II. INVENTORY DATA AND INFORMATION COLLECTION

A. FOREST DATA BASE

Inventory data were collected for many resources so that issues could be addressed, limitations defined, and capability determined. Some of the data were necessary to develop the Forest planning model and to determine capability and analysis areas.

1. Capability Areas

A capability area is defined as an area of land whose inherent characteristics dictate that the response to, or effects of, management will be relatively the same for all acres within the area. In addition, they are locatable and contiguous.

Capability areas were delineated based on the physical and biological factors described below (Hall, 1973).

a. Ecoclass

- Ponderosa Pine
Timber lands comprising principally ponderosa pine, also including Douglas-fir and white fir.

- Mixed Conifer
Timber lands consisting of Douglas-fir, white fir, western larch, ponderosa pine, western white pine, lodgepole pine, Engelmann spruce.

- Lodgepole Pine
Timber lands comprising principally lodgepole pine, also including Douglas-fir, western larch, ponderosa pine, subalpine fir, white fir, and Engelmann spruce

- Grass Dominant
This is a plant community type that is dominated by bunchgrasses and could have interspersed pine trees and mountain mahogany.

- Sagebrush Dominant
This is a community type that includes all sagebrush, bitterbrush, and mountain mahogany.

- Juniper/Bunchgrass
This community type includes juniper/bunchgrass, juniper/stiff sage scabland, juniper/low sagebrush, and juniper/big sagebrush.

- Moist Meadow
Moist or wet meadows are wet to moist in the spring and are subirrigated or have freely available water within the rooting zone throughout the growing season.

- Dry Meadow
Dry meadows are moist to wet in the spring, but may be moderately to severely dry by fall depending on weather conditions during the year.

- Mesic Tree and Shrub
This is a shrub community type that is dominated either by snowberry (15 to 40 percent cover), ninebark (20 to 60 percent cover), or thinleaf alder (40 to 60 percent cover).

- Fir/Sedge
Located on exposed ridges at or above timberline Dominated by fescue on northerly aspects and sedge on southerly aspects. May have subalpine fir or whitebark pine intermingled

- Rockland
This community is a grouping for all exposed rock formations, knobs, talus slopes, and rocky peaks, 2 acres or larger in size

b. Management Needs Classification

Management needs were based on the 1980 Forest Resource Inventory

- Mature
This type of stand presently will appear to be a mature stand of trees without manageable immature crop tree stocking in the understory.

- Commercial Thin
These stands appear to be even-aged, with very few to no large old trees. Tree size is pole or small saw logs, and stocking at present is excess

- Precommercial Thin
These stands have very few to no trees over 9 inches diameter breast height. There are many more small trees and saplings than necessary to stock the area By removal of these excess small trees, the remaining trees will be able to grow at accelerated rates thus producing a merchantable product sooner than the natural system would

- Two-Storied
The stands in this model category will appear to have a rather sparse overstory in comparison to the understory The overstory must contain enough volume to make commercial entry economical and an understory which may, after this entry, have the characteristics of a stand for which precommercial thinning would be prescribed

- No Treatment
The stands in this model category presently appear to be satisfactorily stocked with healthy trees that do not exceed maturity age for the species they contain

- Needing Reforestation
There are two types of stands which should be reforested in the next 10 years

- Nonstocked
This type of stand will appear to have been logged, burned, site prepared, and planted, or may appear to be a brushfield, but it will still be capable of producing at least 20 cubic feet per acre per year of industrial wood fiber. Presently the stand is less than minimally stocked

To qualify as nonstocked, the stand must, at the present time, have less than 2,000 board feet per acre of merchantable timber with mature and crop tree stocking being less than or equal to 16 percent of the recommended stocking level of seedlings and saplings

- Poorly stocked
Poorly stocked stands must have less than 2,000 board feet per acre of merchantable timber with mature and crop tree stocking at between 16 and 39 percent of recommended stocking level of seedlings and saplings, and the majority of stands predicted to have less than recommended stocking at rotation age.

