SOCIOECONOMIC IMPACT ASSESSMENT FOR NATIONAL FOREST PLANNING IN THE SOUTH

By

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ABSTRACT

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National Forest Service managers are in need of a method of demonstrating that their land management decisions are as responsible from an economic and social point of view as they are from that of the traditional physical and biological viewpoints. This study explores and develops methods and techniques for determining the most managerially feasible course of action for selection, based on social and economic considerations which still permit the Region to accomplish its goals and objectives in a manner consistent with its national policy as expressed in the National Forest Management Act. The most general concern is to explain the agency's relation to its social and economic environment. The process for implementing the National Environmental Policy Act and its subsequent regulations require that decision makers estimate the effects of alternative management decisions that may have an impact on the environment of man. Estimating these effects on the physical and biological components of man's environment has

progressed to a more advanced state than have methodologies for determining effects upon the socioeconomic component of man's environment.

In undertaking this study the writer first developed a socioeconomic overview. This overview consisted of baseline data which identified the socioeconomic activity that was taking place in the immediate environment.

Upon the completion of the baseline assessment a three-phase methodology to validate the claims for future impacts of each proposed management alternative was undertaken. Each of the research phases utilized the same conceptual tool for arriving at predicted impacts; the cross-impact matrix, with additional findings drawn from the use of rank correlation, coefficients of concordance and chi-square tests.

This three-phased method entailed:

1. Brainstorming, or interchange between members of the Regional Interdisciplinary Planning Team on the probable impacts of proposed alternatives--ICO combinations on a group of selected social and economic variables.
2. A Ranger Survey to get land managers' opinions of potential impacts of the alternatives--ICO combinations on the selected variables.

3. Professional Sociologist Input was provided by Sociologist from outside the Forest Service with the convening of a special panel from the Southern Association of Agricultural Scientists.

DEDICATION

To

My son Michael,

And

Daughter Kelly,

who give meaning to my life,

I dedicate this

and

all future works.

ACKNOWLEDGMENTS

This dissertation was made possible through the efforts of many individuals. In acknowledging their contributions, I am expressing my gratitude rather than discharging the indebtedness I feel for their invaluable assistance. I am especially grateful to Dr. Lee M. James who was kind enough to accept the position of committee chairperson after my previous dissertation committee chairperson left the University. Special thanks must also go to Dr. Donald F. Holecek for his interest and efforts which helped in the analysis shown in this study.

To other members of my committee whose support provided needed impetus at critical moments, I am deeply indebted. To my mother and grandmother whose values and encouragement made my early education possible, I owe much of whatever I achieve.

To Professor Francis Eaton (deceased), of Rust College in Holly Springs, Mississippi, who ignited my interest in economics through the many challenges and needed support that she provided, I am grateful.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Management planning for the National Forests requires recognition by the Forest Service of socioeconomic and cultural environments which impact upon forest lands and upon which forest land management has an impact.

The management of the National Forests has a variety of effects on people, particularly if they live close to the National Forests. People want certain products or experiences from the National Forests which, in turn, affect the way in which the resources are allocated. Congress has taken these needs and desires into account and thereby legislatively recognized the relationship between people and the National Forests. The involvement of the social sciences in this process is to enable management to meet the requirements of legislation and administrative direction by integrating their input with the physical and biological sciences. Doing this job requires cooperative participation among social and resource specialists to develop a product that can be

regarded by all participants as reasonable for use by planners and decision makers.

Describing what happens to people as a result of the way in which the thirty-five National Forests and two National Grasslands in the South (Figure 1) are managed is the task that the writer has undertaken. The total area involved is 12.5 million acres, representing 2.3 percent of the total land base and 3.9 percent of the total forest and range lands of the Region. The intent here is to determine the extent to which alternative planning actions will impact communities and groups which are the central units for analysis.

The study anticipates socioeconomic outcomes of all alternatives when combined with Issues, Concerns and Opportunities (ICO's) considered,* as they influence given socioeconomic variables. The attempt at anticipation is made to provide the decision-maker with the best available information before any commitment is made.

For the most part, the RPA Program is viewed as having socially beneficial effects on the Southern Region.

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*Those planning subjects raised by the general public are referred to as "issues." The management input is referred to as management "concerns." The public input "issues" and management input "concerns" are said to be considered by top management as opportunities for management actions of internal and external interest. Taken together, they are referred to in the Regional Plan as Issues, Concerns, and Opportunities (ICO's).

Because of the limited area involved, the National Forests do not have the potential for a profound socioeconomic impact on the South as a whole. However, there is considerable potential for impacts on those individual counties that are heavily dependent on the Forest Service for a large percentage of their overall economic activity.

Forest Service Planning

The history of Forest Service planning is here broken into two distinct periods.

Before NFMA

Planning and implementation of management actions in the Forest Service show evidence of having been guided by common sense, public desires, and a commitment to a land ethic. Planning the use of a complex physical and biological forest system has been the responsibility of the forest officer in charge, the line manager, or the decision-maker. Before World War II, this decision-maker had within his own unit, himself and possibly an assistant, all of the technical and managerial skills necessary to request information, evaluate the facts, and carry out a decision which satisfied the local, regional, and national "public." In these early days, multiple-use of multiple benefits from national forests

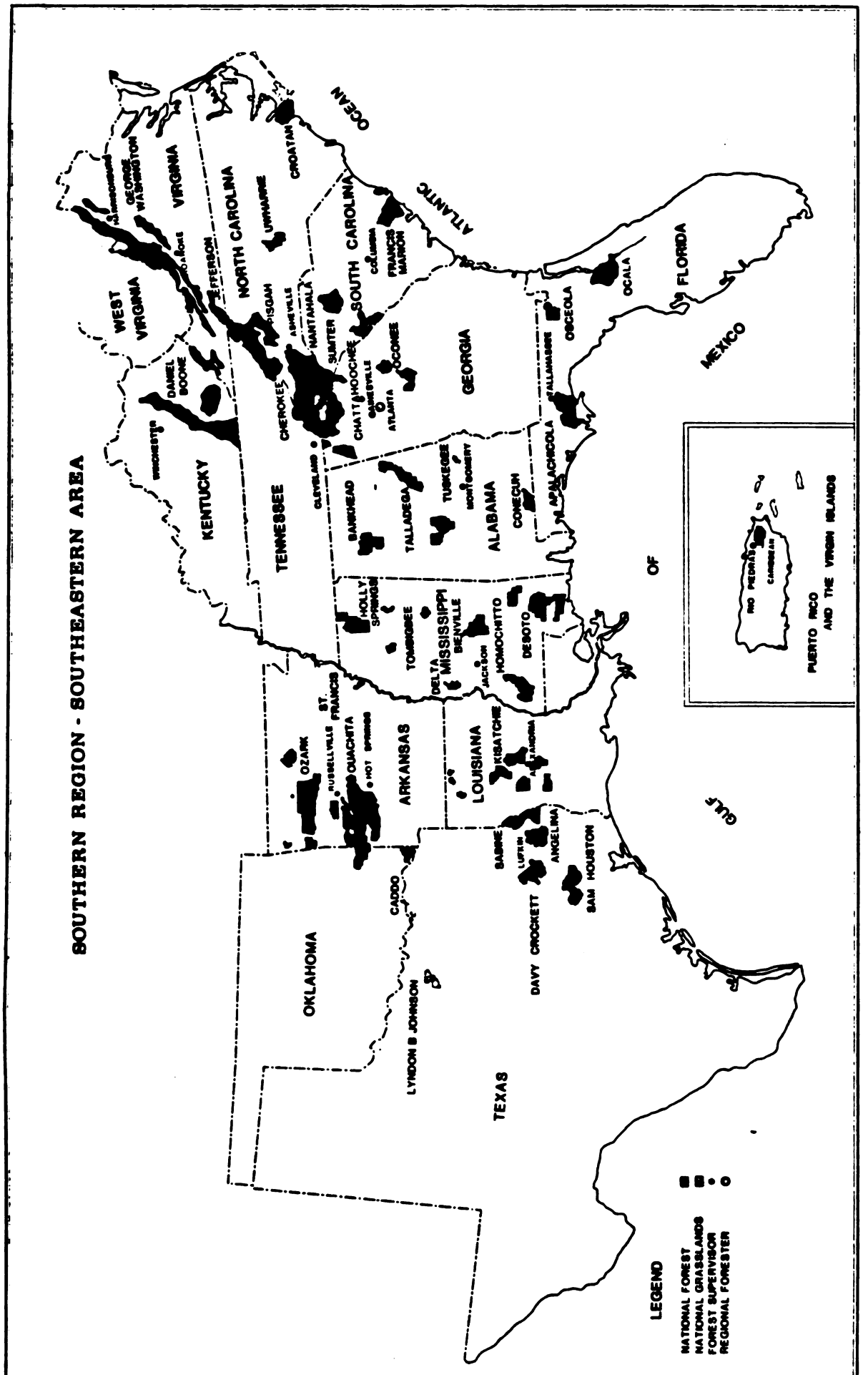

Fig. 1. Location of National Forests in the South.

developed as a fundamental principle used to provide a continual supply of timber, regulate the flow of navigable streams (legal requirements), and satisfy the Forest Service's perception of public desires. As the use of forest resources increased, the decision-maker began to rely more and more on functional specialists for assistance. Forest engineers were one of the first specialist groups employed to provide much needed expertise in road planning design and construction.

During the late 1940's and early 1950's, composite plans or groupings of single resources or functional plans developed by a particular functional specialist became a common planning tool. These single resource plans were presented to the decision-maker who, through a "sorting out" process strongly guided by upper echelon functional staff groups that influenced funding allocations, chose a mix of plans which best fulfilled local conditions. During the "sorting out" process, staff groups became very influential in promoting a particular resource program objective by demonstrating through regional analysis and debate the "net worth" of proceedings in direction A versus B. The decision-maker had no objective way to demonstrate how a particular level of national forest outputs was selected. Annual

program direction relied heavily on past direction and was thus somewhat unresponsive to public desires which were changing in the 1950's. At that time the Southern region was heavily involved in the basic stewardship roles of protection and reforestation.[1]

The increase in public awareness and desires for forest recreation in the late 1950's and the increased national funding for public recreation led the Forest Service to initiate the Multiple-Use and Sustained Yield Act of 1960. This Act met little opposition from industry or environmental groups and quickly passed both houses of Congress and was signed into law. The Act gave statutory authority to the Forest Service to manage other public benefits besides timber and favorable flows of streams. From this Act, "Multiple-Use Planning" was instituted.[2] This planning documented, by administrative zones within the National Forest, broad coordinating requirements that were intended to guide the use of one resource so that the benefits of another forest resource were not excessively diminished. The Multiple-Use Plan did not set resource production goals;

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[1]U.S. Department of Agriculture, Forest Service, Work Plan for Implementing Regional Planning in the South, April 1, 1980.

[2]Ibid., p. 10.

these were to remain in the domain of the functional plans. The Multiple-Use Plan was intended to coordinate actions taken to use renewable and mineral resources. Under this system, District Rangers prepared impact analyses which described the nature, scope and expected impact of a resource project relative to other resources. These analyses described how the project would conform to the combination requirements of the Multiple-Use Plan.

By the early 1960's the expressed public desire for clean air, clean water, and natural beauty was becoming more and more pronounced as was industry's desire for National Forest products.[3] In 1964, the Wilderness Act created a legislative system of land preservation under natural conditions. Since 1920, the Forest Service had administratively recognized in its plans and actions the socioeconomic importance of land unaltered by mankind. The Wilderness Act set up a dominant use of specific tracts of National Forest land and established specific protection measures. Environmental concerns, a need for public disclosure of planning actions, and an increased desire to influence public land

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[3] W. E. Shands and R. G. Healy, The Lands Nobody Wanted (Washington, D.C.: The Conservation Foundation, 1970), pp. 145-147.

management and government actions in general brought about the passage of the Natural Environmental Policy Act of 1969 (NEPA). This Act required a change in "how" the Forest Service reached a management decision which affected the physical, biological, and socioeconomic environment.

After the Wilderness Act and NEPA, the Multiple-Use Planning gave way to considerably more detailed Land Management Unit Plans which were specific to areas of like socio-economic and physical make-up. The Unit Plans incorporated more strict interdisciplinary analysis and public input into the planning process.

The public, through NEPA, now had a legislated mechanism to review and comment on management decisions. These Unit Plans were coordinated by four Area Guides in the Southeast (Mountain, Coastal Plain, Piedmont, and Ozark Highlands) which gave broad coordinating requirements (standards) and broad goals. To stabilize a balanced funding level among the resource functions and further refine the planning process, Congress passed the 1974 Forest and Rangeland Renewable Resources Planning Act (RPA). The RPA did not change the Forest Service planning process below the national level. Region 8's area guides and units plans were still valid. RPA did reaffirm the interdisciplinary approach

to planning and offered a means to assess the short-term and long-term conditions of the nation's renewable resources.[4]

During this rapid evaluation of environmentally inspired legislation and executive orders of the mid 1960's through 1970's, the decision-maker was relying more and more on a greater number of staff specialists to advise on the "proper" choice. Planning, like the other functional specialties, became more precise, was referred to as a science, and developed a core of tacticians who were responsible for development and maintenance of Regional and Forest Plans. Unit plans were not in all places achieving the coordinated guidance they were designed to achieve. Consistency of management actions and plans was often overshadowed by availability of funds which were negotiated through annual interfunctional processes that reflected incremental changes in existing programs.[5]

The momentum of functional plans and their attendant programming, funding, and accomplishment reporting systems was still the operational push piloting specific forest resource output levels. Area Guides, which covered 100

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[4]U.S. Department of Agriculture, Implementing Regional Planning, p. 1.

[5]Ibid., p. 9.

percent of the Region's land area, together with more detailed Unit Plans covering about 20 percent of the Region, were used as the general guide for output targets and coordinating requirements. Functional staff personnel had difficulty in utilizing Area Guides, Forest or Unit Plans as direction. The decision-maker had no documented mechanism to monitor fulfillment of the Unit Plan or method to revise the Plan when necessary.

The planning process was not achieving the benefits and level of public achievement that was originally envisioned for the process. After serious questions of Forest Service timber management practices in the East brought by the Monongahela suits and subsequent enabling legislation, the Forest Service set about to correct operational deficiencies in the planning process. The results of this corrective action was the National Forest Management Act of 1976 (NFMA) and the promulgated Regulation of September 19, 1979 (revised in February 1982). The Act and Regulation established a planning process which is vastly different in scope and complexity when measured against earlier processes. The decision-maker is also in a position to demand improved ways to show how and why given decisions are made.[6]

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[6]Ibid., p. 13.

Under NFMA

After review of the fundamental purposes of the National Forest System and amendment to RPA, which provided additional statutory direction in the preparation and revision of Plans, the National Forest Management Act (NFMA) sets specific procedural and prescriptional requirements for planning, timber management actions, and public socioeconomic consideration in decision making. NFMA strengthened the original RPA and established, by regulation, a complex planning process which is designed to overcome the limitations of past processes. NFMA planning for National Forest System lands features close coordinating requirements with Forest Service Research and State and Private Forestry Programs, as well as increased social input.

The planning process selected in the regulations is a mixture of several planning theories which describes methods used to reach a decision. Briefly, this mixture of methods is founded on mixed scanning systems theory and the mutual casual approach. The mixed scanning method is a combination of the incremental method (do in the future what you did in the past with small change) and the rational method which seeks to maximize the net value of reaching a goal. The systems theory approach is an extension of the

scientific method where objectives are set, alternatives evaluated, and preferred actions chosen. The mutual casual approach tends to weigh one action against its effect on other actions, resources, or socioeconomic values.

During development of the regulations through the NEPA public involvement process, it was concluded that this mixture of planning methods offered the best possible process to satisfy emerging socioeconomic concerns, legislation, executive direction, and environmental capabilities of the renewable resources under the agency's management charge. The planning process is neither unique nor a serious departure from established planning methods. However, implementation does require adjustments in the process used to select and display a mix of resource outputs, develop a suitable budget, and measure the accomplishment and effects of actions taken.[7]

The regional process used to implement NFMA regulations and the policy as outlined by the head of the Forest Service (the Chief) for planning is the Regional Plan. The Regional Plan is the standard for all forest plans and negotiations on budgets and revisions of the RPA Assessment and Program.

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[7] Ibid., p. 14.

The interplay of the previously described planning methods is carried out in ten steps of the NEPA-NFMA planning process:

1. Identification of issues, concerns, and opportunities.
2. Development of planning criteria.
3. Collection of inventory data.
4. Analysis of management situation.
5. Formulation of alternatives.
6. Estimation of the effects of alternatives.
7. Evaluation of alternatives.
8. Selection of a preferred alternative.
9. Implementation of the plan.
10. Monitoring and evaluation of the plan.

The background or baseline data-gathering process for the Socioeconomic Impact Analysis (SIA) starts in step one. The drafting of the socioeconomic overview takes place during and in conformance with the first three steps of the process. During the fourth step of the process, socioeconomic information is analyzed in an effort to identify trends. It is during step five that the planning efforts are merged with the accomplishment targets and anticipated funding levels for the planning period. Here different methods for getting the job done are explored. Items 6

through 8 are the most critical steps of the SIA. It is during these steps that the estimated effect of each of the alternatives, the measuring of such effects against each other, and the selection of a preferred alternative is conducted. The activities that are carried out during these steps and their results, from a socio-economic point of view, is the focal point of this dissertation.

Procedure

This study is intended to assess the socioeconomic impacts of alternative management actions proposed for implementation by the Resources Planning Act (RPA) in the Southern Region by showing the probable differences in outcome for each alternative when measured against selected social variables.

The study is undertaken with the intent of providing social data from an interdisciplinary perspective that anticipates the social outcome of all the alternatives prior to having the responsible official commit to any. This is done in order that the most managerially feasible course of action can be selected from a socioeconomic point of view which will still permit the Forest Service to accomplish its regional goals and objectives in a manner consistent with its national policy as expressed in the RPA. The most general

concern will be to explain the agency's relation to its social environment. The process for implementing the National Environmental Policy Act and its subsequent regulations require that decision-makers estimate the effect of alternative decisions that may have an impact on the environment of man. Estimation of these effects on the physical and biological components of man's environment has progressed to a much more advanced state than have methodologies for determining effects upon the socioeconomic components of man's environment. A methodology for determining possible socioeconomic impacts resulting from forest resource decisions is needed.

