitat needs.

Deer habitat improvement on key winter range will only slightly offset habitat losses to timber, skiing, and geothermal production on the north half of the Forest; if migration routes were substantially blocked, improvements on winter range will have a negligible beneficial effect.

Full implementation of watershed improvement in the Golden Trout Wilderness will protect wet meadows and associated fawning habitat for the Monache herd.

The net effect of this alternative will be a 14 percent reduction in Forest-wide deer habitat capability.

Old Growth and Snags: The Forest will maintain no suitable timber in older seral stages; however, not all of the remaining suitable timber will be reduced to earlier seral stages in the first 50 years. Approximately 7,600 acres of existing old growth will remain by the end of the fifth decade, representing a 86 percent reduction in habitat capability relative to 1982. The greatest reduction will occur in red fir stands that have not yet been harvested and in the Jeffrey pine forest due to the large acreage managed.

The impacts of timber harvest on old growth wildlife will be mitigated by leaving snags in suitable timber to meet 40 percent of the natural snag-dependent wildlife density and by limiting the size of openings to 40 acres in size or smaller. However, improved access will substantially increase the likelihood of illegal snag removal by public fuelwood gatherers.

Riparian Areas: Riparian habitat capability in wet meadows will not decline, as the full watershed improvement program will have been implemented. There could, however be impacts on riparian vegetation associated with major increases in recreation use. A more detailed discussion is found under the heading of Riparian Areas.

Early-Mid Successional Brush: The habitat capability of early and mid-successional brush will decrease 67 percent by the fifth decade. An estimated 116,600 acres of brush will be treated for range and wildlife purposes, and another 64,500 acres of land, most of it brush, will be burned by wildfire. As the treated and burned acres will represent the only early and mid-successional brush by the fifth decade, wildlife dependent on those seral stages will be expected to decline.

AMN: (Maximize All Amenities)

Mule Deer: Ski area development under this alternative calls for no additional ski area capacity beyond full development of Mammoth and June Mountains. Neither will the red fir forest east of San Joaquin Ridge be harvested. Geothermal development will, however, be projected for Lease Blocks I and II; and timber management will continue in the Jeffrey pine forest west of U.S. 395. Although migration routes for the Buttermilk, Sherwin, and Casa Diablo herds could be affected by these activities, developments could probably be located to avoid migration corridors and strict mitigation could be applied to minimize impacts.

The Monache herd will not be adversely affected under this alternative, as there will be no timber harvest or improved access into the Monache area. The type and amount of recreation use in that area will not change much over fifty years.

Livestock will be removed from key deer winter range and grazing will be delayed in key fawning areas, improving habitat capability for deer. Deer habitat improvement on key winter range will further enhance the capability of those lands.

Watershed improvement work will be fully implemented, leaving no wet meadow habitat vulnerable to accelerated erosion and protecting deer fawning habitat for the Monache herd.

The net effect of this alternative will be a 20 percent increase in deer habitat capability, meeting the RPA goal for mule deer.

Old Growth and Snags: The Forest will maintain 30 percent of suitable timber in older seral stages. Approximately 33,200 acres of existing old growth will remain by the end of the fifth decade, representing a 38 percent reduction in habitat capability relative to 1982. This reduction will occur primarily in the Jeffrey pine forest.

The impacts of timber harvest on old growth wildlife will be further mitigated by leaving snags in suitable timber to meet 100 percent of the natural snag-dependent wildlife density and by limiting the size of openings to 20 acres in size or smaller. Although improved access will slightly increase the likelihood of illegal snag removal by public fuelwood gatherers, that impact will be relatively low under this alternative.

Riparian Areas: Riparian habitat capability in wet meadows will not decline under this alternative. The lack of increased recreation and reductions in grazing will further protect riparian areas from potential impacts. A more detailed discussion is found under the heading of Riparian Areas.

Early-Mid Successional Brush: The habitat capability of early and mid-successional brush will decrease 71 percent by the fifth decade. An estimated 111,300 acres of brush will be treated for range and wildlife purposes, and another 48,150 acres of land, most of it brush, will be burned by wildfire. As the treated and burned acres will represent the only early and mid-successional brush by the fifth decade, wildlife dependent on those seral stages will be expected to decline.