- Old Growth
An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics:

a. Stands contain mature and overmature trees in the overstory and are well into the mature growth stage

b. Stands will usually contain a multilayered canopy and trees of several age classes.

c Standing dead trees and down material are present.

d. Evidence of human activities may be present but do not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

- Low Site
Timber lands which are incapable of yielding 20 cubic feet per acre per year of industrial wood fiber

c. Slope

Slope information is derived from Pacific Northwest Region Geometronics and the data is contained in the Forest's Total Resource Inventory Data Base System.

- 35 percent or less
- Greater than 35 percent

d. Roads

Delineations were based on the existing transportation system with differentiation for construction before and after 1982 Unroaded areas and wilderness were also defined

e Range

Delineations were made based on the existing management intensity, as detailed in range allotment management plans.

f Elk Winter Range

A definition of elk winter range was prepared which included evaluation criteria for elevation and snow depth. Using this information, areas of the Forest were proposed as elk winter ranges and were evaluated through cooperative work with the Oregon Department of Fish and Wildlife as well as information from Forest Service personnel who have extensive field experience on the Malheur National Forest. The delineated elk winter ranges were then analyzed to determine how many elk each range could carry, using forage as the driving factor

g. Bald Eagle Winter Roosts

Inventories for bald eagle winter roosts on the Malheur National Forest began in 1979 with U. S. Fish and Wildlife Service personnel reporting bald eagle use on the southern fringe of the Forest Forest Service personnel surveyed and found one additional roost in 1980-1982. In 1982-1984, an interagency study by the Wildlife Cooperative Unit of Oregon State University surveyed the Forest and found additional roosting sites These known roost sites as well as potential roosting habitat are considered in this document For more information, see "Ecology of Bald Eagles Wintering in the Harney Basin, Oregon" by F. Isaacs, on file in the Wildlife Unit in the Malheur National Forest Supervisor's Office

h. Visual Corridors

The viewshed corridors were developed under the guidance of the Forest landscape architect in conjunction with representatives from the four Ranger Districts

A Forest-wide visual resource inventory had been prepared during the late 1970's and early 1980's utilizing the procedure outlined in Agriculture Handbook no. 462, National Forest Landscape Management, vol 2, chapter 1, The Visual Management System.

In 1985 this inventory was reviewed by the Forest landscape architect and Ranger District representatives to see if, after implementing it for several years, corrections or additions needed to be made The conclusion was that the original inventory had overstated the sensitivity of Malheur National Forest visitors to the visual resource.

Based on a re-evaluation of the types of users of the Malheur National Forest and their sensitivity to the visual resource, the inventory was reviewed and revised. Criteria based on the national inventory process as outlined in Agricultural Handbook no 462 was again applied Viewshed corridors were identified that met the national criteria Additional corridors were identified that responded to local concerns and interests based on the best judgment of Forest Service personnel and traffic data gathered by Forest engineering personnel

This revised inventory was used to select viewshed corridors to be managed in all alternatives except the No Action and No Change alternatives. The No Action and No Change alternatives, which are based on present management direction (Forest Unit Plans), have the most viewshed corridors identified. This is because the Forest Unit Plans were developed using the old inventory. The remaining alternatives were developed utilizing the revised inventory.

The viewshed corridors were prioritized according to their importance In all alternatives, those corridors that met the national criteria for being visually sensitive were designated for management as viewshed corridors. Additional viewshed corridors were added based on their priority rating and the theme of the alternative Amenity-oriented alternatives such as Alternative C-Modified have a high number of viewshed corridors identified for management Commodity-oriented alternatives have a low number of viewshed corridors identified for management

The alternatives were formulated by the four District Rangers, the Forest Public Affairs Specialist, and the Forest Recreation Staff Officer The selection of viewshed corridors for each alternative was made by this group, then reviewed by the Forest management team when the alternatives were finalized.

1. Manageable Boundaries for Roadless Areas

These boundaries were developed from the 1979 RARE II Final Environmental Impact Statement, together with the three unit plans, acre data, and maps. The process used is that required for identification of areas which no longer meet RARE II standards (direction book for the 1983 Oregon Wilderness proposal, and the Regional Direction package, November 10, 1983). Maps are on file in the Supervisor's Office Planning Section showing acres which do not meet the criteria. This process was accomplished in the period from January 1983 to December 1985.

