

## ESTABLISHING A PROCESS FRAMEWORK

### FOR LAND USE PLANNING

by

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#### ABSTRACT

The operational aspects of land use planning, to be effective, must be tied to a well defined planning process. The framework for this process includes a set of main components which are important in solving land use planning problems. These components are linked together in a design related to the basic concepts of decision analysis which has been oriented to natural resource problems. Detailed description can be added to the process framework to tailor it to a specific problem, study area, or study level. Some of the major components in the framework are an objectives and goals spectrum, problem formulation, physical characterization of the land, social and economic demands analysis, identification of management alternatives and specific activities, simulation of resource response, allocation of resources, visual quality analysis, transportation system analysis, and a data management system. This process framework is designed to be dynamic, user oriented, and compatible with the type of problems encountered in land use planning.

#### INTRODUCTION - NEED FOR A PROCESS

In any problem solving situation, including land use planning, it is usually advantageous to have a defined systematic procedure to go by. One must be able to answer the questions "What is the problem?", "What kind of information do we need?", "What type of people should be involved in solving the problem?", "What analysis tools or techniques should we use?", "How much detail do we need?", and "Which parts of the problem are most important?". To answer this series of questions and many more, we must be able to identify whether or not they apply to the problem and if they do, where do they apply in the process of solving the problem.

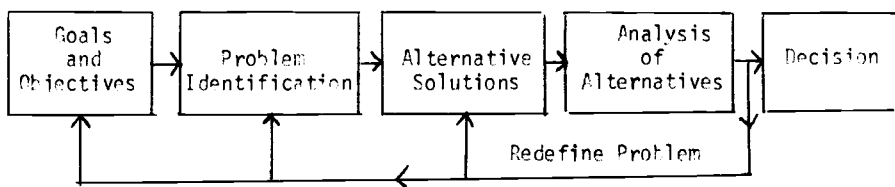
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To put it another way, we must have some form of reference for communication: something to refer back to when we are discussing the planning problem. We must have a systematic framework to which we can tie planning requirements, data needs, management strategies, specific analytical techniques, and computer tools.

### THE PROCESS AND ITS COMPONENTS

The planning process framework referred to in this discussion has been formulated around the basic concepts of problem solving, decision analysis, and general systems theory. Its most elementary components can be depicted in a simple flow diagram as shown below: (1)



This type of planning or decision process is used almost all the time by most people. They may not be specifically aware of where they are in the process, and may not be using it in a systematic, rational sequence of thoughts. But, this process is used for every type of problem solving situation from deciding how to pay the bills or what to do for excitement over the next weekend, to major problems such as deciding what job to apply for or which house to buy.

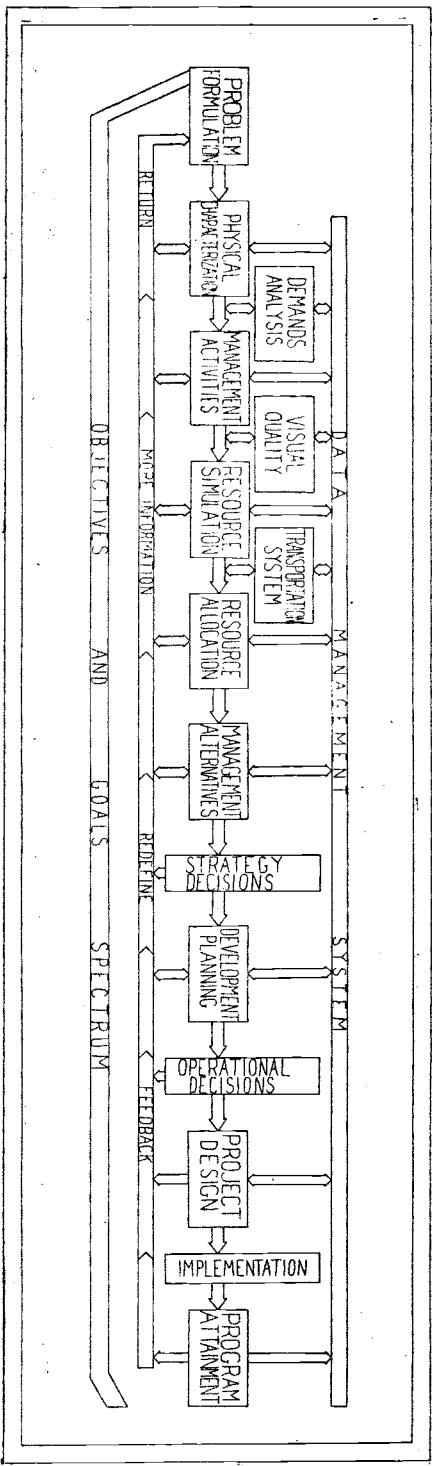
This basic decision process can be expanded and modified to fit the characteristics of land use planning problems as shown in Figure 1 (2). Further adaptation and details can be added to this framework to "tailor fit" it to the specific needs of a particular planning problem or situation.