AMB: (Emphasize Wildlife and Recreation)

Mule Deer: Ski area development under this alternative calls for increased capacity on the Minaret Summit, Mammoth Knolls, and White Wing potential ski areas. As the same general area will also include modified timber harvest and geothermal development for Lease Blocks I and II, deer populations could decline. Although migration routes for the Buttermilk, Sherwin, and Casa Diablo herds could be affected, potential losses will be reduced by locating developments away from migration corridors and applying strict mitigation measures to all activities.

The Monache herd will not be adversely affected by this alternative. There will be no timber harvest or improved access in that area. The type and amount of recreation use will be expected to remain fairly constant.

As livestock will be removed from key deer winter range and grazing will be delayed in fawning areas, deer habitat capability will increase. Deer habitat improvement on key winter range will further enhance habitat quality.

Watershed improvement work will be fully implemented, eliminating the wet meadow acreage subject to accelerated erosion and protecting deer fawning habitat for the Monache herd.

The net effect of this alternative will be an 18 percent increase in deer habitat capability Forest-wide.

Old Growth and Snags: The Forest will maintain 20 percent of suitable timber in older seral stages; however, not all of the remaining suitable timber will be reduced to earlier seral stages in the first fifty years. Approximately 22,140 acres of existing old growth will remain by the end of the fifth decade, representing a 59 percent reduction in habitat capability relative to 1982. The reduction will occur mainly in the Jeffrey pine forest and in red fir stands east of San Joaquin Ridge.

The impacts of timber harvest on old growth wildlife will be mitigated by leaving snags in suitable timber to meet 100 percent of the natural snag-dependent wildlife density and by limiting the size of openings to twenty acres in size or smaller. However, moderately improved access will increase the likelihood of illegal snag removal by public fuelwood gatherers.

Riparian Areas: Riparian habitat capability in wet meadows will not decline, as full watershed improvement will be implemented. The potential impacts of increased recreation on riparian areas will be moderately high. The potential impacts of livestock will decline. A more detailed discussion is found under the heading of Riparian Areas.

Early-Mid Successional Brush: The habitat capability of early and mid-successional brush will decrease 71 percent by the fifth decade. An estimated 109,000 acres of brush will be treated for range and wildlife purposes, and another 51,390 acres of land, most of it brush, will be burned by wildfire. As the treated and burned acres will represent the only early and mid-successional brush by the fifth decade, wildlife dependent on those seral stages will be expected to decline.

MITIGATION OF ADVERSE IMPACTS

The Forest planning process incorporates many mitigation measures to minimize adverse environmental effects under any alternative. The National Forest Management Act regulations require that the management of all resources ensure that National Forest lands are managed under the principles of multiple use and sustained yield. The management direction common to all alternatives provides for mitigation of major adverse impacts associated with management activities.

Management direction common to all alternatives includes:

1. Minimum management requirements (EIS Chapter II).

2. Timber Policy Requirements (EIS Chapter II).

3. Minimum Implementation Requirements (EIS Chapter II).

4. Forest-wide Standards and Guidelines (summary in EIS Chapter II; full detail in Plan Chapter IV).

5. Management Prescriptions (summary in EIS Chapter II; full detail in Plan Chapter IV).

Mitigation of adverse impacts will also be developed on a case-by-case basis for individual projects.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Some adverse consequences cannot be avoided despite the application of mitigating measures. The magnitude of such impacts varies with the emphasis of the alternative.

Air quality: Smoke from wildfires and prescribed fires will have temporary and localized effects on visibility regardless of mitigation. Although geothermal emissions will be moderated as much as technically possible, complete control will not be possible.

Cultural resources: Wherever roads are built and access improves, the amount of dispersed recreation will increase, along with increased chances that artifacts will be removed or cultural sites damaged.

Diversity: Seral stage diversity will decline on range lands, suitable timber lands, and in wilderness. Vegetation on rangelands will continue to mature. Vegetation on suitable timber lands will shift toward earlier seral stages and vegetation in wilderness will shift toward older seral stages as wildfires will be suppressed and prescribed burning will be limited. Illegal snag cutting by the public will be impossible to control completely.

