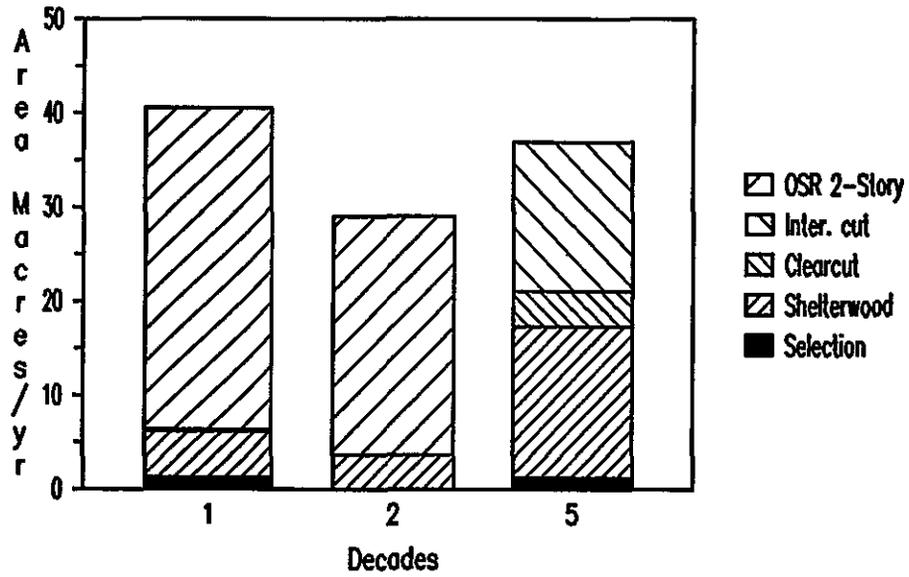


3. Benchmark 3

Maximum Present Net Value (PNV) (Assigned Values)

- a. Description This benchmark estimates the maximum Present Net Value that might be attained on the Forest when those outputs which have either an established market value or an assigned monetary value are emphasized. Timber outputs are subject to rotation age, nondeclining yield, and long-term sustained yield capacity restrictions.
- b. Purpose The purpose of developing this benchmark is to determine the level of resource outputs which would maximize Present Net Value. It provides the means for comparison of this Present Net Value and associated output levels with those of other benchmarks and alternatives.
- c. FORPLAN Objective Maximize Present Net Value for 15 decades
Function
- d. Assumptions and Constraints Timber harvest is scheduled only on lands classified as "suitable" through the suitability analysis.
- ~~Management requirements are not constraints~~
- Nondeclining evenflow at or below long-term sustained yield capacity.
- Rotations based on 95 percent of culmination of mean annual increment
- Ending inventory constraint applied
- All constraints are applicable throughout the planning horizon (150 years).
- Only the benefits and variable costs associated with the timber and livestock animal unit month outputs are considered.
- e. Present Net Value This benchmark established the maximum Present Net Value that could be generated from the Forest.
- f. Timber This benchmark run produced a long-term sustained yield capacity of 64.4 million cubic feet per year with a first decade harvest volume of 57.5 million cubic feet per year (317.5 million board feet per year). This includes approximately 4.3 million cubic feet per year of mortality salvage and nonchargeable timber volume. This total volume will exceed the volume production goals for the Malheur National Forest called for in the "Forestry Program for Oregon" in all five decades. See Table B-15 for volume of timber harvest by decade.
- The species mix for the first decade is 73 percent ponderosa pine and 27 percent mixed conifer species. By the fourth decade it nearly reverses as the species mix becomes 29 percent ponderosa pine and 71 percent mixed conifer. In the fifth decade it recovers to 54 percent ponderosa pine and 46 percent mixed conifer. See Figure B-11 for the harvest methods used to achieve these volumes by decades. In addition, there is an average forest residue potential of 44.8 million cubic feet per year over the planning period. (See Figure B-12.)

