10. Summary

As stated before, the results of the benchmark analysis are based on the FORPLAN model used for the Draft Environmental Impact Statement, and are not updated for changes included in the Final Environmental Impact Statement. This does not affect the comparability of the benchmarks with each other

a Timber

The highest long-term sustained yield capacity produced in the benchmark runs was 68 8 million cubic feet in Benchmark 1, and (with the exception of the Minimum Level Benchmark) the lowest 52 4 million cubic feet per year in the Maximum animal unit months benchmark run (See Figure B-54.)

All of the benchmark runs, except the minimum level benchmark, produce a first-decade harvest volume that is greater than the allowable sale quantity of Alternative A No Action. This value varies from 59 2 million cubic feet per year (326.6 million board feet per year) as a high to 46.9 million cubic feet per year (254.8 million board feet per year) as a low, after adjusting for mortality salvage and other nonchargeable volume All of the benchmarks exceed the volume production goals for the Malheur National Forest called for in the "Forestry Program for Oregon" (Figure B-55)

The potential to produce other wood fiber in the first decade is high in all benchmarks. This value ranges from 47 1 million cubic feet per year (Benchmark 1) to 32.1 million cubic feet per year (Benchmark 11) This value varied due to selection of different harvest methods in all runs. (See Figure B-56, Other wood fiber and personal use firewood)

All of the benchmark runs produce a species mix of approximately 60 to 70 percent ponderosa pine and 30 to 40 percent other species in the first decade. After the third decade, mixed conifer species become the predominant harvest category in most cases, about 65 to 75 percent of total harvest volume.

The majority of the harvested volume, by harvest method, comes from first-entry two-story stands in all benchmark runs, except the Maximum animal unit months benchmark (66 percent other harvest methods in the second and third decades), and Current Direction run (75 percent regeneration harvest first three decades) for the first three decades (See individual benchmark tables for a summary of harvest methods by decades.) The harvest volume in the fourth and fifth decades is supplied by regeneration and intermediate cuts. The majority of the harvest acres is regeneration cuts with clearcutting as the primary harvest cutting method in all benchmarks except Maximum Animal Unit Months and Current Direction.

Precommercial thinning acres are high in the first three decades for all benchmarks except in the Maximum Animal Unit Months benchmark (8,900 acres per year in the second decade) The range for precommercial thinning is from 13,600 acres per year for a low to 20,700 acres per year for a high This acreage drops to almost 0 by the fifth decade in some benchmarks but the average is 5,000 acres/year. The large number of acres of precommercial thinnings in the first three decades can be attributed to the number of acres harvested by overstory removal cuts. (See Figure B-57.)

For the first three decades, reforestation (planting) acres are low in all benchmark runs except the maximum timber The fourth and fifth decades require planting at an average rate of 7,800 acres per year The general trend of low reforestation acres in the first three decades can be attributed to the number of acres harvested by overstory removals In the latter decades, a large number of

clearcuts and other regeneration cuts chosen by the model cause an increase in planting acres (See Figure B-58)