In undertaking this study, the writer first developed a socioeconomic overview. This overview consists of baseline data which portrays what is presently taking place with regard to who is affected by, and who is dependent upon, Forest Service action. Attempts are also made to anticipate trends.

Method

Once the baseline assessment was completed, the writer employed a three-step methodology to validate the claims for future impacts for each alternative. Each of the steps relied upon the same conceptual tool for arriving at

possible impacts: the cross-impact matrix.

In brief, the following three-step methodology was employed:

1. Brainstorming, or interchange among members of the Regional Interdisciplinary Planning team and other Regional Office personnel on the probable impacts of proposed alternative management practices on the selected social variables.
2. Ranger survey to get ranger opinions of potential impacts of the planning alternatives on the same selected social variables in their districts. Twenty-five percent of the ranger population was sampled. The sample was drawn at random, with the limitation that at least one ranger was included for each National Forest. The survey was done by telephone after the writer had the opportunity of explaining the project in some detail to all Forest Supervisors and Rangers in the region.
3. Professional sociology input was provided by sociologists from outside the Forest Service. This was accomplished by the convening of a special panel at the annual convention of the

Rural Sociology Section of the Southern Association of Agriculture Scientists in the spring of 1981. After a full explanation of the project was presented to them and discussed, panel attendees gave their expert opinions on the probable social impacts of the entries on the matrix.

Initially the idea of going directly to the public through questionnaire or direct interview was entertained. However, the projected cost of such a method was found to be prohibitive. This factor together with the time that it would have taken to get the needed feedback forced the writer to seek other techniques.

The writer wanted this project to be a predictive model for future use throughout the Region, and when this and the above considerations were made the use of experts proved to be the more practical and feasible approach.

The three-step methodology for arriving at the projected socioeconomic impacts provided the bracketing used for what is believed to be a practical determination of social impacts which the responsible official can use in selecting the best alternative land management strategy.

In what might be termed a fourth step, impact

ratings were combined into an aggregate rating. This was done after assigning weights to the responses for each of the three groups surveyed so that the aggregate weight given to a group was identical to that assigned to the other two groups.

Responses were in terms of negatives and positives on a rating continuum:

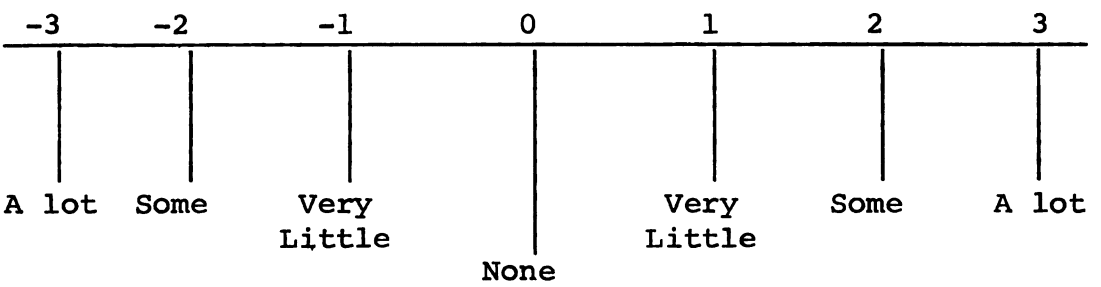

Fig. 2. Information continuum

The specific responses provided information in regard to both specific numerical data and degree of intensity of a positive or negative nature. The continuum approach was especially helpful because it was used for taking responses on either side of center and for cancelling opposite responses from different sides (+some, -some = 0). This method of tallying was explained thoroughly and repeatedly to each group of participants as was the interpretation of meanings of each of the variables and alternatives.

Public Involvement

Although this study does not involve itself specifically with the analysis of public responses in public participation, public input is an essential part of the planning process. Public input is germane to the formulation of the planning alternative--ICO combinations that are used on the vertical axes of the matrix. The "Issues and Concerns" used in this study were gathered from management and the public to be addressed and hopefully solved through the planning process.

Before any Regional Plan is finalized, a draft Environmental Impact statement on all of the alternatives must be presented to the public on the probable effects of all the alternatives. The public at that time will react to the alternatives and can oppose any proposed management actions. If any challenge is successful, then the Region would have to revise its plan.

Resource managers and citizens have discussed for a long time the pros and cons of public participation in the planning and management of natural resources. Today, the question is no longer whether citizens should participate, but how they can participate most effectively. This shift in focus is probably due to several factors: growing demands

from a broader range of people, litigation which has started and defeated projects, support for elected officials who mirror popular viewpoints, and an increasing number of regulatory and legislative mandates.

Recently, there has been more emphasis on devising the most effective methods for making public response a more meaningful part of the agency decision-making process. Resource managers now must consider questions concerning which alternative techniques should be used to involve people in different stages of the resource planning and management process and to fairly present public response on agency issues to decision-makers.[8]

Constraints

The major constraint encountered in this study was the inability of the writer to accurately predict future occurrences even with the aid of the best tools available. Another constraint was the limited time for input by forest managers and professionals. These constraints, together with the communication difficulties and the gap between social disciplines (sociology, economics, political sciences, etc.) and between

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[8]U.S. Department of Agriculture, Forest Service, Public Response Analysis and Evaluation, USDOI, Bureau of Land Management, January 1981.

the social sciences and the physical and biological sciences normally used in management planning efforts have made the task of this study challenging.

Census data used in this study were the most recent available at the time data were compiled for this study (early 1981). Population figures from the 1980 Census were used, but other Census data had to be drawn from the 1970 Census.

Due to the lack of any creditable bases for giving any of the variables used in the study greater weight than that of another (ex., housing vs pollution), they were all treated as equals.

CHAPTER II

LITERATURE REVIEW

The following discussion of literature is broken into five major topic areas (resource and socioeconomic background, theoretical, quantitative, organizational behavior and conflict) that are broadly covered by this research effort.

Resource and Socioeconomic Background

One of the most widely utilized publications in the field of national forest policy in recent years was produced by William E. Shands and Robert G. Healy entitled "The Lands Nobody Wanted."[1] The Conservation Foundation in late 1974 initiated a public policy evaluation which grew out of a concern that the eastern National Forests were not receiving the special attention they needed. For the undertaking of this effort, principal financial support was provided by the Andrew W. Mellon Foundation with added help from a number of other agencies including the Nature Conservancy.

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[1]William E. Shands and Robert G. Healy, The Lands Nobody Wanted (Washington, D.C.: The Conservation Foundation, 1977).

The authors are careful to point out many of the differences that exist between the National Forests of the East as measured against those of the West. Some of the differences that are well worth noting are that every one of the National Forests in the East lies within a day's drive of a major metropolitan area.[2] The authors went further in explaining that these lands, "were purchased, not carved from large blocks of public land, and are characterized by a fragmented ownership pattern creating a patchwork of public and private lands."[3] The Federal Government actually owns only 51 percent of the land within the eastern National Forest designated boundaries. This makes for constant contact with private landowners and increases the importance of considering impacts that Forest Service land management has on the social and economic well-being of adjacent populations.

The work of the Forest Service in rehabilitating the eastern National Forests is one of the great conservation achievements of American history. To build upon this achievement, the authors recommended that future management be devoted to the long-term benefit of society giving priority

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[2]Ibid., p. 1.

[3]Ibid., p. xii.

to two basic principles:

> First, to provide public benefits that cannot be supplied by private land, either because resources are unavailable or because the economic incentive is absent.
>
> Second, to restore the forest as a natural environment, distinct from the man-made environments otherwise dominating in the East. The forests and their products should be used only to the extent that this continuing process of restoration is not interrupted.[4]

These policy recommendations leave two social questions of a political nature unanswered. The authors, in this situation identified the "what" but not "how much is enough?." In that vein it is necessary that we analyze the content of their policy recommendations.

The first recommendation was to give priority to providing public benefits that cannot be supplied privately. However, there are no public benefits that cannot be supplied privately. The difference between public and private land ownership and productive potential is that a deed identifies one as being public and the other as private. It was only a few years ago that the ownership of all this land was private.

Care seems to have been taken by the authors to qualify their recommendation by adding, "...because resources

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[4]Ibid., p. xiv.

are unavailable...." However, all forest resources are available on private as well as public land given the same site capability and management intensity. While the authors identified the "what" (forest resources), they did not specify which ones. Therefore, we cannot determine who would be interested in such resources and for what purpose. In addition, we certainly cannot attempt to determine "how much is enough?" Although the big issue is "to whom" the resources are available, this is a potential social and economic problem area on which the authors make good arguments. And while one cannot definitely prove that they are partisan, they are suspect.[5]

In 1978, Frank J. Connery[6] was commissioned by the U. S. Forest Service to produce a publication to assist the Forest Service in improving analyses of economic impacts associated with Forest Service activities. Prior to the publication of the work, enactment of legislation which strengthened the desire to achieve that objective occurred. The next notable piece of legislation that came about during

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[5]Eli J. Giaquinto, "The Urbanization of National Forest Policy" (Ph.D. dissertation, University of Georgia, Athens, 1980).

[6]Frank J. Connery, Applications of Economics in National Forest Planning (Durham, N.C.: Duke University, 1977).

the period was the Forest and Rangeland Renewable Resources Act of 1974, which was subsequently amended by the National Forest Management Act of 1976. Section six of the amended Act required the Secretary of Agriculture to promulgate regulations for planning on the National Forests to meet conditions specified in the Act. Connery's book, which gave some of the "how to" of economic planning, became useful immediately upon publication.

The manner in which forests are preferred and analyzed by the public is shaped largely by cultural forces. Public hearings and public "input" provide one means of identifying some of these concepts; another is to explore the history of an area and its people, and thereby predict attitudes.

Following this trend of thought, Connery devoted his introductory chapter to the history of the people of the South as it related to the economics of the area. From the earliest colonial days, the Southern economy developed in a manner quite distinct from the rest of the country. Marylanders and Virginians staked their hopes on commercial agriculture, mostly tobacco, almost all of which was sold in England. Meanwhile, the Northeast engaged in a more self-sufficient type of agriculture together with industrial and commercial

activity. The colonial South was an agrarian society with only a small class of merchants and traders, while the Northeast's class of merchants was well established.[7] According to Maddox, et al (1967, p. 8):

> Well before the Revolution, large-scale, commercial farming had become a way of life in the South and had led readily to the development of the slave-based system of plantation farming. It brought into being a... form of political organization that concentrated political and economic power in the hands of the plantation owners and their friends and associates in finance, commerce, and government... This form of social organization provided a profitable and agreeable way of life for the small group at the top. It seriously restricted the range of opportunities for the lower classes of society however, and provided an environment basically hostile to technological innovation and social change.[8]

Following the Revolution, the emergence of cotton as the premier crop[9] wedded the South more firmly to slavery and the plantation system. Cotton production increased from 3,000 bales in 1790 to over 1.3 million in 1940. During this period, cotton production spread from the tidewater areas of the Southeast to Mississippi, Arkansas, and the eastern third of Texas.

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[7]Ibid., p. 5.

[8]James G. Maddox, E. E. Liebhofsky, Vivian W. Henderson, and Herbert M. Hamlin, The Advertising South: Manpower Prospects and Problems (New York: Twentieth Century Fund, 1967).

[9]Ibid., p. 5.

Although much has changed in the South since these observations were made, many of the social and economic problems stemming from its early history still trouble this region. These problems are broadly manifested in the region's political system, the remnants of tenant farming which took the place of the plantation system, and the effects of a legally sanctioned dual school system. These problems are further compounded by the fact that the religious beliefs as expressed in Southern Protestantism usually stresses individual salvation as opposed to collective or social responsibility.[10]

In spite of these observations, the Southern population has displayed capacity for resilience in the face of adversity. Fortunately, this trait also characterized the land of the region. All the way into the first decade of this century, forests were cleared with little regard for soil conservation or forest recovery.[11] Frank J. Connery went on to discuss the analyzing of cost and benefits and measuring the local impacts.

In addition to reviewing publications on forestry

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[10]Wallace M. Alston and Wayne Flynt, Religion in the Land of Cotton (New York: McGraw-Hill, 1972).

[11]Frank J. Connery, Applications of Economics, p. 15.

economics and agriculture in preparation for this undertaking, the writer made use of materials in the fields of planning, management, sociology and evaluation. A recent publication by Glen O. Robinson combines many of the attributes of most of these disciplines. His work is a study of choice and allocation under conditions of scarcity. This latter is a direct result of population growth and socialization.

Robinson's work,[12] was accomplished in order: (1) to do research on and to propose improvement in Forest Service organization and procedure, adjudicatory procedures, rule-making, public involvement, and judicial review; (2) to examine the Forest Service as an administrative institution and as a focal point for looking at the general process, problems, and controversies of public land management, and (3) to provide an economic evaluation of Forest Service public land management--"the study of choice and allocation under conditions of scarcity."

In the words of Robinson:

> While much of the criticism of the Forest Service and its policies seem to be questionable, and certainly

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[12]Glen O. Robinson, The Forest Service: A Study in Public Land Management (Baltimore: The John Hopkins University Press, 1975).

> exaggerated, there is substance in the claim that the agency has in many respects been slow to recognize the modern mood of an environmentally conscious public. At the very least, it has lost much of the initiative of leadership in the eyes of a large, and seemingly growing, part of the public.[13]

Less than successful in pointing out any serious weaknesses on "economic" grounds, the study chastises the Forest Service for not maintaining its high image in the minds of some of the elusive "public." According to Robinson, the Forest Service has lost its leadership in the conservation movement to the Environmental Protection Agency and private conservation organizations such as the Sierra Club. The assumption seems to be that these groups reflect the will of the people in their thrust toward curtailment of resource development and relative non-use of the national forests. Here, the Forest Service was criticized not for the outcome of policy application, but for what Robinson seems to consider a rationale not in line with public desires.[14]

Theoretical

In the area of social choice theory, one of the leading authorities is Kenneth Arrow. In a 1963 publication on

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[13]Ibid., p. xiii.

[14]Eli J. Giaquinto, "The Urbanization of National Forest Policy," p. 14.

"Social Choice and Individual Values,"[15] he contends that in a capitalist democracy there are essentially two methods by which social choice can be made: (1) voting, typically used to make "political decisions," and (2) the market mechanism, typically used to make "economic decisions." Voting and the market, according to the author, are methods of amalgamating the tastes of many individuals in the making of social choices.

Arrow emphasized that his study was concerned only with the formal aspects of whether consistency could be attributed to collective methods of choice where the wills of many people are concerned.

The author dealt with the controversy as to whether or not the economist can make statements saying that one social state is better than another. He wrote that if we admit meaning to interpersonal comparisons of utility, then presumably we can order social states according to the sum of the utilities of individuals under each. Here he informs us that we have a choice of different mathematical forms of the social utility function in terms of individual utilities; thus the social utility might be the sum of the individual

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[15]Kenneth J. Arrow, Social Choice and Individual Values (New York, N.Y.: John Wiley and Sons, 1963).

utilities or their product or the product of their logarithms or the sum of their products taken two at a time. The case here would seem much worse, however, if we deny the possibility of making interpersonal comparisons of utility.

The controversy seems to involve a certain confusion between two levels of agreement. There can be no doubt that even if interpersonal comparison is assumed, a value judgement is implied in any given way of making social choices based on individual utilities. But, given these basic value judgments as to the mode of aggregating individual desires, the economist should investigate those mechanisms for social choice which satisfy the value judgments and should check their consequences to see if still other value judgments might be violated.[16]

Arrow's study confined itself to formal aspects of collective social choice. The aspects not discussed here (perhaps conveniently so) might be described as the game aspects. In the first place, no consideration was devoted to the enjoyment of the decision process as a form of play. Such considerations are real and should be used in determining the mechanics of social choice, but this is not covered

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[16]Ibid., p. 7.

in Arrow's study. In addition to ignoring game aspects of the problem of social choice, the study seemed to assume that individual values are taken as data and are not capable of being altered by the nature of the decision process itself. If individual values can themselves be affected by the method of social choice, it becomes much more difficult to learn what is meant by one method being preferable to another.

On the subject of games, R. Duncan Luce and Howard Raiffa[17] provide a great deal of insight. They contend that conflict of interest, both among individuals and among institutions, is one of the more dominant concerns of at least several of our academic disciplines: economics, sociology, political science, and other areas to a lesser degree.

They state that it is not difficult to characterize imprecisely the major aspects of the problem of interest conflict: an individual is in a situation from which one of several possible outcomes will result and with respect to which he has certain personal preferences. However, though he may have some control over the variables which determine the outcome, he does not have full control. Sometimes this is in the hands of several individuals who, like him, have

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[17]R. Duncan Luce and Howard Raiffa, "Games and Decisions": Introduction and Critical Survey (New York, N.Y.: John Wiley & Sons, 1957).

preferences among the possible outcomes but who in general do not agree in their preferences. The types of behavior which result from such situations have long been observed and recorded, and it is a challenge to devise theories to explain the observations and to formulate principles to guide intelligent action.[18]

Game theory assumes that each member knows the functions in full. Put another way, each person is assumed to know the preference patterns of the other players. The problem for each player is: what choice should he make in order that his partial influence on the outcome benefits him most.

Luce and Raiffa attempt to communicate the central ideas and results of game theory and related decision-making models unencumbered by their technical mathematical details. The primary topic can be viewed as the problem of individuals reaching decisions where they are in conflict with other individuals and when there is risk involved in the outcomes of their choice.

Quantitative

The major book used in the quantitative analysis of

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[18]Ibid., p. 5.

this dissertation was written by Maurice G. Kendall.[19] This book was utilized extensively in the areas of basic rank correlation and in the calculation of the coefficient of concordance for several rankings taken together.

Kendall described his method of arranging a number of individuals in order according to some quality which they all possess to varying degrees so that ordered information could be deduced. The term "ranking" was used to describe these processes.

Kendall also described such concepts as Spearmans P (rho), tests of significance, partial rank correlation, relationship of rank and normal correlation and paired comparisons.

The theory of ranking may be regarded as a less accurate way of expressing the ordered relation of members--less accurate because it does not indicate how close the various members may be on a scale. However, what ranking loses in accuracy it gains in generality. For if the scale of measurement is stretched (and even if the stretching is different in different regions), the ranking remains unaltered; in mathematical language it is <u>invariant</u> under stretching of

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[19]Maurice G. Kendall, <u>Rank Correlation Methods</u> (London: Charles Griffin and Company Limited, 1948).

the scale.