During August to December 1985, District Rangers reviewed each area in their respective Districts and made recommendations for manageable boundaries. These are recorded on maps in the planning records. The Management Team finalized these boundaries and they were approved by the Forest Supervisor in February 1986 (Management Team meeting notes, February 19-21, 1986).

In April 1986 a change was made in which the Dixie Butte area was re-inventoried for nonconforming acres The resulting final boundaries were approved by the Forest Supervisor.

In response to public comments, each ranger district assembled an Issue Task Force to review and address specific, substantive comments related to the district's respective roadless area boundaries identified in the Draft Environmental Impact Statement. Evaluation of public comment was accomplished by rating each roadless area's resource attributes in comparison to the available priced and nonpriced outputs. Resulting from this evaluation the task forces recommended to the Management Team specific Management Prescriptions and changes to the manageable boundaries for each area. These changes were either adopted or further modified for inclusion into the Forest Plan (Appendix K).

2. Analysis Areas

One of the first steps in the development of FORPLAN (Forest Planning Model) was to divide the Forest into analysis areas. For this task, the Total Resource Information System 2000 data base was used extensively Analysis areas are a collection of specific land areas (not necessarily contiguous) with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model. They serve as the basic unit of land in the model for which a range of prescriptions are developed to achieve various multiple-use objectives. Their delineations were intended to capture the significant biological and economic differences in the way the land responds to alternative management strategies The focus of delineating analysis areas was based upon addressing certain issues, concerns, and opportunities identified at the outset of the planning process.

Each analysis area in FORPLAN is defined uniquely by a specific combination of six different level identifiers. A description of and rationale for the analysis areas contained in the FORPLAN model is given in Section III. C of this appendix

3. Production Coefficients

The Interdisciplinary Team developed coefficients for timber, range, sediment, cover quality, roads, water, and costs. Many of the coefficients other than timber were calculated outside the model and using information from some of the reports from the model

4. Suitable Lands

The suitable land classification divides the National Forest land on the Malheur into the following categories water, existing roads, and other nonforested lands; forested lands which are capable but not available for timber harvest, forested lands available and capable, forested lands technologically not suited; and *available, capable, and tentatively suitable forest lands* The suitable lands determination is documented in "Suitable Forested Lands Review," dated August 21, 1984.

The physical review of the Malheur National Forest land base was conducted by both Forest Supervisor's Office and Ranger District personnel. A set of guidelines was first developed, based on National Forest Management Act, Washington, and Regional Office direction, to direct the Forest process and identify those lands most likely to be physically unsuitable for timber production The actual review process used aerial photos, resource maps, the Total Resource Inventory data base, field investigation, and professional judgment. The final outcome of this review can be found in the "Suitable Forested Lands Review" documentation package, December 1983 to October 1984.

The next step in the timber land suitability review was to determine if each individual stand had at least one timber prescription with a positive present net value This was accomplished by using the FORPLAN model, utilizing Objective Function 9, Maximize Present Net Value for Individual Stand with Detail. This analysis generated information that there was at least one prescription with a positive present net value for each timbered category.

Because the number of timber prescriptions proposed did not exceed the total number allowed in FORPLAN, none were deleted because of this step in the analysis. *Timber prescriptions were removed from the model because of certain* physical conditions, i e., no overstory removal option in mature and two-story lodgepole pine, or management consideration; i e , allow only uneven-aged management practices in visual foreground ponderosa pine or mixed conifer stands

The last step in the suitability analysis was done to determine those acres that were not cost-efficient for timber production This was accomplished by the FORPLAN model for each alternative. In general, if the FORPLAN model chose to send acres to minimum level management, it followed this logic First send lodgepole pine >36+ percent slope, then lodgepole pine $\underline{<}35$ percent slope, next mixed conifer >36+ percent slope, then mixed conifer $\underline{<}35$ percent slope, last ponderosa pine >36+ percent slope, then ponderosa pine $\underline{<}35$ percent slope.

5. Developing Allocation and Scheduling Alternatives

The condition classes of existing vegetation were used to schedule management *activities over time for the various benchmarks and alternatives.*

6. Monitoring

Monitoring and evaluation comprise the management control system for the Forest Plan. They will provide the decision maker and the public with information on the progress and results of implementing the Forest Plan.