**FIGURE B-11
HARVEST METHODS**



**FIGURE B-12
OTHER WOOD FIBER AND PERSONAL USE FIREWOOD**

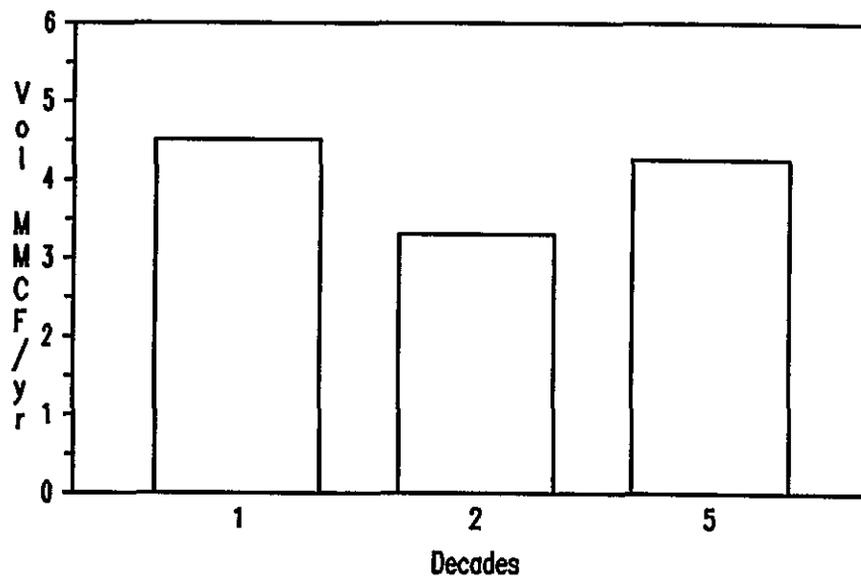


FIGURE B-13
PRECOMMERCIAL THINNING

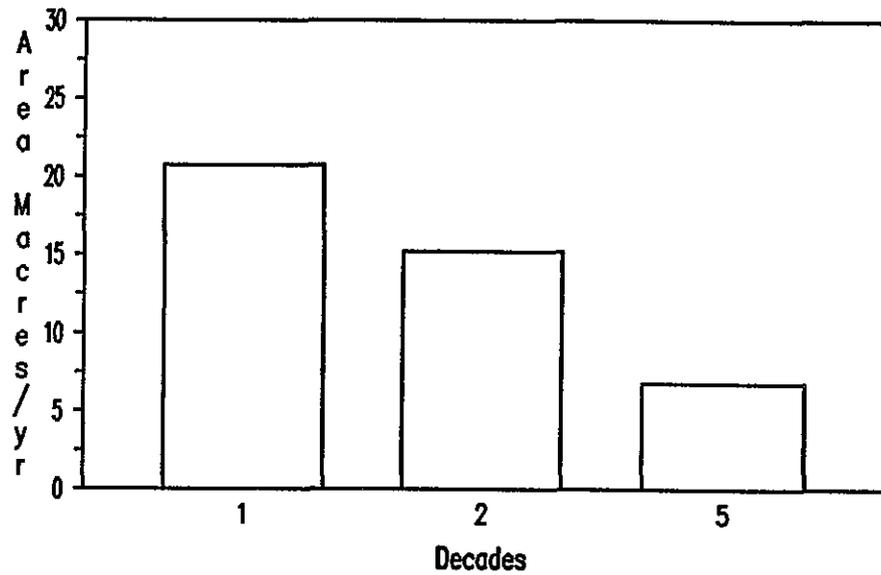
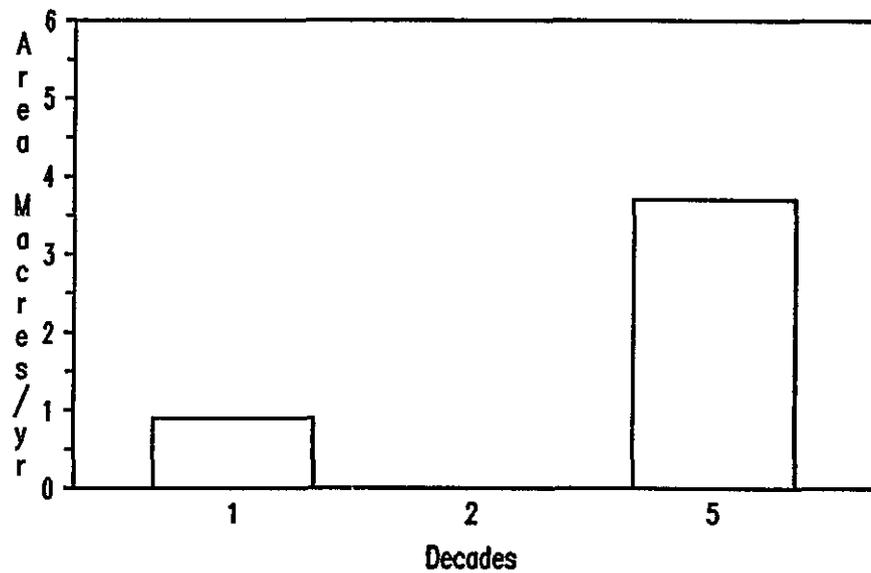


FIGURE B-14
REFORESTATION (PLANTING)



To achieve the projected harvest volumes, there will be an increase in precommercial thinning and planting acres over the 50-year period. General trends indicate high levels of precommercial thinning in the early decades with decreasing levels later. A significant increase in reforestation (planting) acres occurs toward the end of the planning period. See Figures B-13 and B-14 for precommercial thinning and planting acres.

g Range

On Forested land the animal unit months show very little change over the planning period. An expected increase in animal unit months due to stocking level control appears to be offset by a shift of animal unit months from two-storied stands to nonforested range for economic reasons. On nonforested land a large increase in animal unit months occurs in Decade 2. This is attributed to increased forage created by large investments in structural and nonstructural range improvements which occur primarily on nonforested lands (See Figure B-15.)

h. Wildlife

Big-game habitat shows a steady improvement in cover/forage ratios through the fourth decade. By the fifth decade, there is an excess of forage and cover becomes limiting (See Figure B-17.)

Estimated elk numbers (per forage capability) on both summer and winter ranges decrease sharply in Decade 2. Estimated elk numbers on summer range recover slowly, but those on winter range remain constant (Figure B-16). Elk numbers were estimated by forage availability and a discount for less than optimum cover conditions only. No other factors such as hunting, predation, roading, weather, or Habitat Effectiveness Indices, were used to estimate the hypothetical population capacity of this benchmark.

i. Old Growth

Old-growth habitat will not exist outside the wildernesses.

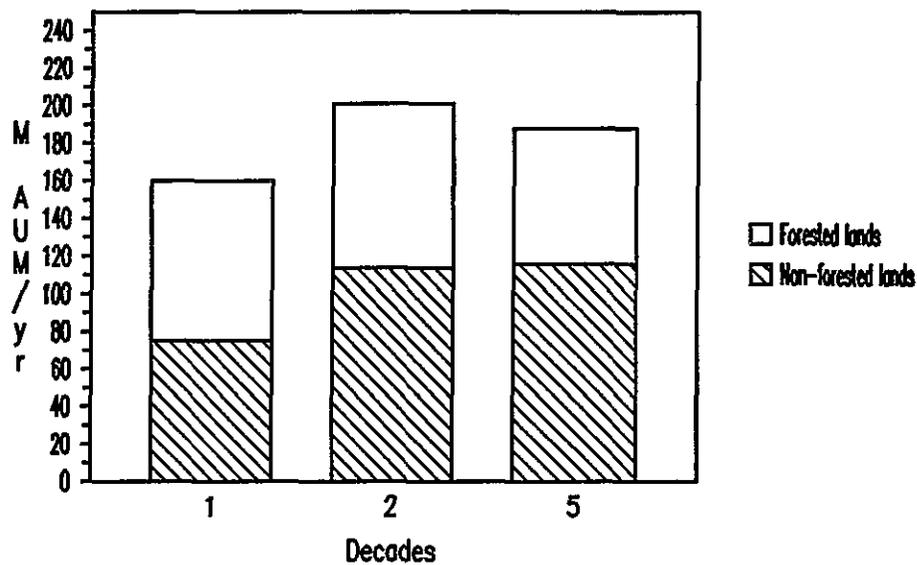
j. Fisheries

Since harvestable (merchantable) timber in riparian areas is liquidated by the third decade with regeneration harvest prescriptions, water quality standards for temperature would not be met in many streams. This high level of timber harvest activity near streams, plus the increased rate of road construction, would also increase the probability that water quality standards for turbidity would not be met. This would have a substantial adverse effect on fish habitat quality. Liquidation of the merchantable timber in riparian areas also removes the long-term supply of large woody material to the stream. This results in a loss of pool habitat which is an additional adverse effect on fish habitat.

After the initial harvest and site preparation there would be little need for operating equipment near the streams until commercial thinning entries begin. Thus, there should be a general recovery of riparian condition in the fourth and fifth decades. This should moderate the adverse effects on fish habitat in these decades.