For further statistical analysis, I drew on a publication by Freedman, Pisani and Purnes[20] in the discussion of weighted and error sampling. Some use of regression tables was drawn from Schaum's Outline Series of Statistics, by Spiegel.[21] Along this same line, use was made of a book by Bhallacharyya and Johnson called Statistical Concepts and Methods.[22]

Organizational Behavior

(Since the literature review revealed that several authors have written similar pieces on this subject, excerpts from several are used here to express common ideas.)

Organizations such as the Forest Service are intended to achieve certain definable goals in the most efficient manner possible. Further, organizations exist in an interdependent state with their social environments, receiving inputs which are transformed into outputs useful to some

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[20]David Freeman, Robert Pisani, and Roger Purnes, Statistics (University of California, Kerkeley: W. W. Morton & Company, 1978).

[21]Murray R. Spiegel, Schaum's Outline Series of Statistics (New York, N.Y.: McGraw-Hill Book Company, 1961).

[22]Gouri R. Bhallacharyya and Richard A. Johnson, Statistical Concepts and Methods (New York, N.Y.: John Wiley & Sons, Inc., 1977).

segment of society.[23]

This approach to organizations as systems shows that they have certain characteristics in common.[24] They are affected by what comes to them in the form of inputs, by what transpires inside the organization, and by the nature of the environmental acceptance of the organization and its outputs. Environmental acceptance helps to sanction actions and to perpetuate the organization. This input-thruput-output relationship shows functional commonalities of all organizations. In trying to achieve their goals, organizations coordinate their activities on the basis of perceived certainty; rational planning becomes effective management when decision makers have access to, and certainty of, beliefs about cost/effect relationships and about preferences regarding possible decisional outcomes.[25]

Organizations may sometimes approach certainty in decision making in both their internal and external realms of activity. Internally, the organization increases certainty by employing controls over organizational activity,

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[23]James D. Thompson, Organization in Action (New York, N.Y.: McGraw-Hill Book Co., 1967), p. 192.

[24]Daniel Katz and Robert L. Kahn, The Social Psychology of Organizations (New York, N.Y.: John Wiley and Sons, 1966), p. 498.

[25]James D. Thompson, Organization in Action, p. 192.

resource inputs, and production outputs. Organizational controls, and increased certainty, also extends to the individual members and to higher behavior and activities within the workplace.[26]

Externally, the organization must function within the social environment which supports the organization's efforts within the society of which it is a large part.[27] Since organizations probably do not control their relations with society in the same manner as they do their employees, we might expect some degree of uncertainty to exist among the decision makers about their ability to predict future optimal decisions and operating patterns.

Characterization of organizations can be made based on the ways in which they deal with uncertainty in their environment. On the one hand, the organization that maximizes internal certainty is said to approach efficiency of technical rationality and closure from its environment. The classical bureaucratic organization centers on such assumptions of efficiency and closure and is marked by the

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[26]William L. Wood, Jr., "Public Participation in the Alpine Lakes Controversy: The Coalignment of Interests" (M.S. thesis, Pennsylvania State University, 1979), p. 11.

[27]Fremont J. Lyden, "Using Parson's Functional Analysis in the Study of Public Organizations," Administrative Science Quarterly 20 (1975): 59-70.

development of the principles of scientific and administrative management. On the other hand, rather than assuming certainty or ignoring the social environment, the open-system bureaucratic structure seeks to achieve certainty through establishing dependent relationships. This enables the organization to remain internally rational and externally effective in light of increasing uncertainty.[28]

Conflict

In trying to reach some satisfying level, decision makers are confronted with demands made by specific groups within their domain or accepted sphere of influence. These groups and group coalitions are guided by values and interests in their interactions with the agency. From exchanges with the agency, these groups learn whether they can trust the agency to produce favorable outputs or decisions. Additionally, the development of trust is important to an agency's ability to maintain a steady state, since less trust may create debilitative conflicts with the task environment.

While conflict in society is viewed as being ever present and inevitable, it is also seen as functional and

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[28]Ibid., p. 75.

integrative in its nature.[29] Pinard[30] views conflict as functional for interest groups in their ability to mobilize the potential resources of secondary groups. In conflict situations, the actions of aggrieved groups may stimulate other groups to try to influence agency actions.

As conflict becomes political, existing organizations and ad hoc groups tend to form around an issue.[31] Thus, the natural resource agencies making land policy proposals may stimulate a mobilization of groups such as bird-watchers, rockhounds, and wilderness interests which do not want land converted to timber-utilization purposes.

In addition, as conflict becomes more intense, new and specialized groups may form, and the amount and frequency of communications among opposing parties may also decrease. The sides become more strongly polarized on the issues and turn inward for both communication and information.

Polarization between agencies and their publics may indicate actual disagreement on the issue. However,

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[29]Lewis A. Coser, The Functions of Social Conflict (New York, N.Y.: The Free Press, 1956), p. 188.

[30]Maurice Pinard, "Mass Society and Political Movements," American Journal of Sociology (1973): 682-690.

[31]Paul H. Conn, Conflict and Decision Making: An Interaction to Political Science (New York, N.Y.: Harper and Row, 1971), p. 315.

unrealistic polarization may also occur when perceptions differ markedly from actual agreement. Unrealistic polarization arises from the need to release tension and may not necessarily be reduced by agency accommodation to specific demands.[32]

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[32]Lewis A. Coser, The Functions of Conflict, p. 189.

CHAPTER III

ALTERNATIVE PLANNING ACTIONS AND VARIABLES

Alternative Planning Actions

An alternative is the proposed management direction designed to meet the requirements of the Resources Planning Act and the National Forest Management Act. Alternatives used in the Southern Region's planning process are different ways of implementing the RPA Program and addressing each of the identified Issues, Concerns and Opportunities. These "different ways" are organized by addressing goals which represent desirable achievements of the Regional Plan. Goal statements were drawn from the RPA Program and the Regional Focus of the National Concerns section of the document developed in the fourth step of the planning process known as the Analysis of the Management Situation (AMS). In the Plan, an alternative would establish a theme by addressing all goals while emphasizing one set of goals more than others. In this regard no alternative excludes any program goal but each alternative differs from all other

alternatives in the degree of emphasis it places on the goals being highlighted to accomplish its intent.

In building an alternative, each ICO potential resolution is examined to determine what could be done in resolving the ICO that would also support achievement of the goal statement. The goal statements for each alternative, in addition to planning purposes in NFMA regulations (36 CFR 219.), make up the "purposes of management direction" in 36 CFR .5(F)(2)(IV). All ICO resolutions and management directions in each alternative are designed to meet planning requirements in NFMA and the Forest Service Manual (FSM) 1920: i.e., each alternative represents a feasible path for RPA Program implementation which encompasses management direction originating at the Washington Office (WO) and Regional Office (RO) levels.

Some basic assumptions were made regarding planning direction for building alternatives. This had to be done because methods and interpretations regarding regional planning were evolving to better fulfill the planning actions as well as the intent of specific laws, regulations, and administrative priorities as the Plan was in development. Many of these evolving interpretations and methods were not fully

documented, existed in draft, or were presented as tentative direction as the regional plans were being developed. During the whole process, the Forest Service knew it had to produce regional plans because an Act of Congress had made it compulsory, but few Forest Service officials on the regional level knew how to do one. Given this situation, the Southern Region Planning Team intended that alternatives in the Regional Plan would fulfill existing laws, regulations, and directions and be responsive to evolving interpretations.

Alternatives, as composed by the Regional Planning Team, consisted of the following characteristics:

1. Each ICO was identified in each alternative (an ICO was allowed the same or a similar resulution within two or more alternatives).
2. The "No action alternative" was described as being a continuation of current funding and targeting to National Forests with projections drawn from historical trends.
3. Each alternative displayed appropriate management standards and guidelines for its accomplishments.

As stated earlier, all alternatives had to follow management direction. Such direction can be identified as Forest Service policy, goals, objectives, and standards and

guidelines. In determining whether an alternative followed management direction, the team used the following definitions:

1. Management Direction

   A statement of multiple-use goals and objectives, the management practices selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives; and the associated standards and guidelines for attaining them.

   "A statement of multiple-use and other goals and objectives." The team interpreted this to mean "policy."

2. Policy

   A guiding principle upon which is based a specific decision or set of decisions.

3. Goal

   A concise statement of the state or condition that a land and resource management plan is designed to achieve. A goal is usually not quantifiable and may not have a specific date for completion.

4. Objective

A specific statement of measurable results to achieve within a stated time period. Objectives reflect alternative mixes of all outputs or achievements which can be attained at a given budget level. Objectives may be expressed as a range of outputs. In short, the Team interpreted "objectives" to be targeted items (outputs, activities, and funding) identified in FSM 1921.246--2 as modified.

5. Standards and Guidelines

Standard--a principle requiring a specific level of attainment, a rule to measure against.

Guideline--an indication or outline of policy or conduct.

The anticipated resolution of the nine ICO's in the Analysis of the Management Situation, identified policies, objectives, standards and guidelines which could be used in addressing ICO's. With goal statements, the anticipated resolutions of the ICO's established a proposed management direction. Different combinations of management direction which address the ICO's and seek achievement of goal statements are alternatives in the Regional Plan.

Goal statements were taken from the Forest Plan for the entire nation known as the Resource Planning Act (RPA) program and the regional focus of national concerns. The goal statements from the Southern Region were combined with those from the RPA program to form "themes" which were then joined with anticipated ICO resolutions to form alternatives.

Several combinations of goal statements were considered in establishing a "theme" for building an alternative. When the combined goal statements were put together with ICO resolutions, an alternative or a proposed management strategy was established. The alternatives can be described by summarizing the combined goal statements as follows:

Alternative Management Strategy A--Continue current regional standards and guidelines to implement the RPA Program and, where current standards and Guidelines do not exist, establish those required by NFMA regulations. This alternative strategy approximates a no-action alternative, and as such, serves as a baseline for estimating changes or differences among the alternatives. The "no-action alternative" is designed to show what would happen if the region made no change in current management direction at the regional level to implement the RPA Program and addresses the identified

ICO's. Funding and targeting remain the same to each National Forest and projection estimates are derived from past experience.

Alternative Management Strategy B--Implement the RPA Program by emphasizing expanded opportunities to improve employment and social well-being of the disadvantaged through application of multiple-use resource management (defined in 36 CFR 219.3) while striving to achieve other national and regional goals.

Alternative Management Strategy C--Implement the RPA Program by emphasizing the energy and cost efficient production of the forest and range resources directed toward meeting public needs and demands through application of multiple-use resource management while striving to achieve other national and regional goals.

Alternative Management Strategy D--Implement the RPA Program by emphasizing the protection and enhancement of forest and range environmental qualities which will provide an enduring supply of outdoor experiences and other beneficial uses through application of multiple-use resource management (defined in 36 CFR 219.3) while striving to achieve national and regional goals.

TABLE 1

SUMMARY OF ALTERNATIVES AND ICO'S

Alternatives (Built from Goal Statements)	Issues, Concerns and Opportunities (ICO's)								
	Timber	Energy	Range	Access	Recreation	WL & Fish	Lands	Water	Visual
A--Take "no Action" to implement RPA - maintain existing management direction	Production well below RPA Program.	Conservation goals met. Lease production below RPA levels.	Targets near RPA levels.	Capital investments in access insufficient to maintain production of resources.	Use levels above RPA targets, quality of experience decreased.	Targets above RPA level.	Acquisition well below RPA level.	Improvements on water and decreased cost of administration unrealized.	Visual quality maintained but not improved.
B--Implement RPA with emphasis on employment, social well-being	Timber production increased over next 50 yrs. Generally improved stock, distribution of targets for better production to help people.	Mineral least standards set. Fuelwood use to be studied.	Target distributed to better help people. Standards set.	Road targets adjusted with timber production. Road type guidelines established.	Targets adjusted. ROS system set as a standard.	Program emphasized. Targets decrease over time.	Targets adjusted to help people. Forest will set acquisition priority standards.	Forest will set objectives for water, Soil & water improvement priorities set.	Continue emphasis on visual quality.
C--Implement RPA with emphasis on energy, cost efficiency	Targets distributed to use less energy and reduce cost. Restocking & utilization standards differ from alt's B & D.	Same as B	Targets adjusted to increase efficiency; standards changed.	Targets adjusted with timber production.	Targets adjusted to increase efficiency, while standards same as alt. B.	Same as alt. B	Targets adjusted to improve administration of Forest.	Improvement target adjusted and priority standards slightly modified.	Same as alt. B.
D--Implement RPA with emphasis on environmental protection and enhancement	Targets distributed to help visual quality. Restocking and utilization standards differ from alt's B & C.	Same as B	Targets distributed Deferred rotation & improve standards set.	Targets adjusted with timber production.	RPA targets met but below current use, while standards same as alt. B.	Same as alt's. B & C.	Target adjusted to emphasize Mountain Forests.	Improvement target adjusted, priorities & standards slightly modified.	Standard set on reduction of visual quality.

Each cell in this table represents the best estimate of the regional land managers and interdisciplinary planning team of probable outcomes from combinations of given alternative strategies (goals) and ICO's.

Building Alternative--ICO Combinations

An alternative ICO combination can be built by following a simple step-by-step procedure:

A. Determine what could be done within the potential resolution of each ICO that would also support the achievement of each of the goal statements, taking one ICO and one goal statement at a time;

B. Combine the "What could be done" to support each goal statement and emphasize one goal over the others for each alternative for each ICO;

C. Taking one alternative at a time, determine which parts of ICO resolution are related to others in their achievement with one goal emphasized above the others;

D. Negotiate ICO resolutions within the alternatives so that the total management direction (all ICO resolutions in the alternative) can be achieved.

Nine ICO's were identified and put into the planning question form to be addressed by the Regional Plan for resolution:

1. Timber Production - To meet an anticipated timber supply shortfall in the South, how much timber should National Forests supply? Where and how

should the Forest Service produce timber on National Forest lands or support production on private and industrial lands?

2. Energy Production and Conservation - What part of the national energy supply can and should come from forest lands of the South?
3. Livestock Grazing on Forests and Rangelands - How and where should the forests and rangelands in the South provide the livestock grazing identified in the current RPA goals? What role should National Forests have in meeting the goals?
4. Access to the National Forests - To most satisfactorily use the National Forests, how much and what kind of access (roads and trails) should the Forest Service provide?
5. Recreation Role on National Forests - How much and what kind of forest recreation should the Forest Service support in the South and what share should be provided by the National Forests?
6. Wildlife and Fish Diversity - To provide diverse wildlife and fish populations and protect threatened and endangered species, how much and what types of habitat should the Forest Service

provide on National Forests or support on private and industrial forests and rangelands?

7. National Forest Land - If land adjustments are needed to make acreage and location adequate, what should be the priority for National Forest land acquisition or exchange?
8. Water - If any additional water or improved quality is needed, what should the Forest Service do to encourage this production or improvement?
9. Visual Quality - The Forest Service systematically promotes scenic values on National Forests. Should this effort be changed, and, if so, how and where?

Eleven alternative--ICO combinations were built from this list (see Appendix C).

Selected Social Variables

In order to establish social significance of the proposed alternatives, the Regional Planning Team investigated and selected several social indicators that were believed to be affected by Forest Service activity. These social indicators--population, employment, income, pollution, occupation, recreation, housing, public reaction--are designated in the study as variables.

Population

The South's population has grown steadily over the last few decades (Table 2) and outpaced national population growth since 1970. Virtually all of the states have experienced substantial population growth, and growth has been particularly large in Florida and Texas. Population growth in National Forest counties has not quite matched population growth for the South as a whole, but it has been substantial.

Population growth in the South and in the National Forest counties of the South is projected to continue. This will expand the likelihood that Forest Service land management decisions will have socioeconomic effects on nearby populations.

Employment

Total employment in the Region has mirrored population trends with 38 percent of the population being employed in 1970, slightly below the U.S. ratio of 39 percent. Participation by females is increasing substantially, but the trend toward increased proportions of total populations in older, retired age groups has a reverse effect. Increases to the 40-43 percent participation range are currently occurring and participation rates are expected to stabilize at this level in the future.

TABLE 2

POPULATIONS BY STATES AND FOREST SERVICE COUNTIES

States	State Population 1970	State Population 1980	Percent of Increase	Population of National Forest Counties 1970	Population of National Forest Counties 1980	Percent of Increase
AL	3,444,354	3,890,061	13	594,297	639,648	8
AK	1,923,322	2,285,513	19	646,572	766,494	18
FL	6,791,418	9,739,992	43	417,228	598,969	44
GA	4,587,930	5,464,265	19	496,826	518,386	5
KY	3,220,711	3,661,433	14	355,203	432,076	22
LA	3,644,637	4,230,972	16	277,087	321,162	16
MS	2,216,994	2,520,638	14	892,220	1,021,485	15
NC	5,084,411	5,874,429	16	934,680	1,049,649	12
OK	2,559,463	3,025,266	18	60,815	71,761	18
SC	2,590,835	3,110,208	20	611,491	691,201	13
TN	3,926,018	4,590,750	17	414,854	478,503	15
TX	11,198,655	14,228,383	27	254,464	384,086	55
VA	4,651,488	5,346,279	15	765,916	930,502	21
	60,805,144	73,542,409	21	6,654,653	7,913,926	19

SOURCE: U.S. Census, 1970 and 1980. 1980 figures are preliminary. (Detailed figures for the region on a per county bases are located in Appendix A.)

Historically, agriculture and related services (with the exception of Forestry) have declined in relative importance and currently account for less than 10 percent of total employment in the region. The decline has been more than offset by growth in the fastest growing sector "services." The regional breakdown, however, tends to mask some of the differences which exist in smaller areas. Most rural counties are still dependent upon agricultural and related services for employment.

Income

Historically, per capita income for the South has been below the national average. Per capita income for the South averaged $6,197 in 1977, 12 percent below the national average. The projections in per capita income reflect substantial increases at both the national and regional level with proportional gains in the South, but a widening of absolute differences. For example, the South is projected to be only 9 percent below the national average by 2020, but the absolute difference in projected increase is from $855 in 1970 to $1,222 in 2020.