FIGURE B-54
LONG-TERM SUSTAINED YIELD CAPACITY

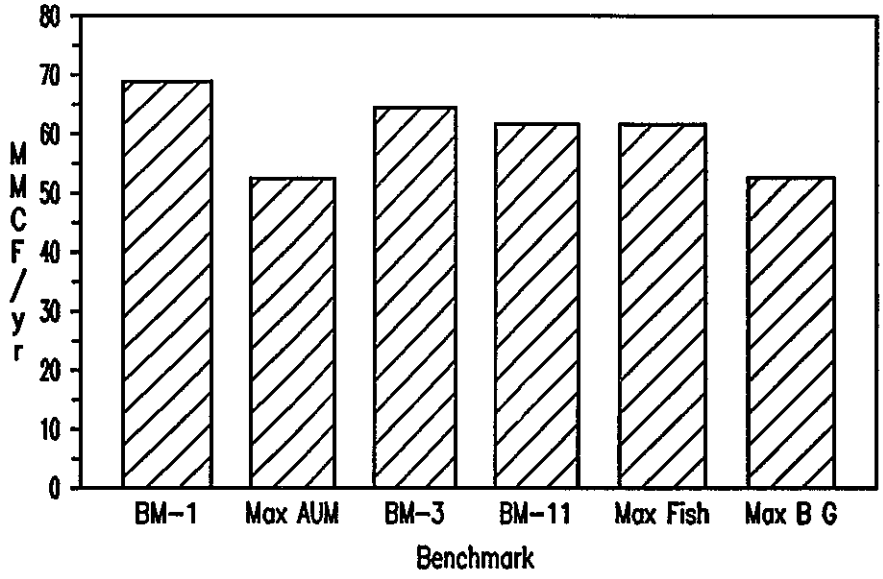


FIGURE B-55
PROGRAMMED SALES OFFERED

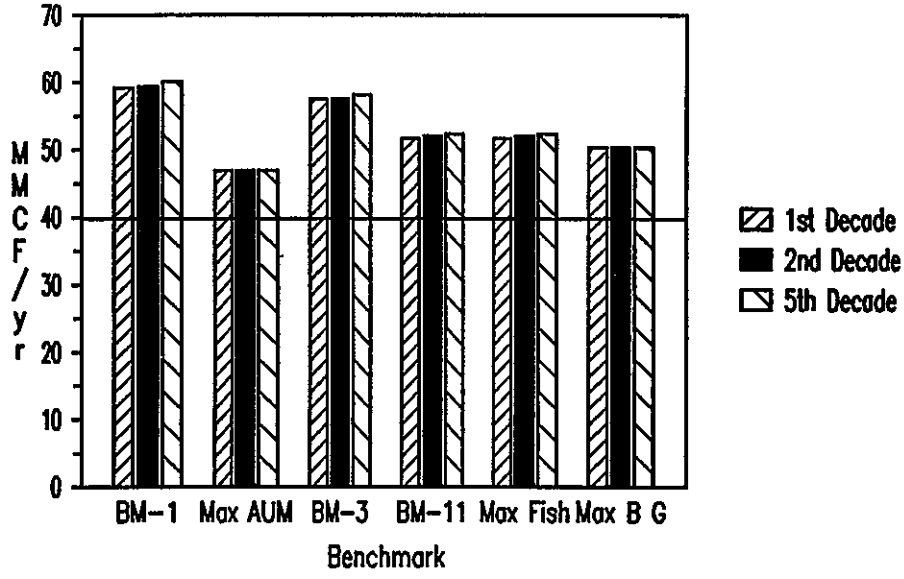


FIGURE B-56
OTHER WOOD FIBER AND PERSONAL USE FIREWOOD

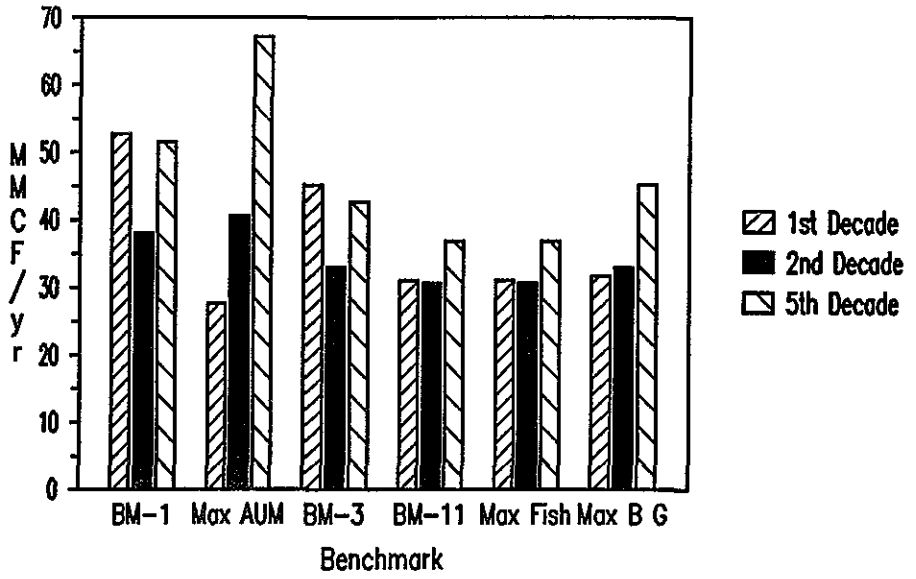


FIGURE B-57
PRECOMMERCIAL THINNING

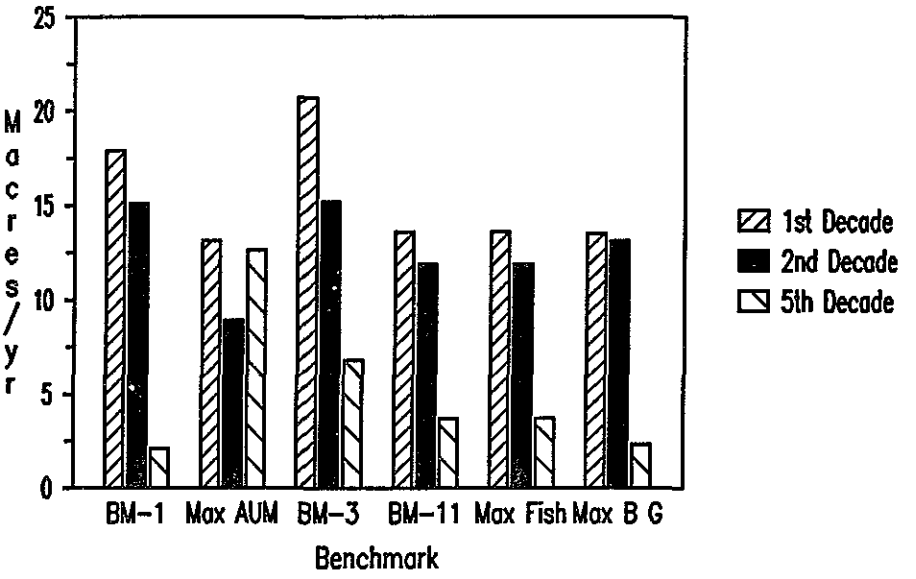
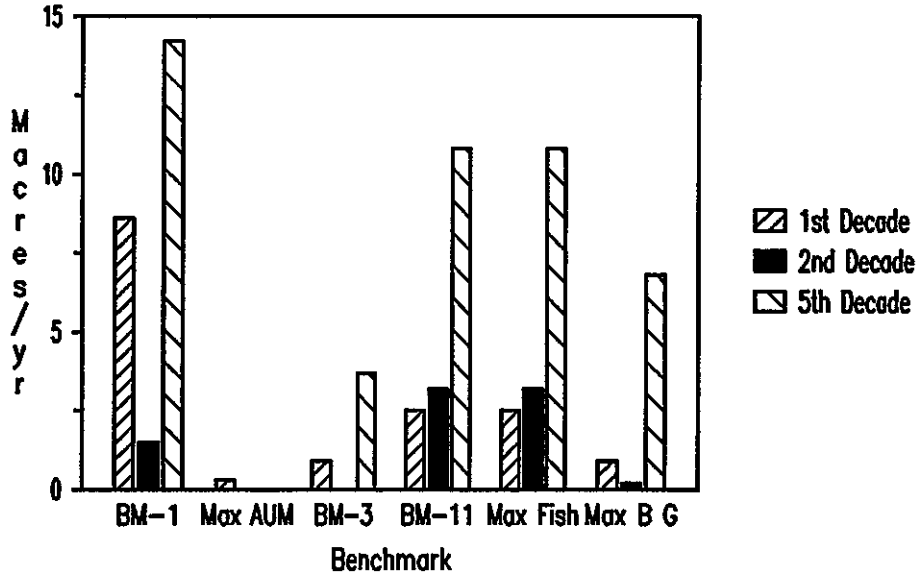


FIGURE B-58
REFORESTATION (PLANTING)



Generally, the benchmarks indicate that a higher level of timber outputs, both normal products and forest residue material, can be produced than is presently occurring. To accomplish a higher level of timber outputs, management activities will have to change over time to best utilize the biological potential of the land. This will require a much higher investment, both in dollars and personnel. However, to reach these higher output levels, there may be greater negative impacts on other forest resources.