Livestock grazing on the Forest increases substantially from the current situation. However, the animal unit months produced in riparian areas is reduced from the current situation. Assuming the large investment to achieve this redistribution of livestock, fish habitat would not be adversely affected. A stable trend could be expected as it relates to livestock management. With 100 percent control of the livestock and maximum administration, an upward trend would be possible.

FIGURE B-15
LIVESTOCK



Cover in the above figure refers to an undefined combination of satisfactory and marginal cover categories

FIGURE B-16
ESTIMATED ELK NUMBERS (per forage availability)

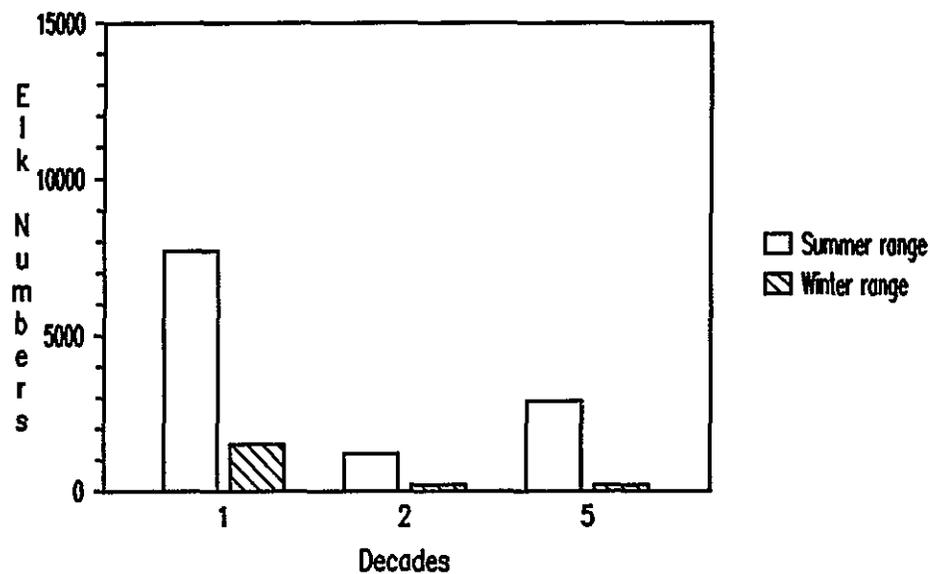


FIGURE B-17
BIG-GAME HABITAT CAPABILITY

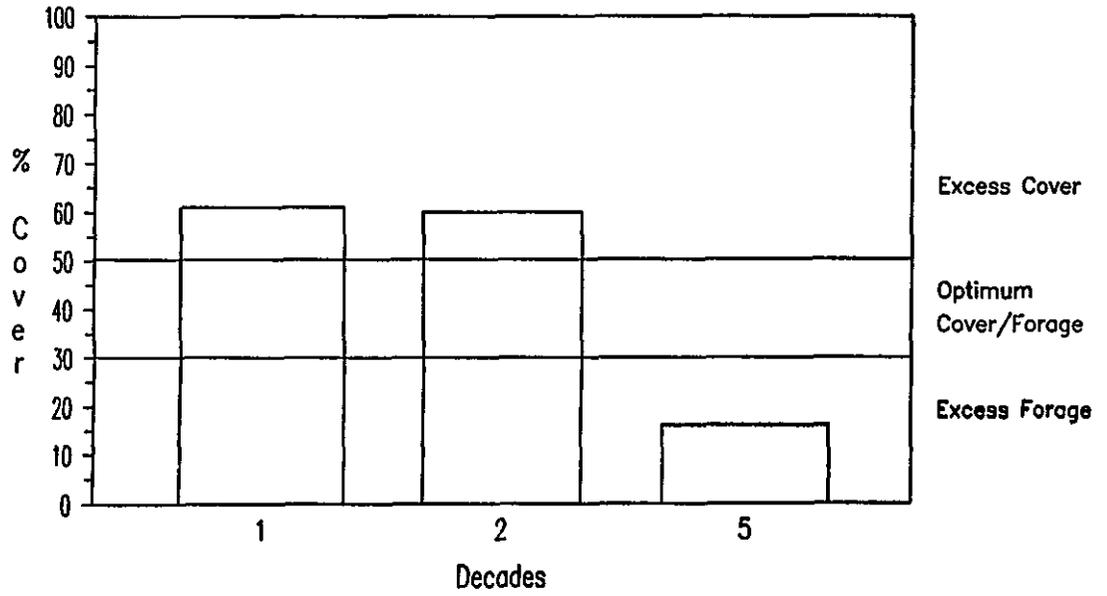
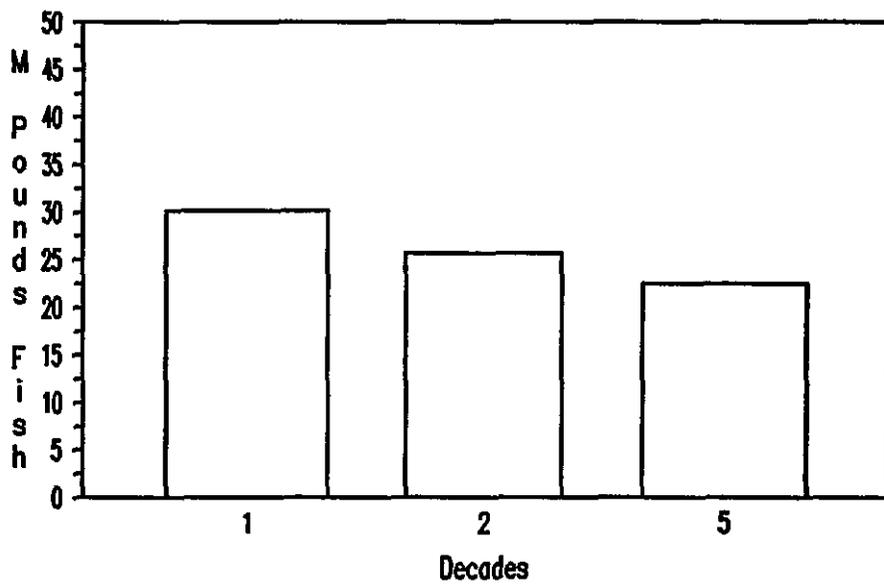


FIGURE B-18
ANADROMOUS FISH PRODUCTION POTENTIAL



The decrease in fisheries production potential shown in Table B-16 and Figure B-18 is only an estimate. More detail concerning application of Best Management Practices investment levels for mitigation, and other Forest activities would be needed to verify this estimate. Within the general description of this benchmark, it would be possible to build a scenario where the Forest contribution to the downstream and ocean anadromous fisheries would be negligible.

k Water

See summary analysis, Section VI C 10 d.