Pollution

In National Forest operations, pollution concerns focus mainly on water and the air surrounding forest land. With regard to water pollution, the situation on the National Forests in the South is quite good. The National Forests routinely protect and improve the water resource. Ninety-eight percent of all water produced on National Forest land meets water quality standards. However, intermingled lands in private ownerships are causing greater water resource problems in many areas. It is anticipated that unless water quality is markedly improved in some of the major rivers, the demand for municipal water from the National Forests will increase as a result of general population increase. The Southern National Forests provide 95 municipal watersheds serving about 1,300,000 people.[1]

When considered as a composite of National Forests and intermingled forest lands, the southern forests are about parallel with the nation as a whole with respect to water quality. Efforts made in the last decade to improve surface water quality have started to show results. Data suggest that the quality of surface water is no longer deteriorating

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[1]U.S. Department of Agriculture, Forest Service, Southern Region Analysis of the Management Situation, October 1980, p. 61.

despite escalatons in use caused by continued increases in population and the gross national product. However, the water element is becoming scarcer as a result of greater demand pressures resulting from these increases. Factories, municipal treatment facilities, and other point sources of pollution are gradually coming under control, although street and farm run-off and other non-point sources are often as serious polluters as the point sources of water pollution.[2]

Similar efforts to monitor and control ground water quality have not been made primarily because ground water has traditionally been considered very good. But recent data suggest that serious problems exist.

With regard to air pollution, prescribed fire is the only activity carried out by the Forest Service that has any impact on air quality standards. It is used on a seasonal basis in all parts of the Southern region. Prescribed fire is regarded as an ecologically sound practice to reduce forest fuels for preventing and/or reducing intensity of wildfires. It is also a forest management tool used to improve productivity and quality of forest resources. Prescribed burning in the South is seasonal; it causes a

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[2]President's Council on Environmental Quality, Environmental Quality (Washington, D.C.: Government Printing Office, December 1980), p. 81.

temporary form of emission and because of this the states have not set up any incremental measurement consideration. The prescribed burning season is generally from mid-December to mid-February. During this period, there are only a few days when burning prescription criteria can be met.[3]

Occupations

This variable is of interest because of the vast amount of change that has occurred in occupational patterns in many areas of the South.

In the past, work routines were primarily oriented to farming in annual crops, depending on seasonal conditions for success or failure. Most of the population now is oriented toward a 40-hour industrial work week. The majority of working-age adults in the mountain communities are working in one of the small, generally non-polluting industries: textiles, carpets, apparel, and small electronics and electrical parts. The commuting time required for these employees to reach work from their homes ranges from ten to sixty minutes. The plants where they work are usually clustered around county seat towns.

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[3]U.S. Department of Agriculture, Forest Service, Southern Region, Draft Environmental Impact Statement, June 1981, p. 22.

Farming is a part-time occupation for many rural people and does not provide a major source of income or food but provides additional food and extra income when produce is sold. Farm type work takes place after mill hours, on weekends, and holidays. It is also carried on by family members who do not happen to be working at the plants at the time.[4]

In the Piedmont and Coastal Plain areas of the South, occupations have changed in a different pattern. Previous to the Civil War, the economy was tied to large plantations using slave labor intensively. The sharecropping system which developed after the Civil War as a method of economic production affected both majority and minority population groups, draining and trapping them all, to the benefit of the cotton-using portions of the world elsewhere. The system rose from the peculiar Southern land labor situation: large land holdings, little capital and a huge reservoir of labor specialized in little else besides cotton cropping. The legacy of sharecropping--poverty, fatalism, and low levels of energy and education, continued haunting

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[4]Jack T. Wynn, "Social Impact Assessment in the Chattachoochee-Oconee National Forest: The Socioeconomic Overview" (Done in the employ of the U.S. Department of Agriculture, December 1980), p. 57.

the poorer classes, both majority and minority members, well into the 20th century.[5]

In the half-century between 1890 and 1940, two major depressions occurred, in 1893 and 1929. Several problems combined in this period: exhausted land overworked by cotton, the disaster of the boll weevil, high cost of credit, low-interest in producing foodstuffs coupled with lack of efficient transportation for perishable goods, and a lack of attachment by tenant farmers to the land they farmed. Together these problems produced a 1940 situation not very much different from that of 1890.[6] Not until the New Deal measures began to take hold in the early 1930's and 1940's did farm changes begin to take place.

The decades of the 1960's and 1970's saw many changes occur in occupations in the South. One noticeable change has been the migration of industry, both large and small, to the "sun-belt." Many industrial concerns, when deciding upon a move south, have opted for non-metropolitan and rural locations.

An analysis of recent trends in manufacturing

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[5]Kenneth Coleman, A History of Georgia (Athens: University of Georgia Press, 1977), p. 118.

[6]Jack T. Wynn, "Social Impact in the Chattahoochee," p. 19.

employment has shown that during the decade of the sixties rural areas have had the advantage over urban areas with regard to employment in manufacturing, principally in the South. Those rates of increase (despite relatively slow-growth nationally), were quite rapid in rural and small-town counties.[7] New plant locations or expansions account for about half the gains in manufacturing employment in smaller, non-metropolitan labor market areas, or about 20 percent of the national total in entirely or partly rural counties.[8] As a specific example in terms of employment shares, the rural and small-town counties in the Tennessee Valley, which together account for only 23.7 percent of the region's manufacturing employment in 1959, accounted for 39.1 percent of the increase during the period 1959-1968.[9]

This rapid growth in rural communities (where most Forest Service landholdings are located) has been largely characterized by a high concentration of low-technology

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[7]Charles Garrison, "Industrial Growth in the Tennessee Valley Region, 1959-1968," American Journal of Agricultural Economics 56 (1974): 50-60.

[8]Claud C. Haren, "Rural Industrialization in the 1960's," American Journal of Agricultural Economics 52 (1970): 431-437.

[9]Charles Garrison, "Industrial Growth in the Tennessee Valley," p. 51.

industries. Labor-intensive industries account for 56.8 percent of the employment increase in the Tennessee region. In cases such as these, there is a tendency for the labor force to be disproportionately filled by women, for many of whom work-force participation has historically been limited.[10]

Recreation

The most visible consumers of the services of the National Forests in the South are the forest recreationists. This use varies from week-long camping vacations to a drive on a forest highway on the way to another place. According to a national survey, people drive considerable distances to participate in outdoor recreation activities.[11] About 95 percent of the vacation and overnight trips, 90 percent of the day outings, and more than 50 percent of short (up to four hours) trips taken for outdoor recreation involve distances that would typically take the participant into a county other than his own.[12] Thus a large part of the demand for recreation on National Forest land comes from persons

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[10] Ibid.

[11] U.S. Department of Interior, Bureau of Outdoor Recreation, Outdoor Recreation: A Legacy for Americans (Washington, D.C.: Government Printing Office, 1973), p. 26.

[12] Shands and Healy, The Lands Nobody Wanted, p. 70.

who live outside the immediate forest area, including many who live beyond the zone in which most "forest producers" are located. About three quarters of those persons who use the National Forests live in metropolitan areas.

The forest recreationists pay no direct fees, or only limited ones, for use of the forest resource, although their indirect outlay may be substantial. Under a law passed in 1974, the Forest Service is allowed to charge fees only for the most highly developed of its facilities, which in the South means that charges are made only on about half of the developed campgrounds and a smaller portion of the swimming beaches. Other forest uses including driving scenic highways, hunting and fishing (except for state licenses), camping on primitive sites, and use of interpretive centers are free to the consumer. User fees play such a small role in the Southern National Forests that in 1974 only about $500,000 in user fees were collected from roughly 22,000,000 visitor days of use.[13] The low user-fee collections result mainly from a large portion of the visitor-days being scenic drives from which fees are not expected.

The public input to the planning process gave emphasis to dispersed and more primitive recreation

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[13]Ibid.

opportunities for National Forest lands as well as expanded opportunities for National Forest recreation in proximity of large population centers. This latter concern is believed to be a reflection of the increasing cost of transportation to more distant recreation sites.

Future demands for forest recreation opportunities may well change in pattern by the year 2000. Recreation demands may also be affected by changing economic trends and an increased average age of the population. Reduced incomes and rising travel costs resulting from inflation may lead to home-and community-centered recreation outlets.

Housing

With population in the South (both rural and urban) on the increase due to many factors (some previously mentioned), it was deemed necessary to look at housing needs. The quality of rural housing is a crucial problem in the United States. Substandard housing exists in every region, but the poorest dwellings are found most often in the South.[14]

The results taken from several surveys show that the

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[14]Savannah S. Day, Louise J. Hayes and Betty Stevens, Housing Research Relevant to Rural Development: A Bibliography and Supplement (Mississippi State University, MS: Southern Rural Development Center, 1979), p. 1.

average rural dweller in the South is an older, low-income homeowner with low educational attainment who lives in a single family, older, woodframe house which often lacks modern conveniences and sometimes needs major repairs. Rural dwellings often lack piped hot water and sewage facilities, have more rooms such as bedrooms and fewer dining rooms, living rooms, and family rooms. Additionally, bathtubs are lacking in many of the rural homes.[15]

With much of the United States in a population decline or slow-growth situation, the South (1970-1975) has had a 9.3 percent metro growth rate and a 6.9 percent non-metro growth rate. Population growth as previously indicated is a major factor for consideration in this region, and there is much concern being devoted to determining the effects that increased economic activity will have on the quality of rural housing.

Public Reaction

Although a regional forester does not directly operate in a political arena, his decisions must be rendered

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[15]Doris Needham, "Housing Conditions and Housing Problems Received by Families in Selected Low-Income Areas of Georgia, Texas, and Virginia," Southeastern Cooperative Series Bulletin (Athens: University of Georgia, Agricultural Experiment Station, 1974), p. 182.

with much consideration for popular support. Any decision made in the face of massive opposition runs the risk of being challenged both in the administrative appeals procedure and/or in the courts.

One major reason that responsible officials are now devoting more attention to public reaction is the recent changes in public attitudes concerning administration of publicly owned resources and the creation of new and powerful environmental-interest groups. These groups have considerably altered the decision environment of resource administrative agencies. For example, during the 1960's the word "ecology" entered the public vocabulary, and committed individuals have organized to pressure the resource agencies to modify their established policies and decision-making procedures. A manifestation of the impact of these environmental groups is the NEPA act itself which authorized creation of the Environmental Protection Agency to safeguard significant environmental preferences and required an "environmental impact statement (EIS)" for projects with federal sponsorship. Environmental groups have gained access to decision-making processes of resource agencies and brought court action for decisions alleged to be in conflict

with the NEPA legislation.[16]

The public involvement on the front end of the prescribed planning process is, at least partially, designed to shortcircuit the environmental appeals process.

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[16]Helen M. Ingram, "Information Channels and Environmental Decision Making," Natural Resources Journal 13 (January 1973): 155-169.

CHAPTER IV

IMPACT ASSESSMENT

The task of socioeconomic assessment is to identify the kinds of social and economic changes that will be generated by land-management alternatives. The intent is to help explain what happens to people as a result of the way in which the Forest Service manages its resources. People and their socioeconomic systems are resources that need to be understood by managers at least as well as physical and biological resources. This understanding should exist in the mind of the manager in contact with a given community in order that he can communicate such in management and policy recommendations up the line to top regional management. This activity takes on greater importance when it is realized that it is only because of people that things are defined as resources in the first place; that biological and physical resources are harvested or managed; and that conflicts develop over land management policies.[1]

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[1]Region 8 I D Team, "Draft Environmental Impact Statement," June 1981, U.S. Department of Agriculture, Atlanta.

At the regional level the social consequences of forest problems are less visible than at the National Forest level. Therefore, regional concerns must be focused more on broad categories such as population shifts; quality of life assessing variables; changing public perceptions of forest use; the impacts of forest use and mineral developments; and other forest-related socioeconomic activities that transcend individual communities.

The performance of a socioeconomic impact assessment consists of determining management actions and comparing them with baseline or prevailing conditions. Any changes in social and economic consequences from the baseline data are socioeconomic effects. The degree of departure of socioeconomic effects from the baseline data indicates the magnitude, kind of change (harmful or beneficial), and the time period over which the change will occur. In this regard, population changes in the South appear to be highly significant. From 1970 to 1980, the region's population increased 21 percent; for the counties containing National Forest lands, the corresponding increase was 19 percent.

According to the U.S. Department of Agriculture's mean index of socioeconomic status and means of component indicators for metro and non-metro counties in the South,

the national norm is higher than that for the South median family income ($7,493 vs. $6,497), male heads of households not in poverty (89.9 percent vs. 86.2 percent), median school years completed (10.9 years vs. 10.0 years), and dwellings with complete plumbing (83.3 percent vs. 77.1 percent). The overall index of socioeconomic indicators shows that while the South as a whole is below the national norm (87.7 percent of national, see Appendix C), the metro areas in the South are, as a whole, above the national level by 6.4 percent. The non-metro counties, where the National Forests are located, measure up to only 83 percent of the national level (USDA, 1979), (see Appendix A). This attaches special importance to possible effects of National Forest management on the socioeconomic status of people living in National Forest counties of the South.

It is a well documented fact that the black population tends to exist in areas that are or have primarily been engaged in agricultural production (Coastal Plain and Piedmont). The same conditions that are necessary for success in the production of other agricultural products are necessary for the production of timber, particularly softwoods. Therefore, the geographical association between the region's minority population and the landbase that is most

favorable to softwood production is amazingly close. However, except for low-paying seasonal labor-intensive jobs, the employment composition of the Forest Service in the South in main line jobs has never reflected the population makeup.

Based on the information above and additional information in the appendices of this dissertation, an attempt was made to devise an acceptable method of validating predicted change under the proposed alternatives. The method chosen was the three-step procedure described under "Method" in Chapter I. The three groups canvassed were the Regional Interdisciplinary Planning team, local forest managers (rangers), and practicing sociologists drawn from outside the Forest Service. Each individual canvassed was asked to assess the impact of each management alternative on the variables included in the cross-impact matrix. The assessments were made on a positive scale (none = 0, very little = 1, some = 2, a lot = 3) or a negative scale (none = 0, very little = -1, some = -2, a lot = -3).

The writer realizes that an attempt was made to quantify social data which are highly unquantifiable in a true sense. However, the quantifications indicated do have meaning in a comparative sense. When the term "none"

is used to express the probable effect of an alternative on a given variable it is certainly different from an expression of a lot for that or any other variable. Although the expression "a lot" may not be quantifiable, it can be compared to "none" if quantifiable values are assigned to each expression, which is the case in this study.

Since each of the groups consisted of a different number of participants and the writer wanted to weigh their inputs on an equal basis, a method of weighting the inputs of the smaller groups to make them equal to the larger group had to be devised.

The land management group contained 26 participants; the sociologist group, 10; the Regional Office professionals, 7. Equal weight for all three groups was accomplished by assigning a weight of 1 to each response by land managers (26 x 1 = 26), a weight of 2.6 to each response by sociologists (10 x 2.6 = 26), and a weight of 3.7 to each response by the Regional Office professionals (7 x 3.7 = 26).

Each participant was asked to assess the impact of each alternative and ICO combination (set out in Table 3, page 78) on each of the variables considered (employment, income, occupation, pollution, recreation, housing, and public reaction). An example of the questionnaire used is shown here with "timber B":

Timber B

In your best opinion, how would timber cut increases of 20-50 percent on a Ranger District affect the employment of disadvantaged people living on and around a Ranger District? What effect would this action have on income, occupational variation, pollution, recreation, housing, and public reaction?

Answer with one of the following responses with an indication of + or -: 0 = None; 1 = Very Little; 2 = Some; 3 = A Lot

Employment	Income	Occupational Variation	Pollution	Recreation	Housing (quality quantity)	Public Reaction

Explanation (optional)

Employment_____

Income_____

Occupational Variation_____

Pollution_____

Recreation_____

Housing (quality-quantity)_____

Public Reaction_____

Other questions asked of each respondent, to which similar answer forms were attached, were:

Timber C

2. What would be the effects on these same variables if timber cuts on the District were intended mainly for economic efficiency (cost vs. benefits)?

3. Energy B

   How would increases in the use of energy sources by 20-25 percent affect these variables as they relate to disadvantaged and minority people living on or around a District?

4. Energy C

   What would be the effects on these variables if energy sources were used mainly for economic efficiency?

5. Range C

   What would be the effect of these variables if range resources were being managed mainly for economic efficiency?

6. Recreation B

   How would increases in Recreation facilities of 20-50 percent affect these variables with regard to disadvantaged and minority people living on and around a District.

7. Recreation C

   What would be the effect on these variables if recreation resources were being managed mainly for the purpose of economic efficiency?

8. Lands B

   How would increases in land acquisition affect these variables as they relate to disadvantaged and minority people living on and around the District?

9. Lands C

   What would be the effects on these variables if land acquisition were being conducted mainly for the purpose of economic efficiency?

10. Lands D

    What effect would land acquisition for the protection and enhancement of the forest and range environmental qualities to improve outdoor experiences have on these variables?

11. Visual D

    What effect would visual improvements associated with the enhancement of forest and range environmental quality for improving outdoor experiences have on these variables?

Compiling Results of Social Effects

The baseline activity levels are assumed to exist in this study and only those socioeconomic impacts that are believed to differ from baseline conditions are shown in the following matrices. Each of the alternatives in the Plan which are designated A, B, C, and D would accomplish all RPA resource targets but with different mixes representing different goals. Each alternative represents different ways of implementing RPA direction through adjustment of National Forest outputs with an ICO resolution that supports achievement of goal statements. Concern here was with identifying objectives which require adjustment as a result of changes in another resource.

Since Alternative A is the current management direction extended into the future with no change, the social conditions that are observed are not treated except to be pointed out in the "baseline." Analysis was therefore performed on the other alternatives (B - D) by the groups involved in the three-step methodology mentioned earlier with respect to the variables (employment, income, occupation, pollution, recreation, housing, and public recreation).

Only the alternatives that were found to have an effect on these variables--that cause them to differ from

the baseline conditions, are mentioned in the following analysis:

Phase I--Brainstorming Survey

The brainstormers surveyed were members of the Regional Planning Team and other Regional Office professionals. The important dimensions of the proposed resource directions (alternatives) were explored and entered onto the vertical axes of the matrix. This was accomplished by compiling all of the alternative ICO combinations used by management element as previously mentioned. The horizontal axes of the matrix is made up of the previously mentioned socioeconomic variable categories.

The individual responses of each of the seven Regional Office professionals were compiled numerically as shown in Tables 3 and verbally as shown in figure 4. The staff group ranked the alternative ICO combinations and then the variables.