Effects of Management Requirements - A comparison of the Max Present Net Value Benchmark (with all Management Requirements) to the Max Present Net Value Benchmark (without Management Requirements) shows the total effect of all Management Requirements taken together reduces Present Net Value by 14 percent, long-term sustained yield capacity by 4 percent, and first decade allowable sale quantity by 11 percent. Further analysis shows the effect of each Management Requirement individually when compared to the Max PNV (without Management Requirements) Benchmark. The following constraint analysis in Table B-22 was developed for the Draft Environmental Impact Statement published in 1987. Since then costs have been updated and the Present Net Value of some benchmarks has changed. Although Present Net Value may have changed for some benchmarks, the constraint analysis is still valid.

The harvest dispersion Management Requirement establishes a maximum amount of acres that can be regenerated in any decade This Management Requirement limits openings created by clearcutting to 40 acres or less with logical cutting units surrounding, shelterwood and overstory removals are limited to 80 acres or less to address watershed, wildlife diversity, and visual management concerns. This Management Requirement results in a substantial reduction in Present Net Value (9 percent); first decade allowable sale quantity is down about 5 percent. Present Net Value reductions are primarily due to timber harvests foregone in valuable, mature timber in the first decade, and the implementation of more costly timber management practices over time. However, long-term sustained yield capacity is higher because of the mix of timber management practices

The mature old-growth Management Requirement results in the dedication of acres of suitable timberland for wildlife habitat for old-growth-dependent wildlife Indicator species considered are pileated woodpecker and pine marten This Management Requirement results in a 3-percent decrease in Present Net Value and a 5-percent decrease in first decade allowable sale quantity The reduction in long-term sustained yield capacity is due to reduction in suitable timber land because of old-growth dedication.

The riparian Management Requirement was designed to protect riparian zones on the Forest Present Net Value and first decade allowable sale quantity tradeoffs are small (Present Net Value - less than 3-percent, allowable sale quantity - 1 percent) This Management Requirement has smaller tradeoffs because it is identified with specific areas of the Forest, the harvest dispersion and old-growth Management Requirements have Forest-wide effects.

The Management Requirements for the Forest were designed to protect specific qualities of the Forest Consequently, there is very little overlap in effect on Present Net Value and allowable sale quantity between Management Requirements, and the Management Requirements are mostly additive Slight overlap between the riparian Management Requirement and the harvest dispersion Management Requirement accounts for the difference in total effect

TABLE B-22

SUMMARY OF MANAGEMENT REQUIREMENTS (MRs) CONSTRAINT ANALYSIS

Benchmark/MR	Present Net Value		Long-Term Sustained Yield Capacity		First Decade Allowable Sale Quantity	
	MM$ 1/	Change 2/	MMCF	Change 3/	MMCF	Change 3/
Max PNV (without MRs)	638 6		593 9		532 6	
Harvest Dispersion	583.4	-55 2	616.2	+22 3	508.1	-24 5
Old Growth	617.7	-20 9	586.5	- 7.4	506.5	-26.1
Riparian	624 1	-14 5	594 6	+ 0 7	526 4	- 6.2
Max PNV (with all MRs)	549.7	- 88.9	572.3	-21.6	477.2	-55.4

1/Discount rate equals 4 percent Present net value calculated in 1982 dollars

2/Change from the Max Present Net Value (without Management Requirements) Benchmark. Also can be interpreted as opportunity costs of the Management Requirements

3/Change from the Max Present Net Value (without Management Requirements) Benchmark.