The following is a brief discussion of each of the process components shown in the Figure 1 diagram:

1. Objectives and Goals Spectrum--The first task in the planning process is to define as clearly and specifically as possible a set of objectives and goals which should be accomplished in land management.

In the Forest Service, we can start with a very general set of policy criteria such as the Water Resource Council Guidelines for national economic development, regional economic development, environmental quality, and social wellbeing. We also have a set of directives from

FIGURE 1. PROCESS FRAMEWORK FOR LAND USE PLANNING



the Office of Management and Budget. The Forest Service is further directed by specific laws such as the Multiple Use and Sustained Yield Act and the National Environmental Policy Act.

We can summarize these objectives in one statement: (3)

"Optimize benefits from the National Forests while maintaining long-term productivity of the land."

We can spell out the objectives of our planning in the form of three questions:

How can forest land be used?  
How should forest land be used?  
How will forest land be used?

These objectives and goals remain dynamic and flexible and can be improved or changed at any time in the process.

2. Problem Formulation--This component of our planning process is perhaps one of the most difficult to accomplish. Many planning situations go on for years without a good understanding or agreement about the problems that they are attempting to solve. Some of the more common types of problems which land use planning is called on to solve include:

- Land management policy and direction
- Land use conflicts
- Land and associated
- Management responsibilities
- Time-space problems
- Program balance over time

Some of the specific questions which should be answered in formulating the problem are (a) the physical boundaries of the problem or planning unit, (b) coordinating guidelines or objectives from one planning level to another, (c) specific planning needs such as team expertise requirements, and (d) basic management constraints and assumptions.

3. Physical Characterization of the Land--This is a basic inventory or description of the land itself, its "pictures", characteristics, potentials, limitations, and natural processes. It may also include a description of the present management situation including types of resource outputs, present developments on the land, and problem areas.

The Forest Service is generally extra strong in this category since the large majority of our formal training, particularly for foresters, soil scientists and range conservationists, is concentrated in learning inventory or data collection techniques.

4. **Social, Cultural and Economic Demands Analysis**--This component is designed to answer the question of how forest land should be used. It gives a general description of the needs and demands that people have for the resources, commodities and services that the land provides.

We must be able to identify what commodities are demanded or needed by various publics from the national or regional levels on down to the local level. These demands are generally considered in terms of dollars, but they may also be evaluated as to their social or cultural values.

Where conflicts exist over the potential for producing the commodities and services to meet these demands, it becomes necessary to evaluate the land characteristics and determine how the land can best be used to satisfy at least the greatest portion of the needs or demands that people have placed on it. If all of these demands cannot be met, it may be necessary to decide which ones can be met elsewhere or which ones will go unsatisfied. It may also be necessary to look at the tradeoffs involved in satisfying various segments and levels of the demands.

5. **Identification of Management Activities**--The next step in the planning process is to identify or describe a set of management activities which can be applied to the land to produce the commodity outputs and services required to satisfy the social, cultural, and economic demands which have been identified. Thus, we must identify those management activities which produce desired outputs and which are also compatible with the land on which they will be applied.

This process of identifying the management activities and then determining where they can be applied can be divided into two parts. First of all, a land suitability analysis, which describes the physical suitability of the land for application of a given management activity. Secondly, a land feasibility analysis which, based on the management program, available technology, economic limitations, manpower limitations, etc., further limits or constrains the applicability of the management activities.

This component in the planning process has been greatly emphasized along with the physical characterization component. Many planning groups or teams have developed very large complex land suitability matrices or a series of overlays from which they can determine the interaction between various land units and the potential management activities.

6. **Simulation of Resource Response**--Before we can decide which management activities to apply on which land units, it is first necessary to predict or estimate what will happen, in terms of produced outputs, when we apply a specific management activity on a given unit of land.

What commodities will be produced at what levels?  
What environmental impacts will be incurred?  
What are the management requirements such as finances or manpower?  
What is the cost effectiveness compared to other management activities?

7. Visual Quality Analysis--This could actually be included in the component of simulated resource response. However, visual quality has taken on such a significant role in our land use planning that it warrants being considered as a completely separate component. It includes a unique set of analytical tools and interpretive expertise. It also invokes a new set of concepts and values into the planning process.

Eighty-seven percent of man's perception is based on what he can see (4). How does man react to the visual aspects of his environment, in this case the Forest or wildland environment that he enters? How does he react to changes in what he sees? The landscape architects in the Forest Service, with some help from outside sources, have put together a comprehensive detailed approach to evaluating the character and quality of wildland landscapes. Basic landscape concepts, dominance elements, dominance principles, and variable factors are all considered in evaluating the landscape characteristics (4). The important but difficult job is integrating these factors and principles of visual quality into the proposed management strategies.

8. Transportation System Analysis--The Transportation System must also be considered as a major component in the planning process.

It may influence resource use--induce demand.  
It may be a constraint on the strategy plans.  
It may be an impact on the resource outputs--negative tradeoffs.