In this regard the minuses and pluses taken from our continuum were tallied in each row to determine alternative ICO combination rankings. Variable rankings were determined in a similar manner using columns instead of rows as is shown in Table 3. (The actual process was believed to be a bit long and confusing to have entered in this part of the text, a detailed listing of each response is shown

TABLE 3

RESULTS OF BRAINSTORMING AND WRITTEN INFORMATION OF STAFF

Variables / Alternative ICO Combinations	Employment	Income	Occupational V.	Pollution	Recreation	Housing	Public Reaction
	6.0						
(2) timber B	2.4	1.8	1.3	- .4	- .3	1.6	- .4
	3.2						
(3) Timber C	1.1	1.3	.4	- .3	.1	.9	- .3
	0.6						
(7) Energy B	1.6	1.6	1.3	-1.9	-1.3	.4	-1.1
	-1.4						
(10) Energy C	.7	- .1	1.3	-2	- .6	.4	-1.1
	-0.6						
(9) Range C	- .4	- .4	0	.1	.6	- .1	- .4
	8.1						
(1) Recreation B	1.9	1.9	1.6	-1.1	2	.7	1.1
	1.4						
(6) Recreation C	.1	.1	.3	- .4	.9	0	.4
	2.4						
(5) Lands B	.3	.9	- .7	.7	2	.9	-1.7
	-1.4						
(11) Lands C	- .1	.4	- .6	.9	.3	0	.4
	-0.3						
(8) Lands D	- .7	0	- .6	.4	2	- .3	-1.1
	2.6						
(4) Visual D	- .7	- .9	- .4	1.3	1.9	- .6	2

NOTE: The figures to the extreme left in parentheses represent the order of ranking for the alternative-ICO combinations and variables. These rankings were established by tallying the figures found in the rows for alternative-ICO combinations and columns for the variables.

in Appendix B.)

Numerical values were positive or negative, and plus and minus signs were used in our tabulations to establish rank. Preference in addition to rank will have to be considered in the process of making a final decision on a recommended or selected alternative.

The ranking concept used here was drawn from a publication by Kendall called Rank Correlation Methods.[2] According to Kendall, when a number of individuals are arranged in order according to some quality which they all possess to a varying degree, they are said to be ranked. The arrangement as a whole is called a "ranking" in which each number has a position.[3] Proceeding from this concept, the ranking of the management alternative--ICO combinations and the ranking of variables are as follows:

Ranking Alternative-- ICO Combinations	Ranking Variables
1. Recreation B	1. Recreation
2. Timber B	2. Income
3. Timber C	3. Employment

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[2]Maurice G. Kendall, Rank Correlation Methods, p. 1.

[3]Ibid.

TABLE 4

DOMINANT RESPONSES OF BRAINSTORMING AND WRITTEN INFORMATION OF STAFF RELATING TO EFFECTS*

Alternative ICO Combinations	Employment	Income	Occupation	Pollution	Recreation	Housing	Public Reaction
Timber B	+some	+some	+some	-some	+some/none	+v.little	-some
Timber C	+some	+some	+v.little	-some	-some/none/ some	none	-v.little/none
Energy B	+some	+some	+v.little	-a lot	-some	none	-some
Energy C	+some	+some	+some/ +v.little none	-a lot	none	none	-a lot
Range C	none	-some/none	none	none	none	none	-v.little
Recreation B	+some	+some	+some	-some	+a lot	none	+some
Recreation C	+v.little/ none	+v.little none	+v.little/ -v.little/ none	none	+a lot	none	+v.little
Lands B	none	+a lot/some/ +some	none	+some	+some	none	-some
Lands C	none	none	none	+some	+some/none	none	-a lot
Lands D	-v.little	-v.little/ +some	none	+some	+some	none	none
Visual D	none	-v.little/ none	none	+some	+some	none	+some

*The dominance here is expressed in the sense that the selected responce was given by the greater number of participants.

4. Visual	D	4. Occupational V.
5. Lands	B	5. Housing
6. Recreation	C	6. Pollution
7. Energy	B	7. Public Reaction
8. Lands	D	
9. Range	C	
10. Energy	C	
11. Lands	C	

Although the primary purpose of this dissertation is to show how the collective wisdom of the three respondent groups can be used in enabling the decision maker (Regional Forester) to gain better socioeconomic information to be used in the decision-making process, the interactions in getting to this informational input are of interest. In this regard correlation can be observed among the respective groups in responses to management alternative--ICO combinations and variables as is done in Table 5.

For example, the degree of correlation between group opinions of the Forest Service's effect on the income and housing variables is desired. Particular interest is devoted to these variables because income is an important economic and social variable that is basic to the socioeconomic well-being of a family unit, and housing status is a

TABLE 5

CORRELATION BETWEEN REGIONAL OFFICE STAFF'S OPINION
OF FOREST SERVICE MANAGEMENT EFFECTS ON
INCOME AND HOUSING

Alternative ICO Combinations	i Income	j Housing	$x = i - \bar{i}$	$y = j - \bar{j}$	x^2	xy	y^2
Energy C	- .1	- .1	-.7	- .5	.5	0.4	.3
Range C	- .4	- .3	-1.0	- .7	1.0	.7	.5
Visual D	- .9	- .6	-1.5	-1.0	2.3	2.0	1.0
Lands D	0	0	- .6	- .4	.4	0.2	.2
Recreation C	.1	0	- .5	- .4	.3	0.2	.2
Lands C	.4	.4	- .2	0	0	0	0
Lands B	.9	.4	.3	0	.1	0	0
Timber C	1.3	.7	.7	.3	.5	.2	.1
Energy B	1.6	.9	1.0	.5	1.0	.5	.3
Timber B	1.8	.9	1.2	.5	1.4	.6	.3
Recreation B	1.9	1.6	1.3	1.2	1.7	1.6	1.4
	$\sum i = 6.6$	$\sum j = 3.9$			$\sum x^2 = 9.2$	$\sum xy = 5.9$	$\sum y^2 = 4.3$

$\bar{i} = 6.6/11 = .6$ $\bar{j} = 3.9/11 = .4$ In this case correlation coefficient $(r_{ij}) = .918$

The eleven (11) observations here are from the eleven management alternatives used in Table 3.

basic indicator of such well being.[4]

The basic calculations for deriving correlation estimates between Regional Office staff opinions about management effects on income and housing are summarized in Table 5. The "i" column represents income and the "j" column represents housing, with differences between minuses and pluses being accounted for in each case.

Coefficients from income and housing were used to calculate input values for the equation for calculating the correlation coefficient (rij) between variable i (income) and variable j (housing).

$$rij = \frac{\sum xy}{\sqrt{(\sum x^2)\ (\sum y^2)}}$$

In this equation the sums are taken over all the estimated effects on the variables i and j, where each x is a departure from the mean of variable i and each y is a departure from the mean of variable j:

$$rij = \frac{5.9}{\sqrt{(9.2)\ (4.3)}} = \frac{5.9}{6.4}$$

$$rij = .918$$

In this case it can be stated that there is a very close correlation in the opinions of Regional Staff

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[4]Peggy J. Ross, H. Blustone and F. R. Hines, Indicators of Social Well-Being for U.S. Counties, 1979, p. 29.

professionals. Coefficients close to +1 represent a strong positive correlation or degree of agreement between responses; coefficients close to -1 represent a strong negative correlation; and coefficients close to zero represent little apparent relation between the two variables.[5]

Phase II--District Ranger Survey

The analysis of responses by the District Rangers sampled followed the same procedures used in the preceding section for Regional Office professionals. The individual responses compiled are summarized in Tables 6 and 7.

Rankings for management alternative--ICO combinations and variables are as follows:

Ranking Alternative--ICO Combinations		Ranking Variables
1. Timber	B	1. Employment
2. Visual	D	2. Recreation
3. Lands	D	3. Occupational V.
4. Energy	B	4. Income
5. Recreation	B	5. Pollution
6. Timber	C	6. Housing
7. Lands	B	7. Public Reaction

[5]Pamela J. Case, Terry D. Edgmon and Donald A. Renton, "Public--A Procedure for Public Involvement," Colorado State University, June 1976, p. 30.

TABLE 6

RANGER SURVEY

Alternative ICO Combinations \ Variables	Employment	Income	Occupational V.	Pollution	Recreation	Housing	Public Reaction
7.6 (1) Timber B	2.1	1.8	1.0	.8	.3	1.0	.6
4.2 (6) Timber C	.7	.2	.3	.3	.5	.4	1.8
5.1 (4) Energy B	1.6	.8	1.1	.7	.3	.4	1.3
- .8 (8) Energy C	0.1	.3	0.1	0.1	.3	0	-1.7
-1.3 (10) Range C	- .2	- .2	- .1	0	.1	0	- .9
4.7 (5) Recreation B	1.2	.6	.9	- .9	1.1	.3	1.5
-2.6 (11) Recreation C	- .3	- .3	- .3	.5	.2	0	-2.4
1.5 (7) Lands B	.5	.5	.5	.7	1.2	0	-1.9
- .9 (9) Lands C	0	- .7	.1	.2	.1	.1	- .7
5.4 (3) Lands D	1.3	1.0	.5	1.3	1.7	.4	- .8
7.5 (2) Visual D	1.0	1.0	.8	1.1	1.8	.5	1.3
	(1) 8.0	(4) 5.0	(3) 5.1	(5) 4.8	(2) 7.6	(6) 3.1	(7) -1.9

TABLE 7

DOMINANT RESPONSES RELATING TO EFFECTS OF
RANGER SURVEY (SUMMARY)

Alternative ICO Combinations	Employment	Income	Occupation	Pollution	Recreation	Housing	Public Reaction
Timber B	+some	+some	+v.little	-v.little	none	some	-some
Timber C	-a lot	-some	none	none	none	none	none
Energy B	+some	+some	+some	-v.little	none	none	+some
Energy C	+some	+some	none	none	none	none	-a lot
Range C	none	none	none	none	none	none	none
Recreation B	+some	+some	none/v.little	-v.little	none	none	none
Recreation C	none	none	none	none	none	none	-a lot
Lands B	none	none	none	none	+some	none	-a lot
Lands C	none	none	none	none	none	none	-some
Lands D	+v.little	+v.little	none	+some	+some	none	-some
Visual D	+v.little	+v.little	none	+some	+some	none	+some

8. Energy C

9. Lands C

10. Range C

11. Recreation C

Calculation of correlation coefficients for Forest Service effects on the income and housing variables was done in the same way as explained for Regional Office professionals. The correlation coefficient between income and housing was calculated to be .953 as summarized below:

$$rij = \frac{\sum xy}{\sqrt{(\sum x^2)\ (\sum y^2)}}$$

$$rij = \frac{2.3}{\sqrt{(5.1)\quad (1.1)}} \qquad \frac{2.3}{2.4}$$

$$rij = .953$$

The correlation between the two variables is good, and slightly better than it was shown to be for the Regional Office professionals.

Phase III--Sociologist Survey

Analysis of responses by the sociologists sampled was done in the same way as for Regional Office professionals and District Rangers. The individual responses compiled are summarized in Tables 8 and 9.

TABLE 8

PROFESSIONAL SOCIOLOGIST SURVEY

Alternative ICO Combinations \ Variables	Employ-ment	In-come	Occupa-tional V.	Pollu-tion	Recreation	Housing	Public Reaction
(3) Timber B	5.7 2.2	1.8	1.1	.4	- .2	.8	- .4
(6) Timber C	2.3 .5	.6	.7	.3	- .8	.6	.4
(4) Energy B	5.0 1.0	1.1	.5	1.5	- .1	.1	.9
(2) Energy C	5.8 1.6	1.9	1.2	.4	0	.1	.6
(7) Range C	1.5 .7	- .1	.7	.2	.1	.2	- .3
(1) Recreation B	9.6 1.6	1.9	1.2	.6	1.5	1.4	1.4
(11) Recreation C	- .9 - .2	.6	- .4	- .1	- .4	0	- .4
(5) Lands B	3.3 1.1	1.1	.6	.5	1.4	- .1	-1.3
(8) Lands C	0.8 .4	.3	.5	- .6	1.1	.4	-1.3
(10) Lands D	- .1 - .3	- .4	.1	- .2	2.3	.2	-2.0
(9) Visual D	.3 .2	.2	- .5	.6	1.8	- .1	1.2
	(2) 8.8	(1) 9.0	(4) 5.7	(5) 3.6	(3) 6.7	(6) 3.6	(7)-1.2

TABLE 9

DOMINANT RESPONSES RELATING TO EFFECTS OF PROFESSIONAL SOCIOLOGIST SURVEY (SUMMARY)

Alternative ICO Combinations	Employment	Income	Occupation	Pollution	Recreation	Housing	Public Reaction
Timber B	+some	+some	+v.little	+v.little	-v.little	none/v.little	-some
Timber C	+some	+v.little	none	+v.little	+v.little	+v.little	+some
Energy B	+v.little	+some	+v.little	+some/ -v.little	-some	none	+some
Energy C	+v.little/ +some/+a lot	+some	+v.little	+some/ +v.little/ none	+v.little/some none	none	+some
Range C	none	-some	none	none	+v.little	none	-some
Recreation B	+some	+some	+some	-some	+a lot	+v.little	+a lot
Recreation C	-some	-some	none	none	-a lot	none	-some/+a lot/ -a lot
Lands B	+some	-some	+some	+some/ -v.little	+some	none	-some
Lands C	+v.little	+v.little	+v.little	-some	+some	none	-some
Lands D	+v.little	+v.little	+v.little	-some	+some	none	-a lot
Visual D	+v.little	+v.little	none	+v.little	+some	none	+v.little

Calculation of correlation coefficients for Forest Service effects on the income and housing variables was done in the same way as for the other groups surveyed. The correlation coefficient between income and housing was calculated to be .750 as summarized below:

$$rij = \frac{\sum xy}{\sqrt{(\sum x^2)\ (\sum y^2)}}$$

$$rij = \frac{2.7}{\sqrt{(6.5)\quad(2.1)}} = \frac{2.7}{3.6}$$

$$rij = .750$$

The correlation shown is positive and reasonably strong, although not as strong as for the other groups surveyed.

Rankings for management alternative ICO combinations and variables are as follows:

Alternative ICO--Combinations		Variables
1. Recreation	B	1. Income
2. Energy	C	2. Employment
3. Timber	B	3. Recreation
4. Energy	B	4. Occupational V.
5. Lands	B	5. Pollution
6. Timber	C	6. Housing
7. Range	C	7. Public Reaction
8. Lands	C	

9. Visual D

10. Lands D

11. Recreation C

Correlations Between Coefficients for Groups Sampled

Correlation coefficients for Forest Service effects on income and housing variables have been calculated to be .918 for Regional Office professionals (Phase I), .953 for District Rangers (Phase II), and .750 for sociologists (Phase III).

Using the standard statistical method for finding a mean figure, the joint simple correlation for Phases I, II and III is .895. This demonstrates a strong correlation between the variables of income and housing.

With the two sets of rankings for Groups 1 and 2, Rank Correlation can be used to measure the degree of correspondence between the two sets of rankings for both management alternative--ICO combinations and variables.

Using the ranking obtained in Phase I in what will be referred to as the "natural order" (1, 2, ... n), all unit scores arising from this must necessarily be positive. Consequently, the contribution of the positive scores, which are designated as "P" will arise only from pairs in the

second ranking (Phase II which will be recorded in the order in which they match those in Phase I, using numbers only).

Alternative--ICO Combinations:	(Rec B)	(Tim B)	(Tim C)	(Vis D)	(Lans B)	(Rec C)
Phase I:	1	2	3	4	5	6
Phase II:	5	1	6	2	7	11

Alternative--ICO Combinations:	(Eng b)	(Lans D)	(Rng C)	(Eng C)	(Lans C)
Phase I:	7	8	9	10	11
Phase II:	4	3	10	8	9

Considering first the pairs associated with the first member of Phase II, which is 5, and recording that there are six numbers to the right of 5 that are greater than 5, the contribution to "P" is therefore +6. Taking now pairs to the right of 1 that are greater, the contribution to "P" of 9. Progressing in this way:

$$P = 6 + 9 + 5 + 7 + 4 + 0 + 3 + 3 + 0 + 1 = 38$$

The coefficient constructed from this we will denote by the Greek letter τ (tau), and the formula is

$$\tau = \frac{2P}{\frac{1}{2}n\ (n-1)} - 1$$

$$\tau = \frac{76}{55} = 1.381 - 1 = 0.38$$

When alternative impacts in Phase II are measured against those in Phase III for <u>rank correlation</u> τ is = 0.20.

and when the same exercise is performed using Phases I and III, γ is equal to 0.24. The answer in this case is near to zero and indicates very low rank correlation of alternatives. Rank correlation for the variables can also be performed in a similar manner:

	Variables						
	(Rec)	(Inc)	(Employ)	(Occu V.)	(Hsng)	(Pollu)	(P.Rec)
Phase I:	1	2	3	4	5	6	7
Phase II:	2	4	1	3	6	5	7
P =	5	3	4	3	1	1	= 17

$$\gamma = \frac{2P}{\frac{1}{2}n\ (n - 1)} - 1$$

$$\gamma = \frac{34}{21} = 0.62$$

Since the figure is nearer to one than zero we can say that there is some correlation between variable rankings of the two phases.

When Phase II is checked against Phase III for correlation of rank γ is equal to 0.71, and when this exercise is performed on Phases I and III γ is equal to 0.71.

Three sets of rankings have been considered, but the next step in the procedure is to derive a single coefficient that will show the correlation between all sets. The

calculation method used previously for comparing pairs of items in a ranking series is no longer appropriate. A statistical method must be used which permits handling a number of rankings at the same time. If a table is constructed consisting of the three sets of rankings using the designations in the matrix for establishing the ordering of management alternative--ICO combinations and variables as the correct order, and placing the ordering in which they were ranked by each of the groups, the following is obtained:

Management alternative-ICO combinations:	(Tim B)	(Tim C)	(Eng B)	(Eng C)	(Rng C)	(Rec B)
Phase I:	2	3	7	10	9	1
Phase II:	1	6	4	8	10	5
Phase III:	3	6	4	2	7	1
Total ranks	6	15	15	20	26	7

Management alternative-ICO combinations:	(Rec C)	(Lnds B)	(Lnds C)	(Lnds D)	(Vis D)
Phase I:	6	5	11	8	4
Phase II:	11	7	9	3	2
Phase III:	11	5	8	10	9
Total ranks	28	17	28	21	15

In a case such as this, consider the sum of the ranks allotted by the respondents, as shown in the last row. These numbers sum to 198, and to $\frac{1}{2}mn\ (n+1)$ where m is the number of sets and n is the number of individuals. The mean value of the sums is then $\frac{1}{2}\ m\ (n+1)$; in the present example, 18.