Fish: New hydroelectric projects will reduce fish habitat somewhat wherever they are developed. Recreation, grazing, road construction, and other activities that increase sedimentation will affect the quality of associated fish habitat.

Minerals: Wilderness and mineral withdrawals will curtail opportunities for mineral exploration and development.

Protection: Any increase in human use of the Forest will increase the risk of man-caused fire. Any increase in the use of motorized equipment or energy transmission lines will increase the risk of operational fires. Any increase in the number of facilities or size of communities will increase the value of property at risk from fire.

Recreation: The potential for conflict between recreationists and other Forest users will increase wherever both types of use increased.

Sensitive plants: Some disturbance of sensitive plant habitat will be unavoidable due to increasing human use, improved access, and increases in land-disturbing developments and activities.

Visual quality: Energy developments and alpine ski areas, though designed to minimize visual impacts, will contrast noticeably with the natural landscape and seriously impair visual quality.

Watershed (soil and water): Any kind of construction, vegetation manipulation, or other land disturbance will have at least temporary and localized effects on the soil. If bodies of water were nearby, effects on water quality will also be expected. Roads, trails, and other areas maintained free of vegetation will be constant potential sites of erosion and sources of sediment. Soil in the areas of sheep bedding grounds will be compacted, and vegetation removed. OHV use in open areas and alpine ski area development will reduce vegetation, increase erosion, and affect water quality (where water is nearby) regardless of preventive measures.

Wildlife: The most significant unavoidable consequences of any alternative on wildlife will be the disturbance created by increasing human use and the loss of habitat to various kinds of development.

Wildlife habitat effectiveness will be lost on (and immediately surrounding) the site of any mineral, energy, ski area, recreation site, road, trail, or other development.

Livestock are more likely to compete with wildlife in riparian areas as the intensity of range use increases.

RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

INTRODUCTION

The relationship between the short-term uses of the human environment and the maintenance and enhancement of long-term productivity is complex. Short-term uses are generally those that occur on an annual basis, such as livestock grazing as a use of the forage resource, hunting as a use of the wildlife resource, or recreation as a use of the water resource.

Long-term productivity refers to the continuing ability of the land to produce commodities and retain amenity values for the benefit of future generations. This ability depends upon management practices that do not allow for the impairment of soil productivity, the overtaxing of water resources, or the alteration of the natural landscape beyond its ability to recover. The long term is, for Forest planning purposes, defined as exceeding fifty years.

The planning alternatives have been assessed for cumulative and long-term effects with the perspective that each generation holds the environment in trust for succeeding generations. The production of commodities while maintaining long-term productivity is an integral aspect of public land management. Management decisions must, therefore, be based ultimately on the capability of the land rather than the urgency of short-term needs. The quality of life for future generations will be determined in part by the continuing productivity of public lands.

INDIVIDUAL RESOURCE DISCUSSIONS

Although new hydroelectric development will increase energy production to a degree considered important in the short-term (given the current emphasis on national energy self-sufficiency), it will have significant long-term effects on the soil resource, hydrologic characteristics of affected streams, the amount and condition of riparian vegetation, the amount and condition of fish habitat, and the recreational appeal of the immediate area.

Mineral development represents an important but temporary gain, whether measured in years or decades. The effects on soil productivity if topsoil is lost and hydrologic features if springs or seeps are involved are, though typically limited in extent, long in duration.

Vegetation rejuvenation or type conversion may result in an initial loss of soil. Over the long term, however, soil loss will be lower than if the land were untreated because vegetative growth will be denser in rejuvenated stands than in decadent ones.

OHV use in the short-term affects the long-term productivity of the soil by removing vegetation and exposing soil to erosion.

Fire suppression minimizes short-term vegetation losses to fire. However, protected stands tend to become overmature and unproductive, with increased chances of being lost to natural mortality by insects and disease in the long run. The overall loss of vegetative diversity is most significant in wilderness, where widespread prescribed burning is not an acceptable management tool.