Effects of Timber Policy Constraints - Analyzing Benchmark 7 (Max PNV with assigned values and Management Requirements), the policy of nondeclining flow results in a reduction in Present Net Value of about 1 percent when compared to a FORPLAN run utilizing sequential lower and upper harvest scheduling (20 percent variation limit per decade) First decade allowable sale quantity is reduced by 7 percent, and allowable sale quantity fluctuates throughout the planning horizon. (See Table B-23). Volume harvests tend to be higher in the early decades (1 through 5) as high-valued existing stands are liquidated, decline in the middle decades as supplies of merchantable material decline, and surge higher in the later decades (10 through 15) as regenerated stands mature and are harvested. The policy of nondeclining flow results in biological gains (exhibited by an increase in long-term sustained yield capacity).

The policy of establishing rotation age on culmination of mean annual increment results in a Present Net Value reduction of less than 1 percent, and a first decade Allowable Sale Quantity reduction of about 2 percent when compared to rotations based on minimum utilization standards (using Benchmark 7) This policy assures that timber is harvested at or beyond its maximum mean annual growth rate, as required by NFMA (36 CFR 219.16) This policy also results in biological gains, as exhibited by an increase in long-term sustained yield capacity.

Culmination of mean annual increment and 95 percent thereof was determined for each individual timber model component and management scenario. Growth potentials were based on Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington (Hall, 1973) and research work done (Barrett, 1979).; Cochran, 1979; Dahms, 1975) in individual timber working groups Actual timber yield tables were built using Stage's stand prognosis model, through linear regression, or through professional judgment

Once each timber yield table was developed, adjustments were made to account for mortality salvage and a reduction for defect, nonplantable sites, etc. Mean annual increments were then calculated for each stand and their individual culmination points identified Rotation age for each stand, both managed and unmanaged, was based on culmination of mean annual increment (or 95 percent thereof) of the managed stand.

It was also determined that all timber model component stands except precommercial thins and nonstocked stands were at or part culmination of mean annual increment and could be regenerated at once Those stands that were not at culmination of mean annual increment were not allowed to have regeneration harvests until they reached 95 percent of culmination of mean annual increment

TABLE B-23
SUMMARY OF TIMBER POLICY CONSTRAINTS, OPPORTUNITY COSTS, AND OUTPUT EFFECTS 1/

Constraint	Present Net Value MM$	First Decade Allowable Sale Quantity MMCF	Long-term Sustained Yield Capacity MMCF
Individual Constraint			
Nondeclining Flow	-7 2	-35 9	+69 0
Culmination of mean annual increment	-2 8	-11 6	+74.1
Combined Constraints	-7 6	-36 3	+69 1

1/Compared to Max Present Net Value (with assigned values and MRs) Benchmark.

Summary of Prescription Assignments - The following table summarizes the acres of suitable timberland by prescription for the various benchmarks

TABLE B-24
SUMMARY OF AVAILABLE TIMBER HARVEST PRESCRIPTIONS BY BENCHMARK (Acres)

Harvest Prescription	Min Level	BM 1	BM 3	BM 7 & 11	Max AUM	Max Big Game	Max Fish
Clearcut	0	651,009	693,131	457,312	172,044	287,936	457,312
Shelterwood	0	372,493	329,205	472,580	707,503	617,151	472,580
Selection	0	21,358	19,218	66,193	46,976	67,178	66,193

b. Range

All benchmarks project a substantial increase in cattle animal unit months from one through five decades, with the exception of the Maximum Big Game and Minimum Level cases

Benchmark 1 (Maximum Timber) is significantly above the current permitted level and increases to approximately 190,000 animal unit months in decade 5

Benchmark Maximum Animal Unit Months displays the highest projected increase in animal unit months. Expected increases of cattle animal unit months begin at 194,000 animal unit months in Decade 1 and increase to 273,000 animal unit months in the fifth decade.