Considering the deviations about this mean, the following is obtained:[6]

$$-12 \quad -3 \quad -3 \quad +2 \quad +8 \quad -11 \quad +10 \quad -1 \quad +10 \quad +3 \quad -3$$

The sum of squares of the deviations in this instance is 570. The solution follows:

$$w = \frac{12S}{m^2 \ (n^3-n)}$$

$$w = \frac{12 \times 570}{9 \times 1320} = \frac{6,840}{11,880}$$

$$w = .576$$

The letter "w" in this case represents what Kendall calls Coefficient of Concordance and measures, in a sense, the communality of judgments for the three sets of responses sampled. The results of this calculation is always a number between 0 and 1, with values of "w" close to 1 representing a high level of concordance and values of "w" close to 0, a low level of concordance or agreement. The coefficient of concordance of .576 indicates a relatively high level of concordance. The corresponding figure for variables is .873.

An additional test, the chi-square test, could be used to determine whether the degree of concordance indicated by "w" exceeds what might have been expected to occur simply

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[6]Kendall, Rank Correlation Methods, p. 80.

by chance in instances where the number of items being ranked is greater than 7. Since there are only seven variables considered, the chi-square test is inappropriate.

The results of all of the previously mentioned calculations are pictured here in tabular form for ease of comprehension.

Table 10

INTERVALS, RANK CORRELATIONS AND CONCORDANCE OF i VS j FOR THE THREE PHASE IMPACT STUDY

Phase	Correlation of Intervals i vs j	Correlation of Variables	Correlation Alternative-ICO Combinations
I-RO	.92	I vs II = .62	I vs II = .38
II-Rangers	.95	II vs III = .71	II vs III = .20
II-Socio.	.75	I vs III = .71	I vs III = .24
Concordance		I vs II vs III = .87	I vs II vs III = .58

The earlier rij analysis indicated within group consistency in how the variables "income" and "housing" are related. In addition, there is useful information to be gained from observations of overall ranking consistency for all variables and all alternative--ICO combinations. From Table 10, we can see that τ progresses from .62 to .71 as comparisons are made between the groups taken two at a time. The fact that γ is always greater than .5, and therefore

closer to 1 in each case suggests a high degree of positive correlation. The same general observation can be made for the coefficient of concordance "w", which in the case of variables is closer to 1 than 0 and therefore shows high correlation when the aggregate of phases are taken together.

When the same type of observation is made for alternative--ICO combinations we also find fluctuating coefficients but with all of them being less than .5 (see Table 10), with a concordance coefficient that is also less than .5.

When the numerical values are set aside and a compilation is made of the verbal answers that occurred most frequently from each of the respective groups (none, very little, some, a lot), we get the following results from the alternative-ICO combinations as they relate to the variables (see Table 11).

Timber B

--There would be moderate increases in income, occupational type and housing improvements, with slight increase in the pollution level and some negative reaction from the public.

Timber C

--There would be little-to-moderate increase in employment and income with no effect on

TABLE 11

COMPILED RESULTS OF SOCIOECONOMIC IMPACTS*

Alternatives-ICO combinations	Employment	Income	Variations of Occupation	Pollution	Recreation	Quality and Quantity of Housing	Public Reaction
Timber B	+some	+some	+v.little	-some	inconclusive	some	-some
Timber C	+some	+v.little	none	inconclusive	none	none	-some
Energy B	+some	+some	+v.little	inconclusive	-some	none	+some
Energy C	+some	+some	none	none	none	none	-a lot
Range C	none	none	none	none	none	none	inconclusive
Recreation B	+some	+some	+some	-v.little	+a lot	none	+some
Recreation C	none	none	none	none	+a lot	none	-a lot
Lands B	none	+some	none	+some	+some	none	-some
Lands C	none	none	none	none	none	none	-some
Lands D	+v.little	+v.little	none	+some	+some	none	-some
Visual D	+v.little	+v.little	none	+some	+some	none	+some

*Projections drawn from Regional ID Team, Random Sample of 25 percent of Southern Region's Rangers and a group of Professional Rural Sociologists.

occupational type, recreation or housing and some negative from the public.

Energy B

--There would be moderate, positive effects on employment, income, and occupational type, negative effect on pollution and recreation, with no effect on housing and some positive public reaction.

Energy C

--There would be positive effects on employment and income, no effects on occupational type, pollution, recreation and housing and a great deal of negative public reaction.

Range C

--This would bring an indefinite level of negative reaction from the public with no effect on the other variables.

Recreation B

--This would bring positive effects on employment, income, job variation, recreation and public reaction, with no effect on housing and a little increase in pollution.

Recreation C

--This would bring a substantial increase to some of the paying activities in recreation by those who can afford such and a strong negative reaction from the general public.

Lands B

--This would bring no increase or decrease in employment, occupational type or housing but would cause increase in income to sellers, some increase in recreation and pollution, assuming timber is removed, with no effect on occupation and housing and some negative public reaction.

Lands C

--This will cause some negative public reaction with no effect on the other variables.

Lands D

--This would cause positive effects in employment, income, pollution and recreation with no effect on occupational type and housing and some negative public reaction.

Visual D

--This would have very small positive effects in income and employment, moderate effects on recreation, and pollution, with no effects on occupation and housing and some positive public reaction.

CHAPTER V

SUMMARY AND CONCLUSIONS

The previous chapters of this study assessed the socioeconomic impacts of alternative management actions that could be used in the implementation of the National Resources Planning Act (RPA) in the Southern portion of the United States (the South) as it is geographically defined and administered by the Forest Service. This was done by showing the probable differences in outcome for all alternative-ICO combinations when measured against selected socioeconomic variables.

The purpose of this study is to provide socioeconomic data that anticipates outcomes from different courses of management action before the decision maker decides on actions. This is being done in an effort to improve the chances of managerial success from a socioeconomic point of view. The concern was to explain the agency's relation to its socioeconomic environment and to provide information that would improve such relations through the normal managerial process.

The study started with the development of a socio-economic overview of the region which showed present conditions in the Region with regard to those groups of individuals who are dependent upon or affected by Forest Service management actions and those who are likely to be so affected if present practices continue into the future. After the baseline was set, a three-phase methodology was employed to validate claims of future impacts for each alternative-ICO combination as it related to the variables. This three-phase methodology employed the cross impact matrix as a common conceptual tool to handle the following:

1. Brainstorming or interchange among members of the Regional Interdisciplinary team and other appropriate regional officials on the probable impacts of proposed alternative management practices on selected social variables.
2. A Ranger Survey to get the opinions of land managers as to potential impacts of alternatives on selected variables.
3. Professional Sociology input was provided by sociologist from outside the Forest Service.

Rank Correlation

Rank correlation was made of mathematical calculations drawn from assigned values given to specific responses to show relationships between certain variables, but the outcomes demonstrated by the previously mentioned conceptual tool was the major emphases of the study.

In looking at rank correlation for alternative-ICO combinations a very low level of agreement or correlation between the first two phases of the study in terms of rank was found to exist. When a similar comparison was made of the Rangers in Phase II with the sociologists in Phase III the result was similar. However, the result was somewhat improved over that between Phases I and II, by a coefficient of .22 (.02 - .24, respectively). When the analysis is taken one step further and a comparison is made between the coefficients of Phases I and III, a figure of .45 is derived which is an improvement over the previous two but is still closer to 0 than 1, indicating little positive correlation.

When a similar look was taken at the variables used in the matrix a very different situation was found. Here, the rank correlation between Phase I and II are much more favorable, with a coefficient of 0.62. Since this figure is closer to 1 than 0, there is a great deal of positive

correlation between the rankings. When the same type of comparison between Phases I and III was made, the results also turn out to be favorable, with a coefficient of 0.71. This again indicates a great deal of positive correlation, with the correlation for Phases II and III being considerably better than that between Phases I and II. In continuing and measuring the correlation between Phases I and III it was revealed that this trend toward escalation continued, with the resulting coefficient of rank being 0.81. The three groups of respondents ranked the variables in very much the same way.

Coefficient of Concordance

When the rankings from all three phases of the experiments were handled at the same time the coefficient of concordance formula was used. The use of this procedure produced results that were similar to those derived from rank corelation:

$\tau > .5$ for variables

$\tau < .5$ for alternatives

$w > .5$ for variables

$w < .5$ for alternatives

In the case of alternatives there was a low level of positive concordance or agreement among the three groups in the way

they ranked the items listed in terms of importance. In the case of the variables the coefficient of concordance was found to be closer to 1 than 0 which suggests a high degree of agreement among the groups from the three phases of the experiment. They all indicated that the item first in importance was employment followed by public reaction with occupational variation being the least concern among the selected variables.

Chi-square Testing

In taking a further look at the information gained from the investigation of the alternatives, it became apparent that the significance of coefficients calculated by the use of the "chi-square test" left some doubt about the amount of confidence that could be placed in the resulting figures. A check was made here to see if the results obtained were better than what we would have had as a mere matter of chance; as it turned out, the chi-square test figure was smaller than what is needed to be 95 percent confident of that. The variables used were too small in number to allow us to use this test. However, the figures that were obtained from variables in the case of coefficient of correlation and coefficient of concordance would suggest that a higher degree of confidence could be placed in the

rank figures obtained for variables than that of alternatives. These facts are more important to the researcher than the decision maker, because the researcher is investigating these findings in order to be in a position to give the decision maker better advice and to use this information as justification for the advice that he or she gives. This is necessarily the case because of its reference to the bases on which we started the investigation in the first place--to give the decision maker the best advice available in the time frame on the alternatives that would be best from a socioeconomic point of view.

Dominant Group Responses

In order to get the form of information that is most useful for direct decision making the writer went back to the representative expressions or dominate answers given by the groups in the three phases of the experiment as they appeared on the cross impact matrix.

When tallies were taken of responses chosen for measurement the greatest point totals were found to have been scored on a consistent basis by the "B" alternative-ICO combinations. The one "Visual D" alternative was also high. The "B" alternative had basically to do with managing the various Forest Service resources to benefit those

disadvantaged people living on and around the respective districts. Rated highest among the "B" resource items (ICO's) was recreation. This observation is in keeping with a point made in the Region's Environmental Impact Statement and the 1980 RPA Assessment. These documents point out that recreation use of the National Forests has increased 37 percent since the last decade.[1] In this regard the Southern Region, like other National Forest Service lands, is a major provider of forest and water based recreation activities.

The National Forests of the Eastern United States (both Northeast and Southeast) are said to have a disproportionate share of the role of providing outdoor recreational opportunities to the American people. In light of the population growth in the South, the role of the National Forests in recreation is likely to become increasingly important in decisions made by forest service managers.[2]

Not only was "Recreation B" rated higher than all other items when the dominant answers of the three groups were taken together, it is rated higher than any other resource alternative by the Regional Office Staff

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[1]Forest Service, "Environmental Impact Statement," U.S. Department of Agriculture, June 1981, p. 90.

[2]Ibid.

Professionals and the Sociologists. Unexpectedly the highest rated item on this basis by the Rangers (resource managers) was a non-resource item--"Visual D," which is also classified under recreation in the Forest Service's management procedure.

From these data it would seem that the group, both when taken separately and as a composite, gave greater emphasis to non-economic than to economic considerations. In fact the "C" alternative-ICO combinations (economic efficiency) received the lowest rating of all. It is also interesting to observe that the land managers rated economic consideration lowest in every case.

Conclusion

When the previously mentioned levels of agreement were examined for correlation between alternatives in Phases I and II, it was revealed that there was very little such agreement. A similar situation was found when a test was made for the levels of agreement among all three phases in looking for the "coefficient of concordance." Although the groups differed considerably in the way they ranked the alternatives, a strong pattern developed with regard to the preference of the "B" alternative.

Therefore, from the standpoint of socioeconomic

considerations it is concluded that the decision maker is best advised to select the "B" alternative-ICO combination. In giving this advice the writer stresses that it is from the socioeconomic point of view. This point is stressed with the full realization that this is but one of many considerations that must be made before arriving at a final decision.*

The three groups used in this study are available to the Forest Service decision maker on a continuing basis but with differences in response time.

The Regional ID Team members will remain either in their present positions or in different positions within the Forest Service organization on career appointments. Getting future responses from this group either as an assembled body or individually should remain relatively easy and relatively quick.

The professional land managers (Rangers) should remain a source of rather easy and prompt input to the decision maker for the same reasons given for members of the ID Team.

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*Although Alternative-ICO combination "B" was believed to be the most important from the socioeconomic point of view, Alternative-ICO combination "C" was the final joint recommendation given from all of the input disciplines when taken together. Though it is not known for sure, speculation has it that this was due to what was believed to be the mood of the administration in office at the time.

The views of the professional sociologists used in this study could be obtained by the Forest Service decision maker in the future by contacting them individually from the list of such names and addresses collected by the writer and filed in the Regional planning process records. Since these individuals are not employees of the Forest Service they might not be as readily available as employees and more time would probably be required to get their input on this basis.

Perhaps the best way to get input from the same group of individuals or a similar group would be to seek such input at annual meetings of the Sociology Section of the Southern Association of Agricultural Scientists. Any input effort greater than this, if assembled questionnaires are involved, would require approval of the Federal Office of Management and Budget. If input from this group proves to be a continuing need, the Regional Office could work out a consultant contract with the group. However, for planning purposes the writer believes that contact at the annual meetings is adequate.

A P P E N D I C E S

APPENDIX A

STATISTICAL PROFILE OF REGION 8 SUMMARY

According to 1970 Census Figures
(Preliminary figures for 1980 population included)

TABLE 12

COUNTY BY COUNTY SUMMARY

National Forest	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970 - 75 Migration (Percent)
Alabama	594,297	639,648	29.7	27.7	34.0	.1
Arkansas	649,572	766,494	10.1	25.7	24.7	11.0
Florida	417,228	598,969	24.8	21.0	37.6	20.3
Georgia	496,826	518,386	20.5	21.0	18.5	6.7
Kentucky	355,203	432,076	2.1	41.2	15.0	3.7
Louisiana	277,087	321,162	31.8	27.6	42.8	- 3.5
Mississippi	892,220	1,021,485	36.0	33.0	28.6	-12.3
North Carolina	934,680	1,049,649	9.2	31.1	17.8	3.3
Oklahoma	60,815	71,761	9.5	30.9	31.5	13.5
South Carolina	611,491	691,201	36.8	31.0	31.9	-16.8
Tennessee	414,854	478,503	2.9	21.7	30.9	3.3
Texas	254,464	394,086	28.1	25.9	32.1	14.1
Virginia	765,916	930,504	5.5	19.1	29.0	5.5
Total	6,654,653	7,913,926	19.0	25.9	28.8	3.8
Jefferson NF Located in Kentucky						
	84,224	111,030	1.8	19.3	52.4	1.7
NFs in West Virginia attached to George Washington NF						
	27,596	32,850	2.7	25.5		4.9
NFs in West Virginia attached to the Jefferson NF						
	11,272		6.1	29.2		4.4

TABLE 13

NATIONAL FORESTS IN ALABAMA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Bankhead	Franklin	22,933	28,280	5.3	23.5	32.6	6.7
	Lawrence	27,281	30,141	19.0	27.3	--	- 4.0
	Winston	16,654	21,767	.6	22.8	24.8	11.5
Conecuh	Covington	34,079	36,216	15.5	24.7	56.9	.4
	Escambia	34,912	38,380	31.0	25.5	43.1	2.0
Talladega	Bibb	13,812	15,501	29.0	30.0	--	1.2
	Calhoun	103,092	119,803	18.9	16.7	64.5	- 1.3
	Clinton	25,180	30,381	14.0	24.8	23.3	8.5
	Clay	12,636	13,706	16.4	28.8	--	1.4
	Cleburne	10,996	12,642	6.2	22.6	27.3	3.0
	Dallas	55,296	52,919	53.8	31.6	49.5	- 3.2
	Hale	15,888	15,304	66.6	44.7	21.2	6.7
	Perry	15,388	14,872	59.3	41.5	27.9	-17.0
	Talladega	65,280	73,718	31.3	20.9	53.3	- 4.3
	Tuscaloosa	116,029	136,081	25.4	19.9	74.0	1.9
Tuskegee	Macon	24,841		82.8	37.4	44.0	.4
Total		594,297	639,648	29.7	27.7	34.0	.1
State		3,444,354	3,890,061	28.1	20.7	58.4	.6

TABLE 14

NATIONAL FORESTS IN ARKANSAS*

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Ouachita	Garland	54,131	68,365	15.3	19.3	65.8	14.2
	Hot Springs	21,963	26,588	13.8	18.0	39.9	5.5
	Howard	11,412	13,164	21.2	19.3	35.2	12.8
	Logan	16,789	19,391	4.2	27.7	42.1	5.9
	Montgomery	5,821	7,710	1.8	29.7	--	11.4
	Perry	5,634	7,232	4.5	31.2	--	19.5
	Pike	8,711	10,241	5.3	24.8	--	10.8
	Polk	13,297	16,838	2.5	24.4	34.1	10.2
	Saline	36,107	51.231	5.0	11.2	46.0	15.0
	Scott	8,207	9,611	.2	28.5	--	11.3
	Sebastion	79,237	93,458	8.5	12.9	82.1	34.2
	Yell	14,208	16,772	3.7	20.0	23.2	14.2
Ozark	Baxter	15,319	27,151	7.3(#Black)	23.8	25.7	38.6
	Benton	50,476	76,736	2.9(#Black)	16.8	45.0	15.7
	Conway	16,805	19,236	16.6	24.1	43.0	1.6
	Crawford	25,677	36,456	2.9	21.9	32.6	14.6
	Franklin	11,301	14,170	3.7	23.6	23.2	5.1
	Johnson	13,630	17,011	4.1	25.6	35.1	14.5
	Logan		(Given above)				
	Madison	9,453	11,307	1.6	33.3	--	5.0
	Marion	7,000	11,262	3.7	30.5	--	31.5
	Newton	5,844	7,725	.7	41.9	--	12.2
	Pope	28,607	37,564	4.0	21.6	41.1	14.9
	Searcey	7,731	8,782	.3	35.4	--	5.7
	Stone	6,838	8,968	1.9	41.3	--	16.5
	Van Buren	8,275	13,317	2.1	32.5	--	18.0
	Washington	77,380	94,056	2.1	15.0	--	10.9
	Yell		(Given above)				
	St. Francis	30,799	30,653	48.6	34.8	40.7	- 5.7
	Lee	18,884	15,389	58.4	43.8	32.8	-11.4
	Phillips	40,046	34,472	55.5	38.1	53.8	-24.0
Total		649,572	Av. 804,856	10.1	25.7	24.7	11.0
State		1,923,322	2,234,011	18.5	22.9	50.0	6.5

*Both the Oz. and that portion of the Oua. located in that state.