The removal of timber from the managed timber base will entail the loss of forested habitat in the short term, but will improve the overall potential health, vigor, and productivity of the forest in the long term. On the other hand, if departure from the even-flow policy were permitted to meet timber output objectives under a given alternative, the long-term sustained yield of the Forest will be lowered.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

INTRODUCTION

Irreversible commitments of resources occur when lost opportunities or depleted resources cannot be recovered. Examples of irreversible commitments are mining, major road construction, and the disturbance of cultural and historical sites.

Irretrievable commitments refer to opportunities for the production or use of a resource that are foregone for a period of time because the land is managed with an emphasis on competing or conflicting resources. Examples of irretrievable commitments are the loss of fuelwood, range forage, or developed recreation opportunities because of management to enhance wildlife habitat values.

IRREVERSIBLE COMMITMENTS

Increased dispersed recreation use and vegetation treatment could result in irreversible losses of cultural and historical resources that might otherwise remain undisturbed.

The loss of riparian vegetation to new hydroelectric development will be irreversible if the soil and hydrologic characteristics of the riparian zone were permanently altered.

Geothermal resources are thought to be depletable, and their extraction irreversible. Once the reservoir of hot stream is tapped, it has a given (though not easily predictable) life span.

Mineral extraction is an irreversible commitment of the mineral resource.

Sheep bedding grounds, roads, watering areas, geothermal well pads, and other facilities developed on suitable range lands represent an irreversible loss of forage for the duration of their existence.

OHV use could irreversibly affect soil productivity through the direct, continuing disturbance of motor vehicles.

The structures and other facilities associated with community growth irreversibly affect soil and water, wildlife, recreation, and the natural appearance of the landscape.

IRRETRIEVABLE COMMITMENTS

Lands dedicated to energy development represent irretrievable commitments during their period of operation. Most other uses will come into conflict with energy production on a given acre of land. New hydroelectric projects as proposed will conflict with fish habitat, riparian values, and recreation. Geothermal development will conflict with recreation, timber harvest, and grazing. Wind farms will conflict with recreation and grazing. All three types of energy development will preclude the management of the area for a high level of visual quality.

The loss of opportunties to mineral development is irretrievable during the period of mineral activity. Virtually no other resources can coexist on-site with an active mineral operation.

The establishment of concentrated recreation areas commits certain lands to management with a recreation emphasis. If the maintenance of developed recreation sites is deemphasized, those sites and associated opportunities can be irretrievably lost over the long term. Alpine ski areas represent an irretrievable loss of wildlife habitat, developed summer recreation site potential, and timber production potential. In-place amenity values (soil, water, and visual quality) will also be foregone.

Soil productivity will be irretrievably lost on those lands occupied by new roads.

Intensive timber management will trigger irretrievable losses in the amount and distribution of old growth forested habitat on suitable timber lands.

Visual Quality Objectives commit certain lands to a high degree of apparent naturalness, precluding or modifying timber, energy, and alpine skiing management for as long as the objectives are applied.

Wilderness designation irretrievably removes affected lands from most kinds of commodity production and from management activities that will alter natural ecological processes. Opportunities for mineral and energy development, motorized recreation, and shrub rejuvenation could represent significant losses.

POSSIBLE CONFLICTS WITH OTHER LAND USE PLANS

There are no known conflicts with the plans or policies of the following cooperating or affected agencies:

- Bureau of Land Mangement, Bishop Resource Area
- Bureau of Land Management, Caliente Resource Area
- Bureau of Land Mangement, Ridgecrest Resource Area
- Bureau of Land Management, Stateline-Esmeralda Resource Area
- U.S. Fish and Wildlife Service, Sacramento
- Counties of Inyo, Mono, Tulare, Madera, and Fresno, California
- Counties of Mineral and Esmeralda, Nevada
- City of Los Angeles, Department of Water and Power, Bishop.

The planning alternatives vary in their potential for conflict with population goals in deer herd management plans developed by the California Department of Fish and Game. Any reduction in deer numbers will represent a conflict, as all deer herd plans call for maintenance of existing populations as a minimum goal. Some deer herd plans call for increased populations; the goals of those plans conflict with all but the most amenity-oriented alternatives.