1. Recreation

Developed Recreation: Developed recreation opportunities would not be provided.

Dispersed Recreation: Unroaded dispersed recreation opportunities outside wilderness would be eliminated by the second decade. This benchmark would eventually provide only roaded modified and wilderness recreation opportunities.

Visual Resource: No provisions for visual resource management would be made. By the second decade the only natural-appearing landscapes remaining would be those in wilderness.

Cultural Resource Cultural resources will be inventoried prior to the implementation of potentially impacting management activities. The number of acres managed for cultural resource values is primarily influenced by the acres of timber to be harvested annually. New acres will accumulate until all lands suitable for timber production have been surveyed and cultural resources located. Thereafter, new cultural resource management acres will continue to accrue as other Forest acres are examined.

m Transportation

Arterial and collector construction and reconstruction will remain constant over time. The reason for this is the dispersion of harvest and recreational activities across the Forest. This assumption of a constant program also applies to maintenance levels 1, 3, 4, and 5 of the road maintenance program. Since local roads are usually used by only high-clearance vehicles, they fall into the maintenance level 2 which will change over time.

The local road system construction and reconstruction program varies over time. This is shown in Figure B-19. This graph shows a decrease in road construction and reconstruction miles after the first decade.

n Protection

The cost of protection (dollars per million acres protected) will not vary by benchmark or alternative. Eighteen protection alternatives were run through the Fire Management Analysis process and the most cost-efficient alternative was selected. Differences in benchmarks or alternatives will probably have no measurable effect on the Fire Management Effectiveness level selected.

Method of Measurement Fire Management Effectiveness is measured by adding appropriated Forest Fire Protection Dollars to Emergency Firefighting Costs and resource loss values. Program Effectiveness is computed by averaging the annual cost over a decade.

TABLE B-16

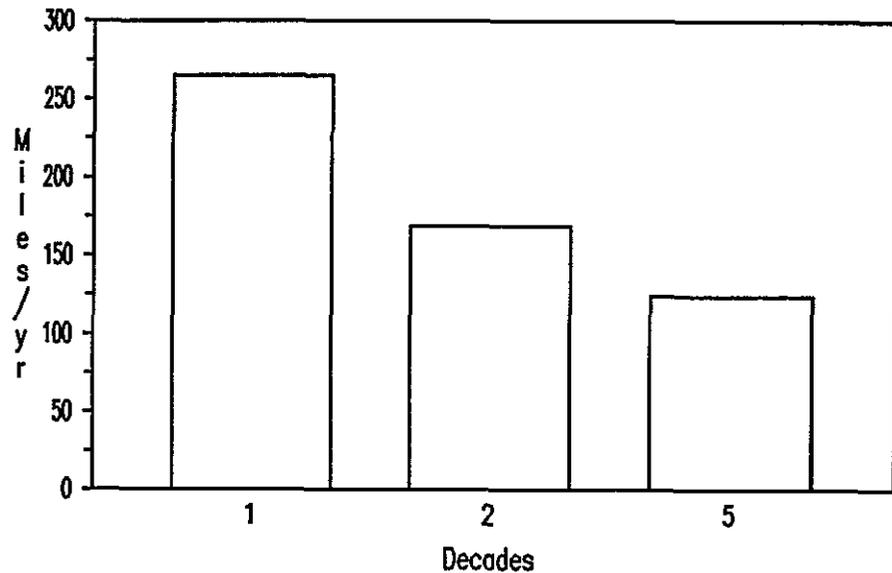
BENCHMARK BM3 - MAXIMUM PNW

Output/Effect	Unit of Measure/yr	1st Decade	2nd Decade	5th Decade
RECREATION				
Developed Use	M RVDs	0	0	0
Dispersed Use				
Semi-Primitive				
Non-Motorized	M RVDs	0	0	0
Semi-Primitive				
Motorized	M RVDs	157 3	157.3	157.3
Roaded Natural	M RVDs	1949	976.1	0
Roaded Modified	M RVDs	1542	2633	3294 4
Wilderness	M RVDs	61.8	61.8	61.8
WILDLIFE AND FISH				
Elk (Summer)	Numbers	7700	1200	2900
Anadromous Fish	M Pounds	30 2	25.7	22.5
Big-Game Use ^{1/}	M WFUDs	72 1	38.1	46.0
Fish Use ^{1/}	M WFUDs	22 3	19.0	16.6
RANGE				
Livestock Use	M AUMs	159.5	200 7	188.0
TIMBER				
LTSYC	MM Cu Ft	----- 64.4 in Decade 15-----		
Programmed Sale	MM Bd Ft	317 5	N/A	N/A
Offered ^{2/}	MM Cu Ft	57 5	57.6	58 1
Other wood fiber and				
Personal firewood	MM Cu Ft	4 51	3.30	4.26
Volume by species				
Ponderosa Pine	MM Cu Ft	38.7	24 6	28.7
Mixed Conifer	MM Cu Ft	14 4	28.6	24 6
Lodgepole Pine	MM Cu Ft	0 1	0	0
Harvest Method				
Overstory Removal				
Two-story stand	M Acres	34 2	25.3	0
Intermediate cut	M Acres	0	0	15 8
Clearcut	M Acres	0 2	0	3.8
Shelterwood cut	M Acres	4.9	3 7	16.1
Selective cut	M Acres	1 2	0	1 2
Precommercial thin	M Acres	20 7	15 2	6.8
Reforestation (Plant)	M Acres	0 9	0	3 7
WATER QUALITY				
Sediment	Index	1368	1113	1394
Water Yield	M Acre Feet	620	620	620
FIRE				
Fire Effective Index	\$/M Acres	1344	1344	1344
Fuel Treatment	M Acres	32 4	23.4	30 8
FACILITIES				
Passenger Car	Miles	1472	1472	1472
High-Clearance Vehicle	Miles	6172	6894	7426
Construction and	Miles	265	169	124
Reconstruction				

^{1/}Included in recreation visitor days in recreation.

^{2/}Including 4.3 million cubic feet per year salvage.

FIGURE B-19
LOCAL ROAD CONSTRUCTION/RECONSTRUCTION



4 Benchmark 7
Maximum Present Net Value (PNV) with Management Requirements (Assigned Values)

- a. Description This benchmark is identical to Benchmark 11, except that assigned values are used instead of market values to price the outputs. The same FORPLAN run was used for both cases and all physical outputs are identical. The tables and graphs for Benchmark 11 also apply to this benchmark.
- b. Present Net Value The Present Net Value reduction (FORPLAN Present Net Value rather than ADVENT) attributable to the imposition of the set of constraints (when compared to Benchmark 3) is \$76.4 million.