TABLE 15

NATIONAL FORESTS IN FLORIDA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Appalachi-cola	Franklin	7,065	7,530	23.2	31.3	44.5	7.5
	Leon	103,047	146,152	30.8	13.8	75.6	19.5
	Liberty	3,379	4,223	14.3	28.5	--	7.4
	Wakulla	6,308	10,694	25.8	26.9	--	39.7
Ocala	Lake	69,305	103,853	25.5	17.6	43.4	28.2
	Marion	69,030	118,140	33.5	20.2	40.4	63.4
	Putnam	36,424	48,755	31.3	21.1	25.7	16.1
Osceola	Baker	9,242	15,278	21.5	18.4	29.6	3.2
	Columbia	25,250	34,625	27.1	19.9	56.2	8.7
Chactaw-chee (Newly Added)	Okaloos	88,178	109,717	14.7	12.1	62.0	9.2
Total		417,228	598,969	24.8	21.0	37.6	20.3
State		6,791,418	9,739,992	33.5	12.7	80.5	20.7

TABLE 16

NATIONAL FORESTS IN GEORGIA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Chattachoo-	Banks	6,833	7,448	5.7	23.0	--	4.3
chee	Catoosa	28,271	36,989	1.2	11.3	46.4	7.9
	Chattooga	20,541	21,825	9.9	15.8	24.6	4.3
	Dawson	3,639	4,748	.8	25.9	--	13.1
	Fannin	13,357	14,781	.6	22.6	--	4.0
	Floyd	73,742	79,839	13.6	13.1	49.6	1.0
	Gilmer	8,956	11,126	.8	24.6	--	10.8
	Gordon	23,570	29,921	5.7	12.8	20.1	10.6
	Habersham	20,691	25,585	6.9	16.5	14.6	7.5
	Lumpkin	8,728	10,613	2.8	23.5	34.1	3.5
	Murray	12,986	19,654	.5	12.0	20.8	16.6
	Rabun	8,327	10,184	1.4	21.2	--	8.3
	Stephens	20,331	21,251	12.6	15.8	33.0	4.4
	Towns	4,565	5,619	.4	31.2	--	6.4
	Union	6,811	9,270	.3	35.4	--	13.9
	Walker	50,961	56,826	5.4	13.4	42.8	2.8
	White	7,742	10,008	5.3	20.9	--	4.8
	Whitfield	55,108	65,725	4.5	11.0	34.2	.8
Sub-Total		436,441	441,418	4.4	17.5	17.8	6.9

TABLE 16--Continued

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Oconee	Greene	10,300	11,318	51.8	26.8	51.8	.3
	Jasper	6,000	7,229	49.4	32.2	--	13.4
	Jones	12,270	16,138	38.8	17.0	15.5	15.2
	Morgan	7,904	11,350	45.2	29.5	24.8	1.7
	Oconee	7,915	12,133	16.8	19.6	--	11.1
	Oglethorpe	7,598	8,885	4.9	24.4	--	1.1
	Putnam	8,398	9,915	49.8	21.9	50.4	- 1.1
Sub-Total		60,385	76,968	36.7	24.5	20.4	6.1
Total		496,826	518,386	20.5	21.0	18.5	6.7
State		4,587,930	5,464,265	28.2	16.8	60.3[1]	1.7[2]

[1] Growth has taken place in both urban and rural counties.

[2] Most of the migration figures were negative from 1960 to 1970.

TABLE 17

NATIONAL FORESTS IN KENTUCKY

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Daniel Boone	Bath	9,235	9,994	4.5	31.2	--	- 2.2
	Estill	12,752	14,506	.4	33.4	22.8	.9
	Jackson	10,005	11,932	.2	50.0	--	- .4
	Laurel	27,386	38,402	1.5	34.6	15.8	9.5
	Lee	6,587	7,660	1.2	48.4	--	3.8
	McCreary	12,548	15,557	1.7	13.3	--	9.7
	Madison	42,730	53,315	7.9	19.0	55.7	7.1
	Menifee	4,050	5,080	.9	32.0	--	3.9
	Morgan	10,019	12,080	.4	43.5	--	1.2
	Onsley	5,023	5,704	.3	61.6	--	.4
	Powell	7,704	11,073	1.6	28.1	--	5.0
	Pulaski	35,243	45,697	2.2	29.3	29.6	11.5
	Rockcastle	12,305	13,929	.1	36.1	--	.9
	Rowan	17,010	19,026	3.0	26.9	42.3	- 3.3
	Wayne	14,268	16,984	2.7	50.1	27.5	6.5
	Whitley	24,145	32,697	1.2	39.7	40.8	15.2
	Wolfe	5,669	6,712	.2	59.0	--	3.7
Red Bird	Bell	31.121	32,255	3.9	39.3	48.2	1.2
	Clay	18,418	22,659	2.1	57.6	--	6.4
	Harlen	37,370	41,993	7.8	36.2	17.8	2.5
	Leslie	11,623	14,821	.1	55.5	--	.4
Total		355,203	432,076	2.1	41.2	15.0	3.7
State		3,220,711	3,661,433	9.5	19.3	52.4	1.7

TABLE 18

NATIONAL FORESTS IN LOUISIANA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Kisatchie	Claiborne	17,024	17,133	50.6	33.2	46.6	- 5.0
	Grant	13,671	16,746	23.5	29.2	--	1.8
	Natchitoches	35,219	39,243	38.6	37.9	45.4	- 2.0
	Rapides	118,078	134,341	30.8	21.7	52.1	- 1.9
	Vernon	53,794	53,058	16.0	19.0	60.9	- 9.7
	Webster	39,939	43,402	32.0	21.2	51.2	- 3.8
	Winn	16,369	17,239	30.8	32.3	43.6	- 3.7
Total		277,087	321,162	31.8	27.6	42.8	- 3.5
State		3,644,637	4,203,972	33.6	21.6	66.1	- 1.0

TABLE 19

NATIONAL FORESTS IN MISSISSIPPI

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Bienville	Jasper	15,994	17,430	46.5	40.5	--	- 1.5
	Newton	18,983	19,708	27.6	29.6	18.7	1.8
	Scott	21,369	24,466	33.1	32.6	31.4	- 2.0
	Smith	12,561	15,027	21.4	32.9	--	2.7
Delta	Issaquena	2,737	2,518	62.1	42.7	--	-17.4
	Warren	44,981	51,578	42.9	22.3	56.9	.6
	Sharkey	8,937	7,976	66.4	46.8	64.7	-17.3
Desota	Forrest	58,849	64,888	26.2	21.9	77.7	- .2
	George	12,459	15,256	13.1	21.6	--	2.9
	Greene	8,545	9,825	22.6	38.8	--	- 2.0
	Harrison	134,582	155,743	22.2	17.4	83.2	1.3
	Jackson	87,975	117,994	19.6	11.3	71.6	11.0
	Jones	56,357	61,659	22.5	22.6	51.1	1.2
	Marion	22,871	25,747	31.6	36.8	32.8	.6
	Pearl River	27,802	33,698	19.7	26.1	37.6	- 5.0
	Perry	9,065	9,990	26.4	30.8	--	3.2
	Stone	8,101	9,747	23.5	23.4	36.2	- .9
	Wayne	16,650	18,437	33.3	37.3	26.2	1.4
Holly Springs	Benton	7,505	8,158	42.0	38.2	--	- 5.7
	Lafayette	24,818	31,081	29.7	28.6	57.5	7.0

TABLE 19--Continued

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
	Marshall	24,027	29,246	62.4	44.1	23.8	7.6
	Pontotoc	17,363	20,942	18.5	32.4	19.9	10.1
	Tippah	15,852	18,714	16.4	31.8	22.0	7.0
	Union	19,096	21,763	15.9	27.6	33.7	5.1
	Yalobusha	11,915	13,133	41.6	37.4	30.2	1.1
Homochitta	Adams	37,293	38,171	49.4	28.7	52.8	- 1.7
	Amite	13,763	13,354	50.7	42.1	--	- 8.4
	Copiah	24,764	26,299	51.2	35.9	35.0	- .4
	Franklin	8,011	8,202	38.9	37.8	--	2.7
	Jefferson	9,295	9,168	75.3	59.0	--	-11.6
	Lincoln	26,198	30,130	31.2	29.9	40.8	- 3.0
	Wilkerson	11,088	10,008	68.9	47.9	--	-15.1
Tombigbee	Chickasaw	16,805	17,818	35.8	32.1	34.0	- .8
	Choctaw	8,440	8,938	28.2	35.3	--	6.4
	Oktibbeha	28,752	35,270	37.3	28.8	55.9	3.5
	Pontotoc		(Listed above)				
	Winston	18,406	19,493	39.2	32.9	35.7	3.5
Total		892,220	1,021,485	36.0	33.0	28.6	-12.5
State		2,216,994	2,520,638	38.2	29.0	44.5	.5

TABLE 20

NATIONAL FORESTS IN NORTH CAROLINA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent	Urban (Percent)	Net 1970-75 Migration (Percent)
Croatan	Carteret	31,603	40,794	13.5	16.6	27.2	- .7
	Craven	62,554	70,631	28.8	19.1	55.2	.6
	Jones	9,779	9,673	45.5	29.8	--	- 5.8
Nantahala	Cherokee	16,330	18,940	3.5	25.2	--	1.5
	Clay	5,180	6,593	1.6	34.7	--	- 6.3
	Graham	6,562	7,194	1.0	24.8	--	- 4.4
	Jackson	61,737	25,878	21.8	25.4	--	10.2
	Macon	15,778	20,138	3.7	24.9	--	14.0
	Swain	8,835	10,240	4.0	4.0	26.9	- 6.5
	Transylvania	19,713	23,316	7.1	13.4	--	3.9
Pisgah	Avery	12,655	14,422	1.3	29.3	--	7.9
	Buncombe	145,056	160,265	11.2	13.6	52.3	2.2
	Burke	60,364	72,357	9.1	10.0	28.5	2.5
	Caldwell	56,699	--	6.8	12.0	31.0	1.4
	Haywood	41,710	46,449	3.0	15.9	27.6	2.4
	Henderson	42,804	58,088	8.1	19.9	28.0	12.5
	McDowell	30,648	35,013	5.8	15.0	31.1	5.4
	Madison	16,003	16,791	.9	32.1	--	4.0
	Mitchell	13,447	14,391	.3	28.0	--	2.7

TABLE 20--Continued

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
	Transylvania		(Listed above)				
	Watauga	23,404	--	2.1	22.3	37.4	19.3
	Yancy	12,629	14,955	1.8	30.5	--	7.3
Uwharrie	Davison	95,627	112,681	10.5	10.5	37.0	1.0
	Montgomery	19,267	22,355	25.1	19.8	24.8	- .2
	Randolph	76,358	91,187	8.1	9.9	30.0	3.5
Yadkin	Caldwell		67,374				
	Watauga		31,611				
	Wilkes	49,524	58,323	5.7	20.3	6.9	5.1
Total		934,680	1,049,659	9.2	21.1	17.8	3.3
State		5,084,411	5,874,429	24.1	16.5	45.0	2.7

TABLE 21

NATIONAL FORESTS IN OKLAHOMA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Ouachita	LeFlore	32,173	40,199	4.4	29.4	31.7	7.6
	McCurtain	28,642	35,872	14.5	32.4	31.2	19.2
Total		60,815	76,071	9.5	30.9	31.5	13.4
State		2,559,463		10.3	15.1	68.0	2.6

TABLE 22

NATIONAL FORESTS IN SOUTH CAROLINA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Francis Marion							
	Berkeley	56,199	89,100	33.1	26.1	41.5	6.3
	Charleston	247,565	269,353	35.7	19.5	82.0	- .5
Sumter	Abberville	21,112	22,806	31.4	16.9	26.2	- .8
	Chester	29,811	30,024	39.7	20.6	32.8	- 3.0
	Edgefield	15,692	17,647	51.9	30.3	34.6	- .7
	Fairfield	19,999	20,614	59.8	31.5	17.1	- 4.7
	Greenwood	49,686	56,681	28.8	11.4	42.4	1.7
	Laurens	49,713	51,049	29.0	13.0	38.4	- 1.4
	McCormick	7,955	7,724	60.8	34.4	--	- 6.5
	Newberry	29,273	30,946	33.5	16.6	31.5	2.0
	Oconee	40,728	48,604	11.5	15.1	30.0	2.5
	Saluda	14,528	16,037	34.0	22.5	1.7	- 5.3
	Union	29,230	30,625	29.0	15.5	36.9	- .6
Total		611,491	691,201	36.8	21.0	31.9	-16.8
State		2,590,835	3,119,208	32.3	19.1	47.6	3.4

TABLE 23

NATIONAL FORESTS IN TENNESSEE

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Cherokee	Carter	43,259	50,051	1.9	19.8	28.8	2.4
	Cocke	25,283	28,711	3.3	29.3	29.0	6.0
	Green	47,630	54,157	3.1	21.1	28.0	1.2
	Johnson	11,569	13,753	1.1	30.4	--	6.3
	McMinn	35,462	41,567	5.8	18.2	43.8	7.8
	Monroe	23,475	28,585	5.0	26.1	29.6	3.8
	Polk	11,669	13,525	0.6	21.8	--	- 1.1
	Sullivan	127,329	143,178	30.0	13.3	55.8	1.0
	Unicoi	15,254	16,341	.8	19.8	47.4	- .4
	Washington	73,924	88,635	5.1	16.9	45.7	6.0
Total		414,854	478,503	2.9	21.7	30.9	3.3
State		3,926,018	4,590,750	16.5	18.3	58.8	2.9

TABLE 24

NATIONAL FORESTS IN TEXAS

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Angelina	Angeline	49,349	63,987	18.3	15.0	53.9	5.5
	Jasper	24,692	30,741	24.1	20.9	25.3	5.6
	Nacogdoches	36,362	46,705	22.7	19.8	62.0	14.6
	San Augustine	7,858	8,578	34.1	33.2	32.3	2.4
Sub-total		118,261					
Davey Crockett	Houston	17,855	22,260	42.3	33.0	37.1	- .5
	Trinity	7,628	9,437	29.8	28.5	29.2	3.1
Sub-total		25,483					
Sabine	Jasper		(Counted above)				
	Sabine	7,187	8,714	24.3	30.9	--	2.4
	Shelby	19,672	23,087	25.1	26.8	25.4	1.9
	San Augustine		(Counted above)				
Sub-total		27,859					
Sam Houston	Montgomery	49,476	127,702	14.3	15.5	24.2	63.6
	San Jacinto	6,702	11,372	43.3	38.3	--	26.1
	Walker	27,680	41,680	30.6	23.1	63.4	30.7
Sub-total		83,861					
Total		254,464	394,086	28.1 (Average)	25.9	32.1	14.1
State		11,198,655	14,228,383	22.2	14.7	79.8	3.7

Most of the migration figures were negative from 1960 - 1970.

TABLE 25

NATIONAL FORESTS IN VIRGINIA

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
George Washington	Allegheny	12,461	13,685	3.8	15.2	--	-10.3
	Amherst	26,072	28,980	22.9	12.4	29.4	2.5
	Augusta	44,220	53,651	5.8	12.4	--	8.3
	Bath	5,192	5,776	12.0	24.9	--	8.5
	Botetourt	18,193	23,294	9.4	11.3	--	10.4
	Frederick	24,107	33,934	3.8	11.4	--	9.9
	Highland	2,529	2,957	.4	21.9	--	5.5
	Nelson	11,702	12,206	29.2	28.6	--	- 1.1
	Page	16,851	19,279	4.0	16.9	22.9	8.7
	Rockbridge	16,637	17,878	5.4	16.6	--	- 1.2
	Rockingham	47,890	56,348	2.6	10.9	6.2	5.9
	Shenandoah	22,853	27,315	2.7	12.9	--	13.0
	Warren	15,301	21,035	8.2	10.0	55.8	18.3
Sub-total		264,008	316,338	8.5	15.9	28.6	6.0
Jefferson	Bedford	26,242	34,814	17.9	14.7	1.8	9.8
	Bland	5,423	6,346	2.5	20.0	--	.1
	Betetourt		(Figures given above)				
	Buchanan	32,071	37,407	.3	27.2	--	- 1.6
	Carroll	23,092	27,094	.7	20.5	--	1.2
	Craig	3,524	3,966	1.1	18.0	--	8.3
	Dickerson	16,077	19,718	1.3	34.0	--	6.4
	Giles	16,741	17,753	3.4	16.9	--	- 4.7
	Grayson	15,439	16,283	4.2	20.0	--	- 2.6

TABLE 25--Continued

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
	Lee	20,231	25,885	1.0	39.7	--	16.2
	Montgomery	47,157	63,034	6.2	10.7	36.6	18.2
	Pulaski	29,564	35,108	7.0	11.8	34.6	5.6
	Roanoke	53,817	72,658	5.3	6.2	63.5	11.8
	Rockbridge		(Figures given above)				
	Russell	24,533	31,356	1.5	25.4	--	1.9
	Scott	24,376	24,981	1.5	27.0	--	- .5
	Smyth	31,349	33,053	1.5	14.8	32.6	- .3
	Tazewell	39,816	50,420	4.5	21.8	35.6	8.6
	Washington	36,033	46,548	2.8	19.7	11.7	5.3
	Wise	35,194	42,343	3.3	27.4	19.6	9.9
	Wythe	22,139	25,499	4.5	15.0	26.5	2.8
Sub-total		501,909	614,166	over 3.7	over 20.5	29.2	5.0
Total		765,916	930,504	5.5	19.1	29.0	5.5
State		4,651,448	5,346,279		12.4	63.1	2.0

TABLE 26

NATIONAL FOREST LANDS LOCATED IN KENTUCKY BUT CONNECTED TO THE JEFFERSON NATIONAL FOREST

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
Jefferson	Letcher	23,165	30,253	2.4	40.1	11.0	10.1
	Pike	61,059	80,777	1.2	32.2	7.5	7.2
Total		84,224	111,030	1.8	36.2	9.3	8.7
State		3,220,711	3,661,433	9.5	19.3	52.4	1.7