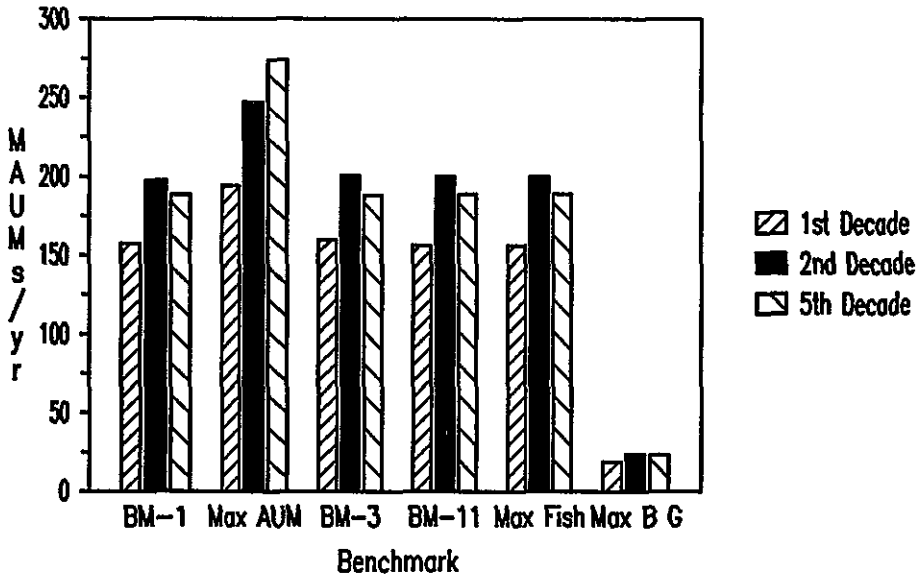
Benchmark Minimum Level provides for no permitted commercial cattle grazing.

Generally, the large projected increases in cattle animal unit months will result in grazing all suitable areas well above the amount currently permitted (See Figure B-59) Proper distribution of cattle will require high investments in stock water, fences, and intensive livestock and range management by permittees and the Forest

c. Wildlife

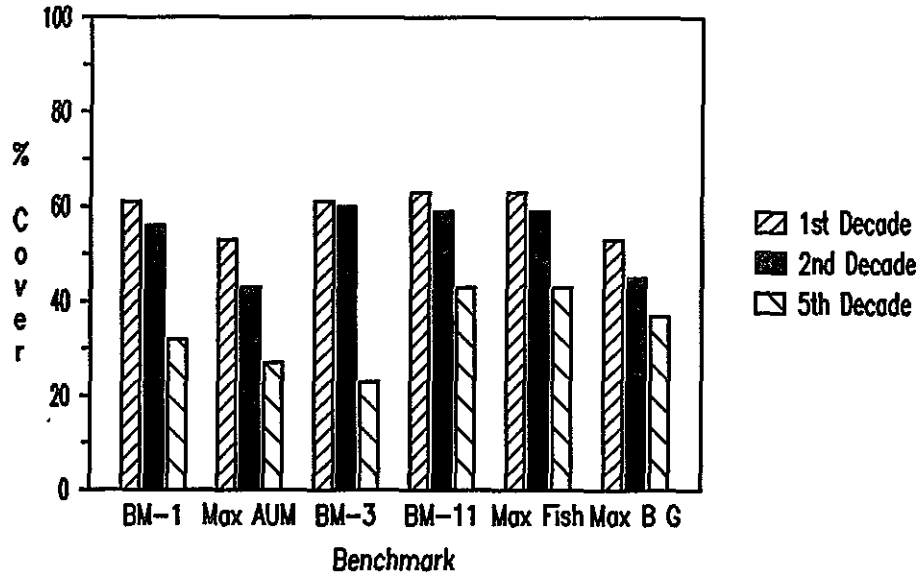
The Forest is responsible for managing big-game habitat to maintain the percentage of elk that would utilize Forest winter and summer habitat according to Oregon Department of Fish and Wildlife herd management objectives. At the present time, Oregon Department of Fish and Wildlife estimates at least 2,865 elk are wintering on the Forest. This number meets the Oregon Department of Fish and Wildlife herd-level objective for wintering elk on the Forest. Elk populations have increased in the past 8 years and wintering elk numbers will probably increase as total elk numbers on the Forest increase.