5. Benchmark 11
Maximum Present Net Value (PNV) with Management Requirements (Market Values)

- a. Description This benchmark estimates the Present Net Value that might be obtained on the Forest as a function of the benefits and variable costs associated with timber, livestock, and anadromous fish outputs, subject to rotation-age restrictions, nondeclining yield, and Management Requirements.
- b. Purpose The purpose of this benchmark is to show the opportunity costs of the Management Requirements in terms of Present Net Value and output levels.
- c. FORPLAN Objective Function Maximize Present Net Value for 15 decades.

d Assumptions and Constraints

Timber harvest is scheduled only on lands classified as "suitable" through the suitability analysis.

Management Requirements are constraints.

Nondeclining flow at or below long-term sustained yield capacity.

Rotations based on 95 percent of culmination of mean annual increment.

Ending inventory constraint applied

Only resource outputs which have an established market value are considered as benefits for Present Net Value calculations.

Selection harvest only in riparian areas (except lodgepole pine) in order to meet water quality (temperature) standards and other riparian area resource needs

Old-growth acres (44,860) necessary to maintain viable wildlife populations removed from land base available for timber harvest.

Harvest dispersion constraints:

Less than or equal to 25 percent per decade of mixed conifer and ponderosa pine in riparian areas;

Less than or equal to 10 percent per decade of lodgepole pine in riparian areas;

Less than or equal to 38 percent per decade on all other available lands for shelterwood final harvests;

Less than or equal to 25 percent per decade on all other available lands for clearcut final harvests.

All constraints are applicable throughout the planning horizon (150 years).

e. Timber

This benchmark run produced a long-term sustained yield of 61.7 million cubic feet per year with a first decade harvest volume of 51.7 million cubic feet per year (284.8 million board feet per year). This includes approximately 4.0 million cubic feet per year (11.9 million board feet per year) due to mortality salvage and nonchargeable timber volume. This total volume will exceed the volume production goals for the Malheur National Forest called for in the "Forestry Program for Oregon" in all five decades. See Table B-17 for volume of timber harvest by decade.

The species mix for the first decade is approximately 55 percent ponderosa pine and 43 percent mixed conifer. This gradually shifts to 70 percent mixed conifer species and 30 percent ponderosa pine in the fifth decade. See Figure B-20 for the harvest methods used to achieve these volumes by decades. In addition, there is an average forest residue potential of 32.1 million cubic feet per year produced over the planning period (see Figure B-21)

To achieve the projected harvest volumes, there will be an increase in precommercial thinning and planting acres over the 50-year period. General trends indicate high initial levels of precommercial thinning, gradually decreasing towards the fifth decade. A significant increase in reforestation (planting) acres occurs over the planning period. See Figures B-22 and B-23 for precommercial thinning and planting acres

f Range Management

On Forested land, animal unit months remain approximately constant. On nonforested lands animal unit months increase in the second decade and then remain constant in decades 3 through 5. (See Figure B-24.)

The assumed increase in forage productivity is based upon installation of structural and nonstructural range improvements, which will occur on both commercial forest and nonforest lands, as well as stocking level control from timber management activities.