TABLE 27

NATIONAL FOREST LANDS IN WEST VIRGINIA THAT ARE CONNECTED TO THE GEORGE WASHINGTON AND JEFFERSON NATIONAL FORESTS

Ranger District	County	1970 Population (Number)	1980 Population (Number)	Minority (Percent)	Below Poverty Level (Percent)	Urban (Percent)	Net 1970-75 Migration (Percent)
George Washington							
	Hampshire	11,710	14,864	1.9	20.8	--	7.7
	Hardy	8,855	10,051	3.4	26.9	--	2.0
	Pendleton	7,031	7,935	2.8	28.7	--	4.8
Total		27,596	32,850	2.7	25.5	--	4.9
Jefferson	Monroe	11,272		6.1	29.2	--	4.4
State		1,744,237	1,930,787	8.0	18.1	39.0	.6

APPENDIX B

DETAILED RESULTS OF PARTICIPANT RESPONSES

TABLE 3

RESULTS OF BRAINSTORMING AND WRITTEN INFORMATION OF STAFF

Alternative ICO Combinations	Employment		Income		Occupation		Pollution		Recreation		Housing		Public Reaction	
9 - 19	+some	4	+some	4	+some	3	-some	2	+some	2	+v.little	3	-some	3
(2) Timber B	+a lot	2	+v.little	2	+v.little	2	-v.little	1	none	2	-v.little	1	-a lot	1
	+v.little	1	+a lot	1	+a lot	1	-a lot	1	-a lot	1	+some	1	+some	1
					none	1	+some	1	-v.little	1	+a lot	1	+a lot	1
							+v.little	1	-some	1	none	1	+v.little	1
							none	1						
6 - 13	+some	4	+some	3	+v.little	3	-some	3	none	2	none	3	-v.little	2
(8) Timber C	-some	1	+a lot	2	-v.little	1	none	2	+some	2	+v.little	2	none	2
	+a lot	1	-v.little	1	-some	1	-v.little	1	-some	2	+a lot	1	+v.little	1
	-v.little	1	-some	1	+a lot	1	+v.little	1	+v.little	1	-v.little	1	-a lot	1
					none	1							+some	1
8 - 22	+some	4	+some	4	+v.little	3	-a lot	4	-some	3	none	3	-some	4
(4) Energy B	+v.little	3	+v.little	3	+some	2	+some	1	-v.little	2	-v.little	2	+some	2
					-v.little	1	-v.little	1	-a lot	1	+some	1	-v.little	1
					+a lot	1	-some	1	none	1	+a lot	1	-a lot	1
9 - 14	+some	2	+some	2	+some	2	-a lot	3	none	5	none	4	-a lot	2
(3) Energy C	-some	1	-some	1	+v.little	2	-some	2	-some	2	-v.little	1	-v.little	2
	-v.little	1	+v.little	1	none	2	-v.little	1			+v.little	1	+some	1
	+a lot	1	-v.little	1	+a lot	1	none	1			+a lot	1	-some	1
	none	1	-a lot	1									none	1
	+v.little	1	none	1										
3	none	3	-some	2	none	5	none	4	none	4	none	6	-v.little	3
(11) Range C	+v.little	2	none	2	+some	1	-some	1	-v.little	1	-v.little	1	none	2
	-a lot	1	-a lot	1	-some	1	+some	1	+some	1			+some	1
	-some	1	+a lot	1			+v.little	1	+a lot	1			-some	1
			+v.little	1										
11	+some	4	+some	4	+some	4	-some	3	+a lot	4	none	4	+some	3
(1) Recreation B	+v.little	2	+v.little	2	+v.little	2	-v.little	2	+v.little	2	+v.little	2	+a lot	2
	+a lot	1	+a lot	1	+a lot	1	none	2	none	1	+a lot	1	-some	1
													-a lot	1
													+v.little	1
													none	1
4	+v.little	2	+v.little	2	-v.little	2	none	4	+a lot	2	none	5	+v.little	2
(10) Recreation C	none	2	none	2	+v.little	2	-some	2	-v.little	1	+v.little	1	-v.little	1
	+some	1	+some	1	none	2	+v.little	1	+v.little	1	-v.little	1	-a lot	1
	-v.little	1	-v.little	1	+some	1			+some	1			+some	1
	-some	1	-some	1					-some	1			+a lot	1
									none	1			none	1
6 - 26	none	3	+a lot	2	none	3	+some	4	+some	5	none	4	-some	4
(7) Lands B	+some	2	-some	2	-some	2	-some	1	+v.little	1	+some	3	-a lot	2
	-v.little	2	+some	2	-a lot	1	-v.little	1	+a lot	1			+some	1
			none	1	+some	1	none	1						
5	none	4	none	4	none	3	+some	3	+some	2	none	5	-a lot	3
(9) Lands C	-some	1	-some	1	-some	1	none	2	none	2	+some	1	-some	2
	+some	1	+some	1	-v.little	1	-v.little	1	-some	1	-some	1	-v.little	1
	-v.little	1	+a lot	1	-a lot	1	+v.little	1	-v.little	1			none	1
					+some	1			+v.little	1				
7	-v.little	3	-v.little	2	none	4	+some	3	+some	4	none	4	-some	4
(6) Lands	none	2	+some	2	-v.little	2	-v.little	1	+a lot	2	-v.little	1	+some	2
	+v.little	1	-a lot	1	-some	1	+v.little	1	none	1	-a lot	1	-a lot	1
	-a lot	1	+v.little	1			-a lot	1			+some	1	-v.little	1
			none	1			none	1						
8 - 10	none	4	-v.little	3	none	4	+some	3	+some	3	none	5	+some	4
(5) Visual D	-v.little	2	none	3	-v.little	3	none	3	+a lot	2	-a lot	1	+a lot	2
	-a lot	1	-a lot	1			+a lot	1	+v.little	1	-v.little	1	none	1
									none	1				
	(5) 8		(3) 11		(6) 7-11		(4) 10		(2) 14		(7) 7-5		(1) 19	

NOTE: The figures to the extreme left in parentheses represent the order of ranking in terms of importance for the management alternative--socioeconomic variable combinations. These rankings were established by tallying the "a lot" responses. In cases where there were ties between the tallys of two or more alternatives, then a secondary tally was made of the "some" category. Figures shown above each of the alternatives were derived from a tie breaking procedure among rankings. E.g., 9 - 19 above Timber B states that the tally of "a lot" ended in a tie between Timber B and another Alternative so I then tallied the "some" category which produced the figure 19 which is higher than the "some" figure for the Alternative where there was a previous tie.

The above mentioned exercise was also used for the variables shown on the horisontal axis.

TABLE 6

RANGER SURVEY

Alternative ICO Combinations	Employment		Income		Occupation		Pollution		Recreation		Housing		Public Reaction	
22	+some	11	+some	14	+v.little	15	-v.little	14	none	12	+v.little	10	+some	12
(3) Timber B	+a lot	9	+v.little	6	+some	5	none	8	+some	6	none	8	-v.little	5
	+v.little	6	+a lot	6	none	6	-some	4	+v.little	3	+some	7	-some	5
									-some	3	+a lot	1	+a lot	3
									-v.little	2			-a lot	1
28	-a lot	7	-some	5	none	10	none	11	none	12	none	12	-some	11
(2) Timber C	+some	4	-a lot	4	+v.little	4	-v.little	5	+v.little	7	-v.little	4	-a lot	8
	-v.little	4	+some	4	-v.little	4	+v.little	5	+some	3	+some	3	-v.little	3
	-some	3	+v.little	3	-some	3	+some	3	-v.little	2	-some	3	+some	3
	+v.little	3	none	5	+a lot	2	-some	1	-some	1	+v.little	3	none	1
	none	4	+a lot	3	+some	3	+a lot	1	+a lot	1	+a lot	1		
	+a lot	1	-v.little	2										
20 - 55	+some	11	+some	2	+some	9	-v.little	12	none	12	none	18	+some	8
(5) Energy B	+v.little	7	+v.little	7	+v.little	7	none	7	+v.little	7	+v.little	6	+a lot	7
	none	4	none	4	none	5	-some	5	-v.little	2	+some	1	+v.little	4
	+a lot	4	+a lot	3	+a lot	2	+some	2	+some	2	+a lot	1	-some	3
					-v.little	3			-some	2			none	3
									+a lot	1			-v.little	1
13	+some	7	+some	6	none	12	none	12	none	11	none	19	-a lot	10
(9) Energy C	none	6	none	6	-some	3	+v.little	7	+v.little	5	-v.little	4	-some	7
	-some	4	-some	5	-v.little	3	-v.little	5	+some	5	+some	1	-v.little	3
	-v.little	4	-v.little	3	+some	3	+some	1	-v.little	4	+v.little	2	none	5
	+v.little	4	+v.little	5	+v.little	4	-some	1	-some	1			+some	1
	-a lot	1	+a lot	1	-a lot	1								
2	none	18	none	18	none	20	none	20	none	18	none	23	none	11
(11) Range C	-v.little	6	-v.little	6	-v.little	4	-v.little	3	-v.little	4	-v.little	1	-some	8
	+v.little	2	+v.little	2	+v.little	2	+v.little	3	+some	2	+v.little	2	-v.little	3
									+v.little	2			-a lot	2
													+v.little	2
14 - 54	+some	10	+some	11	none	8	-v.little	14	none	10	none	16	+some	10
(8) Recreation B	+v.little	8	+v.little	7	+v.little	8	none	7	+some	6	+v.little	7	+a lot	7
	none	7	none	6	+some	7	-some	5	+a lot	5	+some	2	+v.little	4
	+a lot	1	-v.little	2	+a lot	1			-v.little	2	-some	1	-some	2
					-v.little	2			+v.little	3			none	2
													-v.little	1
34	none	9	none	11	none	12	none	11	none	11	none	18	-a lot	19
(1) Recreation C	-v.little	6	-v.little	7	-v.little	7	+some	5	+a lot	5	-v.little	4	-v.little	3
	-some	3	-some	3	-some	2	+v.little	5	-some	4	+v.little	3	-some	2
	-a lot	2	+some	3	-a lot	1	-v.little	2	+some	2	+some	1	+some	1
	+some	3	-a lot	1	+some	1	-some	2	-a lot	2			none	1
	+v.little	2	+a lot	1	+v.little	2	+a lot	1	+v.little	1				
	+a lot	1			+a lot	1			-v.little	1				
20 - 59	none	10	none	8	none	12	none	11	+some	11	none	13	-a lot	13
(4) Lands B	+v.little	7	+v.little	7	+some	5	+some	8	+v.little	7	+v.little	5	-some	8
	+some	5	+some	5	+v.little	5	-some	3	none	7	+some	3	+some	2
	-some	3	-some	2	-some	3	+v.little	2	+a lot	1	-some	3	-v.little	1
	+a lot	1	+v.little	2	+a lot	1	-v.little	1			-a lot	1	+a lot	1
			-a lot	1			+a lot	1			-v.little	1	none	1
11	none	8	none	9	none	14	none	14	none	9	none	14	-some	9
(10) Lands C	-some	5	-v.little	6	+v.little	4	-v.little	4	+some	7	+v.little	7	-a lot	3
	-v.little	6	-some	4	+some	3	+some	4	-some	5	-v.little	2	-v.little	5
	+some	4	-some	4	-some	2	+v.little	3	+v.little	3	-some	2	none	4
	+v.little	2	+v.little	2	-v.little	3	-some	1	-a lot	1	+some	1	+a lot	3
	-a lot	1	-a lot	1					-v.little	1			+some	2
14 - 58	+v.little	12	+v.little	13	none	12	+some	12	+some	13	none	16	-some	10
(7) Lands D	+some	7	none	7	+v.little	11	none	7	+v.little	5	+v.little	8	+some	6
	none	6	+some	6	+some	2	+v.little	4	+a lot	5	-v.little	1	-a lot	5
	-v.little	1			-v.little	1	+a lot	2	none	2	+some	1	-v.little	3
							-some	1	-v.little	1			+a lot	2
14 - 59	+v.little	9	+v.little	10	none	11	+some	12	+some	19	none	16	+some	15
(6) Visual D	+some	8	+some	8	+some	7	none	8	+v.little	4	+v.little	6	+a lot	4
	none	7	none	6	+v.little	6	+v.little	5	+a lot	2	+some	3	-a lot	2
	+a lot	1	+a lot	1	-a lot	1	-v.little	1	none	1	-a lot	1	+v.little	2
	-some	1	-a lot	1	+a lot	1							-some	2
													none	1
	(2) 29		(4) 19		(5) 11		(6) 5 - 69		(3) 23		(7) 5 - 32		(1) 94	

TABLE 8

PROFESSIONAL SOCIOLOGIST SURVEY

Alternative ICO Combinations	Employment		Income		Occupation		Pollution		Recreation		Housing		Public Reaction	
12	+some	8	+some	6	+v.little	7	+v.little	4	-v.little	2	none	4	-some	4
(4) Timber B	+a lot	2	+v.little	3	+some	2	+some	3	+some	2	+v.little	4	+a lot	2
			+a lot	1	none	1	-a lot	2	-a lot	2	+some	2	-a lot	2
							none	1	+a lot	1			+some	2
									+v.little	1				
									-some	1				
7 - 28	+some	4	+v.little	4	none	6	+v.little	4	-v.little	3	+v.little	4	+some	5
(7) Timber C	-v.little	2	+some	2	+some	3	+some	3	+some	2	none	5	none	3
	-some	2	+a lot	1	+v.little	1	-some	2	-some	3	+some	1	-a lot	2
	+a lot	1	-a lot	1			-a lot	1	-a lot	1				
	none	1	-some	1					none	1				
			none	1										
7 - 30	+v.little	5	+some	5	+v.little	5	+some	3	-some	3	none	6	+some	6
(6) Energy B	+some	3	+v.little	4	none	3	+v.little	3	none	2	+v.little	2	-some	3
	-v.little	1	-a lot	1	+some	1	+a lot	2	+some	2	+some	1	+a lot	2
	none	1			-some	1	none	2	+v.little	2	-a lot	1	-a lot	1
									-v.little	1				
9	+v.little	3	+some	7	+v.little	6	+some	2	+v.little	3	none	9	+some	6
(5) Energy C	+some	3	+v.little	2	+some	3	+v.little	2	none	2	+v.little	1	-some	2
	+a lot	3	+a lot	1	none	1	(Blank)		+some	2			-a lot	1
	-some	1					none	2	-a lot	1			+v.little	1
							-a lot	1	-some	2				
							-some	1						
							+a lot	1						
3	none	4	-some	3	none	5	none	4	+v.little	5	none	8	-some	5
(11) Range C	+v.little	3	+some	2	+v.little	3	+v.little	3	none	3	+v.little	2	+a lot	2
	+a lot	1	+v.little	2	+some	2	-v.little	1	-some	2			+v.little	2
	+some	1	none	2			+some	1					-v.little	1
	-v.little	1	-v.little	1			-some	1						
19	+some	7	+some	5	+some	5	+some	3	+a lot	4	+v.little	4	+a lot	7
(1) Recreation B	+v.little	2	+v.little	3	none	3	none	1	+some	3	+a lot	2		
	none	1	+a lot	2	+v.little	2	+v.little	2	-some	2	+some	2	-a lot	2
							-v.little	2	+v.little	1	none	2	-v.little	1
							-a lot	1						
							+a lot	1						
15	-some	3	-some	3	none	5	none	3	-a lot	4	none	7	-some	3
(3) Recreation C	+some	2	+a lot	2	-v.little	2	+v.little	2	+some	3	+v.little	2	+a lot	3
	-v.little	1	+some	2	-some	2	+some	2	+v.little	2	-some	1	-a lot	3
	+v.little	1	+v.little	2	+some	1	-some	2	none	1				
	+a lot	1	none	1			-a lot	1					+some	1
	-a lot	1												
	none	1												
6 - 39	+some	5	+some	5	+some	4	+some	3	+some	7	none	4	-some	7
(8) Lands B	none	2	none	2	none	3	+v.little	3	+v.little	1	-some	3	+a lot	1
	+v.little	1	+v.little	1	-v.little	1	none	2	-v.little	1	+some	2	-a lot	1
	+a lot	1	+a lot	1	+v.little	1	-some	2	none	1	+v.little	1	+v.little	1
	-a lot	1	-a lot	1	-some	1								
6 - 29	+v.little	6	+v.little	5	+v.little	5	-some	5	+some	7	none	5	-some	5
(9) Lands C	-a lot	1	-some	2	none	1	+v.little	3	-some	1	+v.little	2	-a lot	2
	+a lot	1	+some	1	+some	2	-v.little	1	-v.little	1	+some	2	+some	1
	-some	1	-a lot	1	-some	2	+some	1	none	1	-some	1	+v.little	1
	none	1	+a lot	1									(mixed 1)	
16	+v.little	4	+v.little	4	+v.little	3	-some	4	+some	5	none	4	-a lot	7
(2) Lands D	-some	3	-some	3	-some	3	+v.little	2	+a lot	4	+some	2	+some	1
	+a lot	1	-v.little	1	+some	2	+a lot	2	+v.little	1	-some	2	-some	1
	-a lot	1	+some	1	none	2	-some	1			+v.little	2	+v.little	1
	-v.little	1	-a lot	1			none	1						
4	+v.little	7	+v.little	7	none	6	+v.little	4	+some	5	none	6	+v.little	5
(10) Visual D	-v.little	1	-some	2	-v.little	3	+some	3	+a lot	2	-some	2	+some	3
	-some	1	-v.little	1	-some	1	-some	2	+v.little	2	+some	1	-some	1
	none	1					none	1	none	1	+v.little	1	-a lot	1
	(3)	15	(4)	14	(7)	0	(5)	12	(2)	19	(6)	3	(1)	30

APPENDIX C

MECHANICS FOR ALTERNATIVE ICO SELECTION

The planning team devised a method for making a preliminary estimate of the objectives within each ICO that might be adjusted to achieve the goal statements presented in the alternatives. The "x" in the figure signifies targets (activities, outputs, or effects from FSM 1921.246--2) to be adjusted within ICO resolutions to support goal statements, while "y" signifies targets which require adjustment as a result of changes in one or more x's (a kind of secondary adjustment).

FIGURE

Alternative ICO	Timber	Energy	Range	Access Roads	Recre.
A	No Action				
B	x	x	y	y	x
C	x	x	x	y	x
D	y	y	y	y	y

Alternative ICO	WL & F	Land	Water	Visual
A	y	x	y	y
B	y	x	y	y
C	y	x	y	x
D	y	x	y	x

B = Social well-being and employment improvements

C = Energy and cost efficient production

D = Protection and improved environmental quality

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