III. FOREST PLANNING MODEL

A. OVERVIEW

FORPLAN, the Forest Service FORest PLANning model, is the model used in the development and evaluation of benchmarks and alternatives Underlying this land assignment model is an analytical structure and mathematical technique known as linear programming The elements of an assignment problem are included in a set of mathematical relationships (or equations) in the linear programming model. These equations describe the elements of the problem in terms of the overall goal (or objective function) to be achieved, the activities to achieve the goal, and the restrictions (or constraints) placed upon the ways in which the goal can be achieved. In most cases the objective is to maximize economic efficiency as measured by present net value. The activities to achieve the goal are the *Management Prescriptions. The constraints are the Management Requirements or* other restrictions used to address or represent various goals and objectives

FORPLAN is a third-generation configuration of a series of linear programming models developed by the Forest Service to aid in resource management planning Timber Resource Allocation Model and Multiple Use Sustained Yield Calculator, two predecessors, are single-resource models designed to evaluate timber assignment problems. FORPLAN is designed to evaluate problems involving "multiresource" outputs. (For more information refer to "FORPLAN Version 1· An Overview", K Norman Johnson, 1986)

The following are the changes which have been made in analysis methods (principally the FORPLAN model) since the Draft Environmental Impact Statement was published in 1987

Shelterwood dispersion constraints. An error in the specification of these was corrected, resulting in a small increase in the available timber volume

Watershed model. The Draft model used a single geographic area representing the entire forest This has been changed to fourteen areas, representing seven major watersheds, each split into winter range and non-winter range.

Timber inventory update. The timber inventory used in the model was made in 1980. In order to simulate correctly the starting inventory for the plan period, the first ten year period in the model was constrained to produce the known harvest for the 1980-1989 period, distributed approximately according to harvest type and area The results from the second ten year period in FORPLAN were then used to simulate the first decade of the plan, which is the 1990-1999 period

Manageable understories. The method of representing the manageable vs unmanageable understories in two story stands in the model was changed to be more geographically specific and also to reflect more recent estimates of stand health and vigor.

Habitat Effectiveness Index. This approach to modeling elk habitat was adopted after publication of the Draft EIS The FORPLAN model was modified to include cover yield tables, which are used to provide cover outputs over time, and to provide a means by which cover can be a constrained value

Riparian zones. Stream channels (the area of seasonal high-water flows) were removed from the suitable timber land base for each alternative This corrected an earlier model deficiency. In addition, timber yield tables for these areas were modified to provide longer rotations and more structural material for the stream channels

Snags and Snag Replacements. These are now set to provide a minimum of 40% of potential populations The calculation for this is done outside FORPLAN.

Wild and Scenic Rivers. The suitable land base was reduced to reflect the inclusion of areas under the Omnibus Oregon Wild and Scenic Rivers Act of 1988

Uneven-age timber management. Provision for this was added to the revised model and applied to alternatives C-Modified and I

Old growth replacement. Provision was made in the revised model to replace a specified fraction of areas managed for old growth with other areas having similar characteristics This option was used in alternative I only.

Board foot volumes. A more accurate method of calculating board foot volumes was employed, based on variable conversion ratios appropriate to the average diameter

B. ANALYSIS PROCESS AND ANALYTICAL TOOLS

As directed in the Planning Regulations (36 CFR 219.12) "Each alternative shall represent to the extent practicable the most cost-efficient combination of Management Prescriptions examined that can meet the objectives established in the alternative "

The Interdisciplinary Team analyzed economic efficiency at several stages of the planning process in order to be reasonably assured that the alternatives developed and displayed in the Final Environmental Impact Statement complied with the intent of the direction The discussion of the analytical process and tools used will follow the general outline below:

1 Analysis prior to FORPLAN.
2 How FORPLAN was used in the analysis
3 Analysis done in addition to FORPLAN model analysis

1. Analysis Prior to FORPLAN

Once the issues, concerns, and opportunities were identified and planning criteria developed, the Interdisciplinary Team began to formulate management strategies and their associated standards The step was probably one of the most difficult and laborious, and possibly the most important task of the interdisciplinary planning process Management strategies coupled with their respective standards provide specific direction for implementation and serve as a framework for how to use, develop, and protect the Forest's resources in a manner consistent with the goals and objectives of the alternatives

Since the standards provide general rather than site or project-specific direction on how to implement the Forest Plan, it was not possible to calculate a present net value for most of the standards However, economic efficiency was a consideration throughout their development. For example, from a silvicultural standpoint, clearcutting and planting is more desirable in terms of control over species mix than is natural regeneration However, natural regeneration is often more cost effective and successful in various plant communities.