Monitoring and evaluation entails comparing the end results being achieved to those projected in the Plan. Costs, outputs, and environmental effects, both experienced and projected, will be considered

To do this, a comparison will be made, on a sample basis, of overall progress in implementing the Plan as well as whether the overall relationships on which the Plan is based have changed over time When changes occur, they will be evaluated for their significance, and appropriate amendments or revisions made

The goals for monitoring and evaluating this Forest Plan are to determine.

1. How well the Forest is meeting its planned goals and objectives;

2. If existing and emerging public issues and management concerns are being adequately addressed;

3. How closely the Forest Plan's management standards are being followed;

4. If outputs and services are being provided as predicted;

5. If the effects of implementing the Forest Plan are occurring as predicted, including significant changes in the productivity of the land;

6. If the dollar and manpower costs of implementing the Forest Plan are as predicted;

7. If implementing the Forest Plan is affecting the land, resources, and communities adjacent to or near the Forest;

8 If activities on nearby lands managed by other Federal or other governmental agencies, or under the jurisdiction of local governments, are affecting management of the Forest;

9. If research is needed to support the management of the Forest, beyond that identified in Chapter II of the Forest Plan, and

10. If there is a need to amend or revise the Forest Plan.

Monitoring will test resolution of the same issues and concerns that the Forest Plan was designed to resolve. For each key resource area there are one or more monitoring questions. At specific time intervals, each question will be answered with either a "yes" or "no." If the answer is "yes," then there is reasonable assurance that expected results are being achieved and implementation will continue. If the answer is "no," then the situation will be evaluated and appropriate action taken to correct it Appropriate action will range from correcting performance deficiencies when standards are not being implemented, to modifying the Forest Plan when acceptable effects cannot be achieved within the framework of the Forest Plan

7. Plan Implementation Programs

Implementation of the Malheur National Forest Plan requires moving from an existing management program, with a budget and "targets" for accomplishment, to a new management program with a budget, goals, and objectives that provide a different way of addressing the issues and concerns people have voiced about Forest management. The Forest Plan establishes the direction for the Malheur National Forest for the next 10 to 15 years, when used in conjunction with Forest Service Manuals and Handbooks and the Pacific Northwest Regional Guide

This Forest Plan serves as the single land management plan for the Malheur National Forest Upon implementation, this Plan will supersede all present land management plans for the Malheur National Forest Land management plans superseded are for the John Day, Silvies-Malheur, and South Fork planning units

Subject to existing rights, all other contracts, cooperative agreements, or instruments for occupancy and use of the land will be brought into compliance with the plan generally no later than three years after the plan is enacted or as otherwise specified in the standards.

The management direction provided by this Forest Plan comprises the sideboards within which project planning and activities take place It defines management area goals and management standards that guide project activities toward achieving a desired future condition for the management area and, collectively, for the Forest It specifies a schedule for project activities (management practices) It provides guidance concerning potential land type and habitat type constraints, including assumptions about the appropriate vegetation management practices for timber sale projects On-the-ground project analysis validates or invalidates the appropriateness of those assumptions

Within this guidance, the projects are developed to most efficiently and effectively accomplish the management goals and objectives All National Environmental Policy Act requirements will be complied with in all projects

Project environmental analyses provide an essential source of information for Forest Plan monitoring First, as project analyses are completed, new or emerging public issues or management concerns may be identified Second, the management direction designed to facilitate achievement of the management area goals are validated by the project analyses Third, the site-specific data collected for project environmental analyses serve as a check on the correctness of the land assignment All of the information included in the project environmental analyses is used in the monitoring process to determine when changes should be made in the Forest Plan

If the environmental analysis for a project shows that (1) the management area prescriptions and standards can be complied with, and (2) little or no environmental effects are expected beyond those identified and documented in the Forest Plan Final Environmental Impact Statement, the analysis will probably result in either an environmental assessment or a categorical exclusion In either case, an analysis file and/or project file will be available for public review In other instances, the District Ranger, Forest Supervisor, or Regional Forester may decide to document the analysis through an environmental impact statement.