FIGURE B-20
HARVEST METHODS

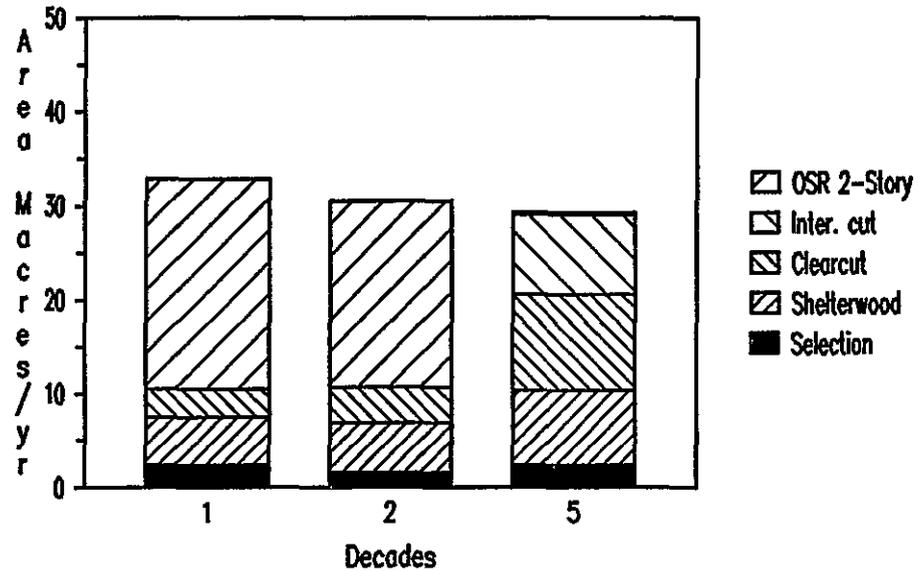


FIGURE B-21
OTHER WOOD FIBER AND PERSONAL USE FIREWOOD

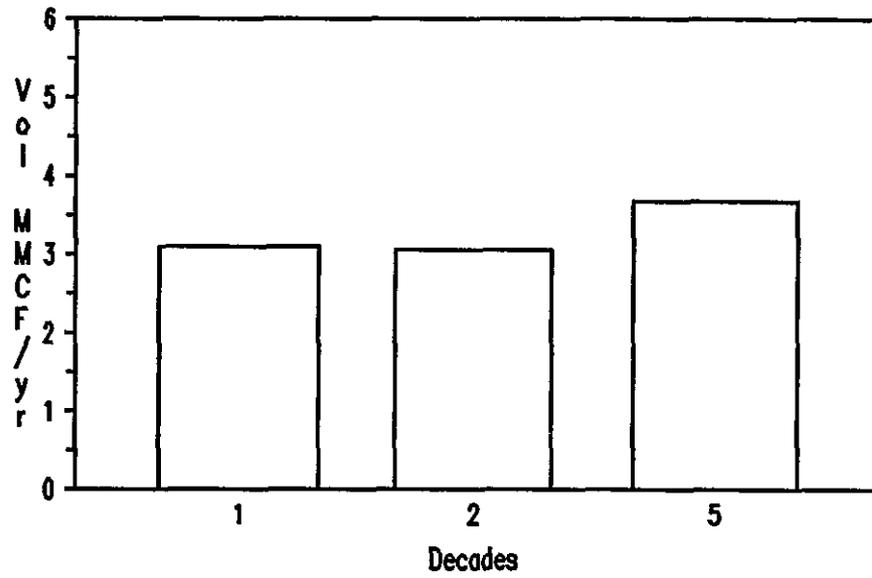


FIGURE B-22
PRECOMMERCIAL THINNING

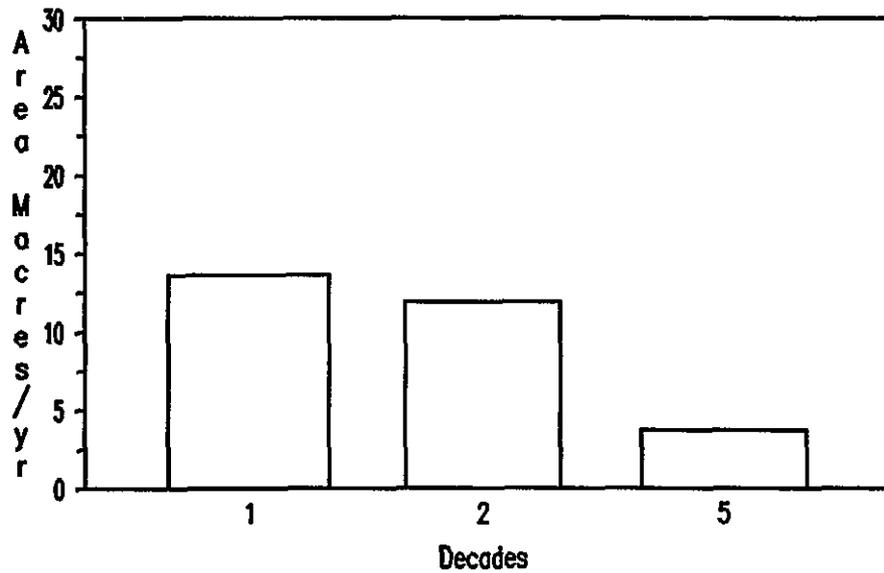


FIGURE B-23
REFORESTATION (PLANTING)

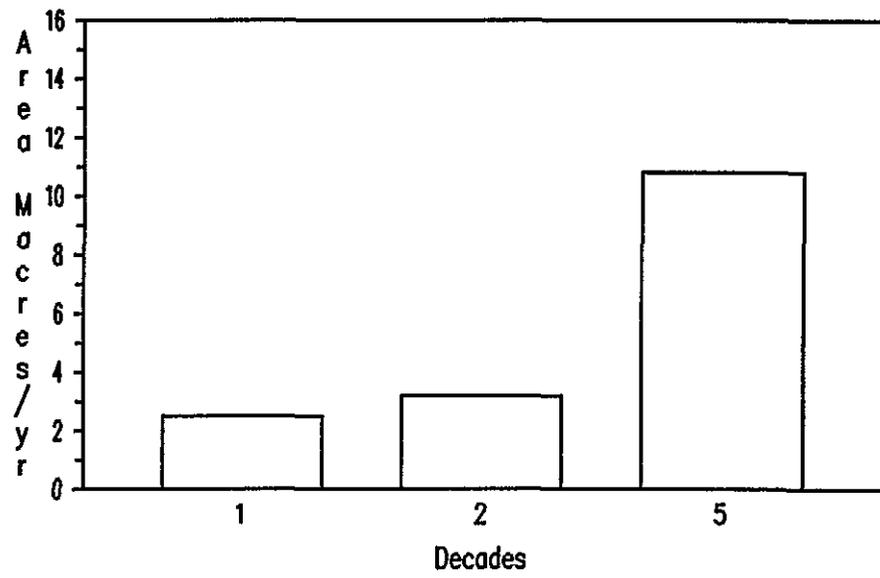
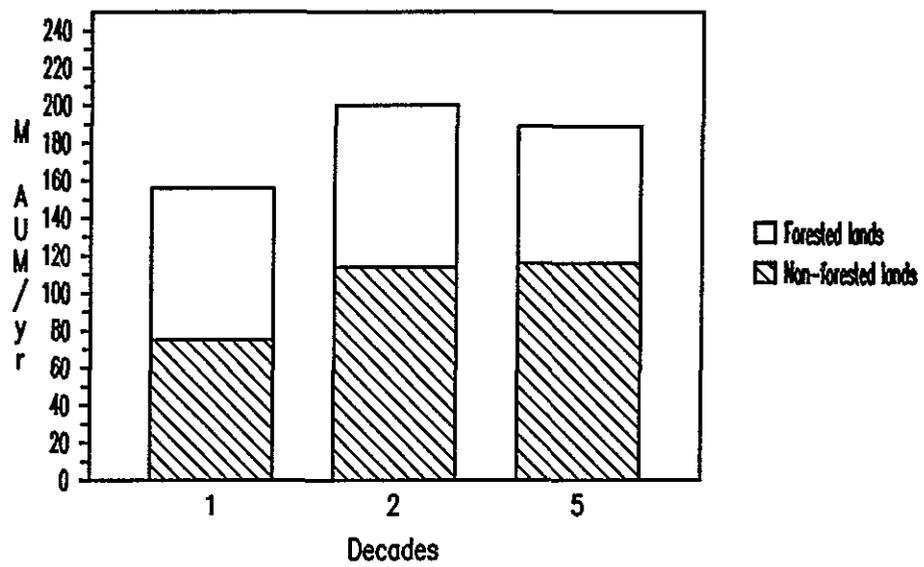


FIGURE B-24
LIVESTOCK



g. Wildlife

Big-game habitat shows a steady increase toward optimum cover/forage ratios through the fifth decade (Figure B-26).

Estimated elk numbers (per forage capability) on both winter and summer ranges decrease through the second decade then remain approximately constant (Figure B-25). Elk numbers were estimated by forage availability and a discount for less than optimum cover conditions only. No other factors such as hunting, predation, roading, weather, or Habitat Effectiveness Indices, were used to estimate the hypothetical population capacity of this benchmark.

h. Old Growth

Old-growth habitat will be maintained at a level necessary to maintain viable wildlife populations (44,860 acres)

i. Fisheries

This benchmark run has constraints which are intended to meet Management Requirements. In terms of water quality and fish habitat, the constraints which are most important are those which specify selection harvest in riparian areas and cause the harvest to be more evenly distributed over time. Within the limits of our ability to predict changes on such a broad scale, it appears that this run is at least close to providing for shading requirements. On-the-ground implementation of this prescription could probably make the necessary adjustments to meet shade requirements from the perspective of timber harvest. The natural contribution of large woody material to the streams would continue to decline over time.