One approach to incorporating the transportation system into this process is to first of all make some initial analyses based on the physical capabilities and limitations of the land. Then add the transportation system required to meet management needs. In this way, it is possible to evaluate the specific effects in terms of induced benefits or impacts which are attributable to the transportation system.

9. Allocation of Land and Resources--The allocation component is probably the most important part of the entire planning process. This is where we are, in a sense, "putting it all together." Like the manager of a ball team, we have identified who our players are, we know what the capabilities are for each of the players, we know what the rules and

objectives of the game are, and we know what kind of limitations and constraints we are going to incur when we play the game. With this in mind, we can develop a game plan or strategy.

In our land use planning situation, we have identified the land units, characterized them, and measured or described the resource capabilities and limitations of each one of these land units. We have identified what the demands or resource outputs should be in terms of commodities and services, and subsequently identified the commodity constraints which must be met. We have also spelled out what types of management activities we can apply to the land. Finally, we have identified the limitations or constraints on management such as funding, manpower, and time that we have to work with. As a result, we have developed what we can term a "management alternative" or "strategy."

In most cases, there are differing opinions as to how the land should be managed. Therefore, it is advantageous to develop a number of different management strategies and compare the results in terms of positive outputs, tradeoffs, costs, or environmental impacts.

This allocation component is where the analytical power of the computer can be greatly utilized--for systematic analysis techniques such as linear programming, goal programming, gaming, etc.

10. Data Management System--Throughout the process of land use planning, it is advantageous to have available an effective way of handling data: store it, update it, revise it, delete it, retrieve it in various forms, sort it, and analyze it. If the problem or planning situation is relatively small and simple, the data can be stored in a notebook or a file cabinet. But, when it comes to storing all of the data at a detailed level for several million acres such as might occur on a National Forest, the data handling job becomes very complex. This is where another of the features of a computer system becomes important--its ability to store, manipulate and retrieve information.

- Add information to the data management system at any point along the planning process.
- Retrieve the information in tabular display.
- Interface the data directly into some other analytical technique.
- Reference the data to a set of map coordinates so that we can graphically display it by location in a map form.

11. Long-Range Strategies--Management Alternatives--At this point we can assume that various management alternatives or strategies have been considered, evaluated, and compared. The decision maker must now decide to either accept one of these strategies or to reject them all and ask for further analysis of a different set of alternatives. This is essentially making a decision on what was referred to earlier as "How will the National Forests be used?". It can also be described as the program formulation component of the process.
12. Developmental and Operational Decisions--After the decision has been made on a long-range strategy or directional program to follow for management of the land, the planning emphasis can be directed to a more intensive level of developmental needs to meet that long-range program. This is what can be referred to as the on-going program or the development schedule. It usually covers a short-range five to ten-year time period. This plan must form an interface between the long-range plan and current existing managerial conditions on the planning unit. It must tie in with the current funding level, the manpower available, the immediate transportation system and other developments that are available.

### 13. Other Features of the Process

Public Involvement--Can be applied at any point throughout the process. Therefore, there is no specific component for it. There are certain points in the process where public involvement is most important, such as the identification of demands, allocation of the land, and review of the management alternatives.

Time Dimensions--The planning process must be structured to include some form of time dimension into the future. Management activities, management strategies, commodity outputs, and demands must be expressed over time.

Iterative Process--The planning process is not a uni-directional approach where the user starts at one end, goes through all the hoops or steps, and ends up at the far end with a completed job. It is cyclic or iterative and never completely finished. Anytime new information, change in demand, or a new problem occurs, it may be necessary to go back and re-evaluate the previous plan.

Dynamic Process--The planning process must be adaptable and flexible to meet the need of changing conditions. The user must be able to identify new demands, add different types of management activities, or even add new components to the process framework as they become important.



## APPLICATION OF THE PROCESS

This planning process was designed by the Watershed Systems Development and Application Unit primarily as an aid in presenting the concepts of land use planning to Forest Service planning groups (2). It has also served as a reference in discussing the application of analytical techniques and computer tools to land use planning (3).

Planners, particularly at the field (Forest) level, have found that it is essential for them to utilize some form of process diagram to organize their planning job. Some of them have used the process described here as a framework and then added more detailed steps to it (2). Other planning groups have changed the components around, left some out, or added new ones to meet their needs (6, 7). In all cases, the basic concept of a systematic, decision-oriented procedure has been recognized as a key factor in effective planning or problem solving.

Another important factor to consider in applying this process or any others is the background and understanding level of the people who must relate to it. For instance, in the Forest Service probably less than one percent of the people involved in land use planning can be considered as systems analysts or even technically trained planners. Likewise, people from the technical specialties, other governmental agents, and the general public must be able to readily understand the basic process and identify where their interests and responsibilities "fit." The process framework must be designed to meet these needs and allow the people involved to build their understanding level without a prerequisite knowledge of all the technical skills associated with land use planning.

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