B. SOURCES OF DATA

This section is designed to briefly summarize the major data sources used in the analysis This is by no means a comprehensive list However, it does provide a quick overview of the types and variety of information included in the process

1. Data Source Summary

Timber resource information for existing forested types, including stand volumes, average ages, stocking levels, and species composition was taken from the Forest's 1980 Total Resource Inventory Stand type maps were an integral part of the inventory process Initial stand mapping was from 1 12,000 color aerial photos of the Forest. The information from these photos was transferred to 1 15,840 orthophotos. These maps were the basis for the stratification of the Forest into broad areas based upon stand structure and silvicultural treatment

opportunities. These type islands were sampled according to the variation within each type. The composite of this information makes up the Forest Timber Inventory.

Tentative suitability for timber management activities was assessed and lands were identified into the Total Resource Inventory system. This determination was made based on stand maps, ecoclass data, wilderness and research natural area maps, and Forest and district expertise. This assessment is documented in the "Forested land Evaluation, Unsuitable Acres, for the Malheur National Forest"

Managed stand timber yield tables for even-aged silvicultural systems were developed to predict future timber yields based on the management practices applied. The Stand Prognosis Program was the basic yield simulator for the *ponderosa pine, mixed conifer, and lodgepole pine working groups.*

Empirical yield tables for management prescriptions which utilize uneven-aged silvicultural systems were developed by Forest specialists and Stand Prognosis. These tables were based on assumptions of desired stand structure, growth models, and volume equations The development process is documented in the "Managed and Regenerated Yield Tables - Uneven-aged/Multistory" (USDA Forest Service 1986).

Plant communities on the Forest were identified and described in "Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington" (Hall 1973). This guide was used extensively, and was the source of estimates of vegetative growth potential for wood fiber and forage. They also were used as a guide in assessing suitability for natural versus artificial regeneration.

Wildlife habitats were identified for indicator species on the Forest. These were based on habitat requirements, the Forest stand and plant community maps, and specialist knowledge of current or historical use by these species. The Forest's stream inventory classified existing streams as Class I, II, III, and IV, based on Regional standards for stream flow and use characteristics. A Watershed Improvement Needs Inventory (1981-1982) which is updated annually was used for determining watershed conditions.

Forest trail information was obtained from the Forest Trail System Inventory, trail condition surveys, and trail logs. Additional sources include annual trail maintenance plans and the 5-year capital investment program for trails

The second roadless area review and evaluation (RARE II) provided data on *currently unroaded areas*

Riparian plant communities were delineated using a combination of ecosystem mapping, the Soils Resource Inventory, the Stream Classification, and infrared photo interpretation.

Basic recreation data was derived from information collected in the field and stored in the Recreation Information Management System. This data was used to estimate existing recreation use on the Forest and was the basis of the Forest's recreation demand estimates

The "Recreation Opportunity Spectrum (ROS) User's Guide" served as the basis for the recreation capacities on a per acre basis within each recreation opportunity spectrum class (USDA Forest Service 1982). A Recreation Opportunity Spectrum (ROS) Inventory was completed in 1985.

A Visual Resource Inventory was completed in 1982. This document contains information concerning the Forest viewsheds, and areas seen from major Forest travelways and public use areas

Information on Forest mineral materials was obtained from Bureau of Land Management data, project records regarding mineral materials production, and Forest pit development and operation plans.

Information related to the Forest road system was obtained from the Forest transportation and road management program and project records. These records contain information regarding: inventory of roads, transportation system mapping, road management objectives, road closure and obliteration plans, rights-of-way needs, road log and condition surveys, traffic classification and use data, annual and deferred maintenance plans, multiyear capital investment needs, and cooperative maintenance plans with other agencies or private cooperators

Information related to Forest buildings and facilities was obtained from project records, facility inventory data, and multiyear capital investment needs.

Economic benefits and trends were derived on Region 6 Planning Direction Timber values were based on past experienced stumpage prices, adjusted to reflect differences in value by diameter class Other benefit values were taken from the 1985 Resources Planning Act program estimates

Cost data was based on historical records for the starting point values Much of this data was extrapolated and updated to develop costs for current and future cost estimates. A spreadsheet simulation of the ADVENT model was used in the final calculations of present net value and budget estimates for the alternatives.