FIGURE B-25
ESTIMATED ELK NUMBERS (per forage availability)

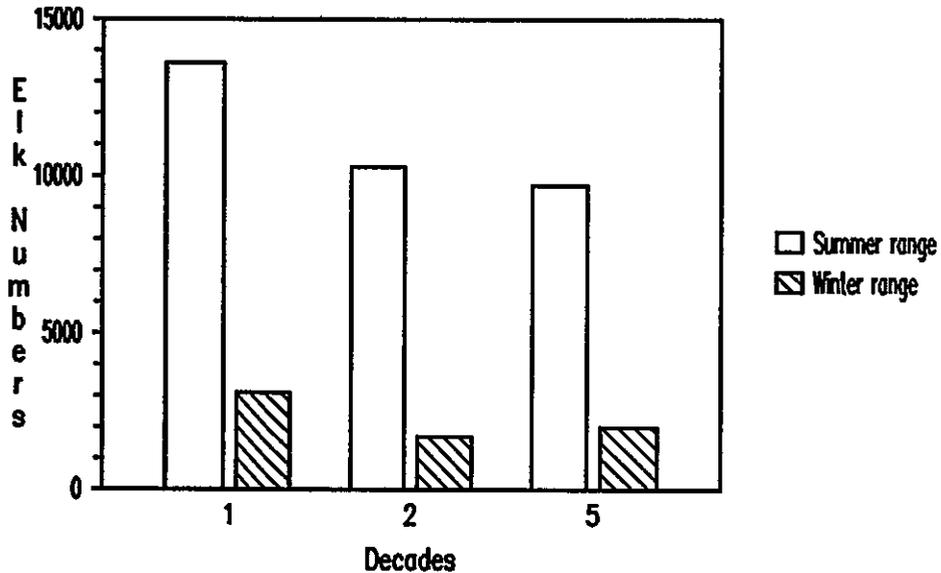
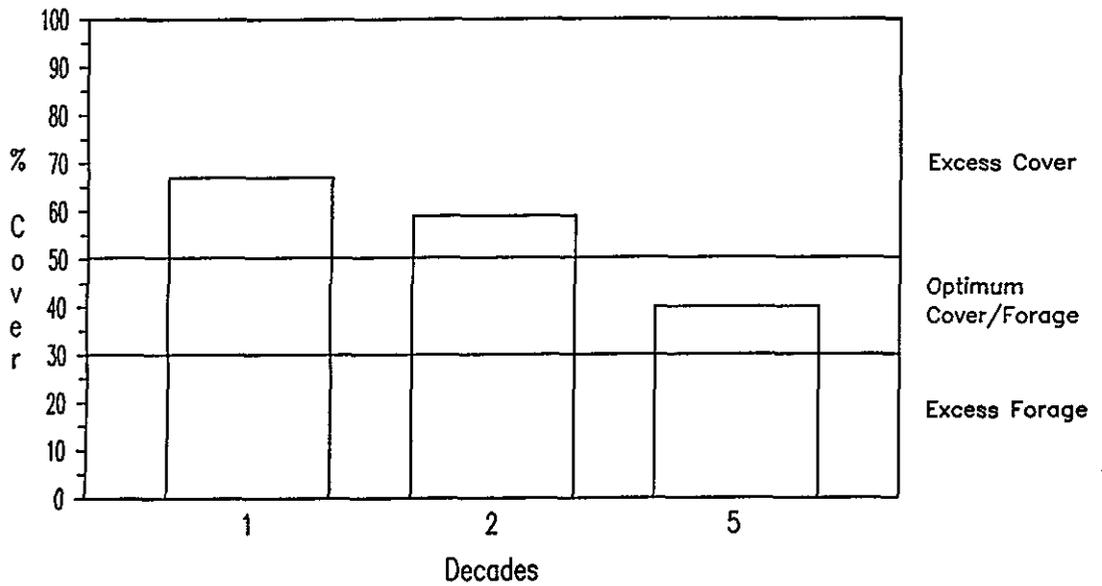


FIGURE B-26
BIG-GAME HABITAT CAPABILITY



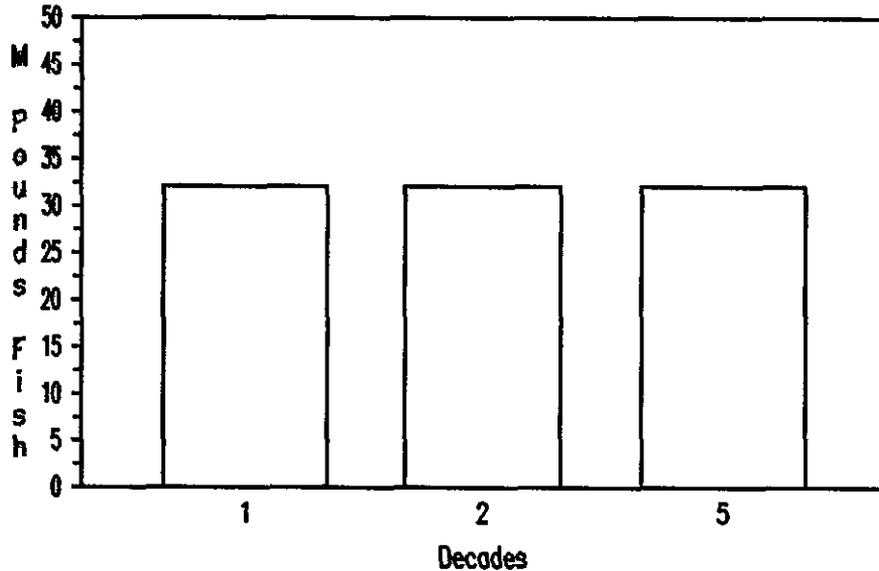
Cover in the above figure refers to an undefined combination of satisfactory and marginal cover categories

Road construction and reconstruction increase only slightly over the current situation. We assume that best management practices for timber harvest activities, including roading, will meet State water quality standards for sediment and turbidity.

Livestock grazing on the Forest increases substantially from the current situation. However, the animal unit months produced in riparian areas is reduced from the current situation. Assuming the large investment to achieve this redistribution of livestock, fish habitat would not be adversely affected. A stable trend could be expected as it relates to livestock management. With 100 percent control of the livestock and maximum administration, an upward trend would be possible.