FIGURE B-59
LIVESTOCK



Elk thermal cover standards (which state that 10 percent of elk winter range will remain in thermal cover) are met in all the benchmarks during the five-decade analysis. (This differs from, and should not be confused with, the analysis method used for the alternatives, which is based on satisfactory and marginal cover applied to individual watersheds). Since no timber harvest occurs in the Minimum Level benchmark, it will be excluded in the following discussion

FIGURE B-60
BIG-GAME HABITAT CAPABILITY



Big-game cover capability increases towards optimum in all benchmarks and all show optimum big-game cover conditions for at least two of the five decades Two benchmarks show cover decreasing below 30 percent The Max Animal Unit Month benchmark produces a 28/72 cover/forage ratio in the fourth decade and 24/76 cover/forage ratio in the fifth decade However, 10 percent of the winter range would still carry thermal cover in these benchmarks. The best big-game cover condition is produced in the Maximum Big Game Benchmark (See Figure B-60)

Livestock management does not affect cover; however, cattle grazing can impact the amount of forage available for big-game use. Forage left unused by livestock on flat ground and the majority of forage found on steep ground (greater than 35 percent slope) would be available for big-game use

Habitat diversity displays the relative degree of abundance of forest successional stages. A diversity index is a number that indicates the relative degree of diversity in habitat on the Forest for each decade. A high degree of diversity reflects a healthy, stable forest community capable of supporting many wildlife species. The Max AUM Benchmark displayed a high diversity index, thus indicating *a good mixture of forest successional stages.*

Old-growth acres remain constant through all benchmarks (with the exception of Benchmarks 1 and 3). Approximately 44,860 acres of old growth were selected to meet dispersion and habitat requirements for a minimum viable population of old-growth dependent species. Additional old growth is available in the wilderness, in the Pine Creek Further Planning Area, and in the Vinegar Hill-Indian Rock Scenic Area

The amount of bald eagle winter roost habitat (both potential and active) remains constant at 4,400 acres and potential peregrine falcon eyrie sites remain constant at four sites through all benchmarks (except Benchmarks 1 and 3)

d. Water

Water yield remains constant in all decades for all benchmarks

Sediment is a function of road construction and logging, no ties to range animal unit months or practices were attempted. Livestock grazing could have a substantial affect on sediment yield With the exception of the Maximum Anadromous Fish, Maximum PNV, and Minimum Level benchmarks, sediment tends to peak in the third decade which is due to the model building most roads in that decade Sediment yield figures were adjusted to reflect building roads into the majority of unroaded areas in the first decade However, the third decade peak persists, presumably due to road construction elsewhere

e. Fisheries

The benchmark analysis makes evident the following· (1) Anadromous fish production cannot be maintained at current levels without implementation of management practices designed to meet State water quality goals for temperature and turbidity; and (2) increases in anadromous fish production can be achieved by significant expenditures in riparian area improvements and/or by a significant reduction in riparian area management activities

D. RESULTS OF THE BENCHMARK ANALYSIS

As detailed in the previous section (Section C, Benchmark Analysis) in the text and summaries of outputs, the benchmarks produce varying environmental effects and resource output levels The modeling constraints for each benchmark have been previously discussed, the following section presents the results of the benchmark analysis. Most of the results are presented in an incremental fashion; i.e., differences in benchmarks are displayed in successive fashion. The analysis which follows is largely concerned with the following benchmarks: Minimum Level Management, Maximize Timber without Management Requirements (MRs) - Benchmark 1; Maximize PNV without MRs with Assigned Values - Benchmark 3; Maximize PNV with MRs with Assigned Values - Benchmark 7, and Maximize PNV with MRs with Market Values - Benchmark 11. The analysis completed for other benchmarks (Max AUM, Max Anadromous Fish, and Max Big Game), whose primary purpose was to generate upper production limits for specific resource outputs, was detailed in Section VI.C, Benchmark Analysis. The Current Situation benchmark is identical to the No Action Alternative which is discussed in Section VIII of this Appendix; consequently, the Current Situation Benchmark is not discussed in detail here

As stated before, the results of the benchmark analysis are based on the FORPLAN model used for the Draft Environmental Impact Statement, and have not been updated for changes included in the Final Environmental Impact Statement. This does not affect the comparability of the benchmarks with each other.