The Inyo National Forest regularly coordinates its planning efforts with the counties and the City of Los Angeles in an effort to maintain compatibility of uses between public and private land. Where private lands are dispersed and intermingled with the Forest, National Forest needs usually prevail. Near communities, the Forest modifies uses as practicable in response to local public needs.

ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

INTRODUCTION

With the national emphasis on energy conservation as well as on greater production, Forest management activities and energy programs have become major concerns, meriting explicit consideration. The objective of this evaluation is to provide energy-related considerations on which Forest planning alternatives can be assessed and compared. The following analysis

provides a means for determining the net energy balance of Forest-based resources. The net energy balance is the difference between the energy produced and energy expended in utilizing a Forest resource or service.

Energy yields considered in this evaluation include direct power generation from hydroelectric power plants, wind farms, and photovoltaic cells (cells that convert sunlight into direct electrical current); fuelwood; and red meat (including game) production.

Energy consumption includes the energy required to produce and utilize Forest resources and services. Energy consumption calculations include the energy content of fuels consumed for wildfire suppression, recreational travel, work-related travel, performing work, operation of ski lifts, geothermal exploration, mineral extraction, and road construction and maintenance operations.

In the first decade, all alternatives consume more energy than they yield. Yield/consumption ratios vary from 0.38:1 to 0.46:1.

It is presumed that geothermal power will not be produced until the second decade of the planning period, so no yields are displayed in this analysis. However, considerable energy is consumed in the first decade for geothermal exploration. The energy yield/consumption ratios after geothermal power is on line will depend upon how large the geothermal resource is, and how much is developed on the Forest. Table 99 provides a comparative summary of energy yield/consumption ratios by alternative in the first decade.

Table 99
Energy Balance by Resource Group and Planning Activity
(first decade - billion BTUs)

Action	Alternatives					
	PRF	CUR	RPA	CEE	AMN	AMB
Recreation						
Consumption	23473.0	25791.0	23135.0	22197.0	21680.0	24942.0
Yield	0.3	0.3	0.3	0.3	0.3	0.3
Timber						
Consumption	2348.0	2622.0	3192.0	2440.0	1963.0	2348.0
Yield	1112.0	1242.0	1512.0	1156.0	930.0	1112.0
Fuelwood						
Consumption	152.0	193.0	174.0	179.0	114.0	117.0
Yield	1048.0	1547.0	1394.0	1440.0	911.0	942.0
Range						
Consumption	65.0	39.0	55.0	70.0	39.0	41.0
Yield	83.0	83.0	97.0	90.0	82.0	87.0
Energy						
Hydroelectric						
Consumption	0	0	0	0	0	0
Yield	8895.0	8895.0	8895.0	8895.0	8895.0	8895.0
Wind						
Consumption	0	0	0	0	0	0
Yield	850.3	0	850.3	850.3	850.3	850.3
Photovoltaic						
Consumption	0	0	0	0	0	0
Yield	0.1	0.1	0.1	0.1	0.1	0.1
Locatable Minerals						
Consumption	1812.0	1812.0	1812.0	1812.0	1812.0	1812.0
Yield	0	0	0	0	0	0
Geothermal Exploration						
Consumption	323.6	323.6	190.7	323.6	190.7	190.7
Yield	0	0	0	0	0	0
Roads						
Consumption	222.0	41.0	284.0	163.0	91.0	211.0
Yield	0	0	0	0	0	0
Fire Management						
Consumption	115.0	115.0	115.0	115.0	115.0	115.0
Yield	0	0	0	0	0	0
TOTAL						
Consumption	28792.6	30936.6	28957.7	27299.6	26004.7	29776.7
Yield	12357.7	11767.4	12748.7	12431.7	11668.7	11886.7
NET ENERGY BAL.	**16434.9**	**19169.2**	**16209.0**	**14867.9**	**14336.0**	**17890.0**
Yield/Cons. Ratio	**0.43:1**	**0.38:1**	**0.44:1**	**0.46:1**	**0:45:1**	**0.40:1**