Investments in habitat improvements, including bank stabilization and riparian improvements, are assumed to continue at relatively low levels, being accomplished primarily through the K-V program. The net result should be a stable fish habitat condition over time, with improvement due to mitigation offsetting impacts due to increased commodity production. (See Figure B-27)

FIGURE B-27
ANADROMOUS FISH PRODUCTION POTENTIAL



j. Water

See summary analysis, Section VI.C.10.d.

k. Recreation

Developed Recreation. Developed recreation opportunities would not be provided.

Dispersed Recreation: Semiprimitive recreation opportunities outside wilderness would be eliminated by the first decade. This benchmark would provide only roaded modified and wilderness semiprimitive nonmotorized opportunities.

Visual Resource: No provisions for visual resource management would be made. By the end of the first decade, the only natural-appearing landscapes remaining would be those in wilderness.

Cultural Resource. Cultural resources will be inventoried prior to the implementation of potentially impacting management activities. The number of acres managed for cultural resource values is primarily influenced by the acres of timber to be harvested annually. New acres will accumulate until all lands suitable for timber production have been surveyed and cultural resources located. Thereafter, new cultural resource management acres will continue to accrue as other Forest acres are examined.

l. Transportation

Arterial and collector road construction and reconstruction will remain constant over time. The reason for this is the dispersion of harvest and recreational activities across the Forest. This assumption of a constant program also applies to maintenance levels 1, 3, 4, and 5 of the road maintenance program. Since local roads are usually used by only high-clearance vehicles, they fall into maintenance level 2 which will change over time.

The local road system construction and reconstruction program varies over time. This is shown in Figure B-28. This graph shows a decrease in road construction and reconstruction miles after the first decade

m. Protection

The cost of protection (dollars per million acres protected) will not vary by benchmark or alternative. Eighteen protection alternatives were run through the Fire Management Analysis process and the most cost efficient alternative was selected. Differences in benchmarks or alternatives will probably have no measurable effect on the Fire Management Effectiveness level selected.

Method of Measurement: Fire Management Effectiveness is measured by adding appropriated Forest Fire Protection dollars to Emergency Firefighting costs and resource loss values. Program Effectiveness is computed by averaging the annual cost over a decade.

FIGURE B-28
LOCAL ROAD CONSTRUCTION/RECONSTRUCTION

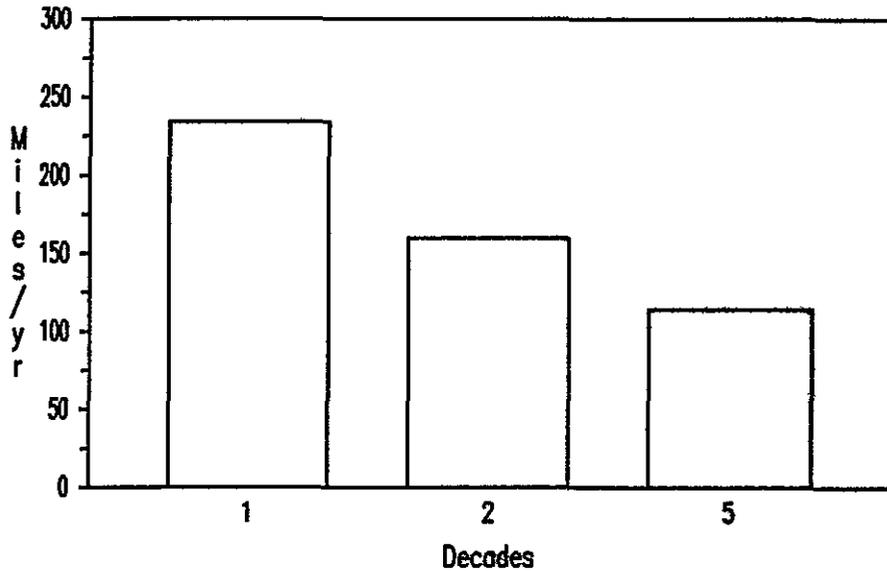


TABLE B-17
BENCHMARK BM11 MAXIMUM PNW WITH MRs

Output/Effect	Unit of Measure/yr	1st Decade	2nd Decade	5th Decade
RECREATION				
Developed Use	M RVDS	0	0	0
Dispersed Use				
Semi-Primitive				
Non-Motorized	M RVDS	0	0	0
Semi-Primitive				
Motorized	M RVDS	157.3	157.3	157.3
Roaded Natural	M RVDS	1949	976.1	163.1
Roaded Modified	M RVDS	1542	2633	3183
Wilderness	M RVDS	61.8	61.8	61.8
WILDLIFE AND FISH				
Elk (Summer)	Numbers	13,600	10,300	9,700
Anadromous Fish	M Pounds	32.1	32.1	32.1
Big-Game Use ^{1/}	M WFUDs	105.6	70.4	109.2
Fish Use ^{1/}	M WFUDs	23.7	23.7	23.7
RANGE				
Livestock Use	M AUMs	156.0	199.9	188.9
TIMBER				
LTSYC	MM Cu Ft	----- 61.7 in Decade 13 -----		
Programmed Sale ^{2/}	MM Bd Ft	284.8	N/A	N/A
Offered ^{2/}	MM Cu Ft	51.7	52.0	52.3
Other wood fiber and				
Personal firewood	MM Cu Ft	3.10	3.06	3.68
Volume by species				
Ponderosa Pine	MM Cu Ft	26.1	23.2	14.5
Mixed Conifer	MM Cu Ft	20.7	23.7	33.1
Lodgepole Pine	MM Cu Ft	0.8	0.9	0.1
Harvest Method				
Overstory Removal				
Two-story stand	M Acres	22.3	19.8	0.2
Intermediate cut	M Acres	0	0	8.5
Clearcut	M Acres	3.0	3.8	10.3
Shelterwood cut	M Acres	5.1	5.3	7.9
Selective cut	M Acres	2.4	1.6	2.4
Precommercial thin	M Acres	13.6	11.9	3.7
Reforestation (Plant)	M Acres	2.5	3.2	10.8
WATER QUALITY				
Sediment	Index	1333	1168	1446
Water Yield	M Acre Feet	620	620	620
FIRE				
Fire Effective Index	\$/M Acres	1,344	1,344	1,344
Fuel Treatment	M Acres	26.6	24.9	25.5
FACILITIES				
Passenger Car	Miles	1,472	1,472	1,472
High-Clearance Vehicle	Miles	6,103	6,735	7,196
Construction and	Miles	234	160	114
Reconstruction				

^{1/}Included in recreation visitor days in recreation.

^{2/}Including 4.0 million cubic feet per year salvage.