

Appendix

A - Public Involvement

OVERVIEW

The public involvement process for the Coronado National Forest was begun in March, 1978. Public issues, management concerns, and opportunities have been combined into one list. Some were identified as issues and concerns in the regional planning process for the Southwest Region. Although some land and resource plans had been previously completed by the Coronado or were in the development process, the Coronado chose not to develop a list of preliminary issues and concerns. It was felt the public might be more open and candid about what they felt was bad or good about management of the Coronado National Forest, if they were not presented with a predetermined list.

General Public Contacts

Organizations were used as a primary means of contacting people to invite them to get involved in Forest Service planning. A search was made through southeastern Arizona to identify organizations. A letter inviting participation was sent to the 1002 organizations identified. Ten percent of the groups responded. Individuals who held Forest Service permits for grazing, special uses, etc. were added to the mailing lists along with individuals solicited through organization newsletter articles, newspaper stories, radio public service advertisements and organization mailing lists, for a total of 3200 people and organizations. An invitation to 12 public workshops held throughout southeastern Arizona during the Spring of 1978 was sent to names on the mailing list. The invitations included a response form enabling individuals unable to attend the meetings to make comments. Two hundred fifty three response forms and 745 letters were received. Almost five hundred people attended the workshops which were held in the following communities:

<u>Community</u>	<u>Date</u>	<u>Persons in Attendance</u>
Douglas, AZ	4-24-78	62
Willcox, AZ	4-26-78	20
Safford, AZ	4-28-78	28
Tucson, AZ	4-29-78	36
Portal, AZ	4-29-78	128
Arivaca, AZ	5-2-78	16
Nogales, AZ	5-2-78	18
Green Valley, AZ	5-3-78	14
Patagonia, AZ	5-3-78	32
Sierra Vista, AZ	5-4-78	50
Catalina, AZ	5-8-78	7
Tucson, AZ	5-9-78	79

Other Contacts

In addition to the general public contacts discussed above, the following specific agencies, governments and Indian Tribes were initially contacted to advise them of the planning effort and to identify any concerns they might have.

<u>Name of Agency or Organization</u>	<u>Date Contact Made</u>
<u>Cities</u>	
Bisbee	10/6/78
Douglas	10/6/78
Nogales	10/6/78
Oro Valley	10/6/78
Pima	10/6/78
Safford	10/6/78
South Tucson	10/6/78
Thatcher	10/6/78
Tucson	10/6/78
Willcox	10/6/78
Sierra Vista	10/6/78
Huachuca City	10/6/78
<u>Counties</u>	
Cochise	10/6/78
Graham	10/6/78

<u>Counties (Continued)</u>	
Hidalgo	10/6/78
Pima	10/6/78
Pinal	10/6/78
Santa Cruz	10/6/78
<u>Agencies</u>	
New Mexico Game & Fish Department	10/6/78
Bureau of Reclamation	10/6/78
BLM - State Office	10/6/78
National Park Service Group	10/6/78
Saguaro N.M.	10/6/78
Coronado N.M.	10/6/78
Chiricahua N.M.	10/6/78
Tumacacori N.M.	10/6/78
AZ State Clearinghouse	10/6/78
AZ Bureau of Geology & Mineral Technology	10/6/78
AZ Cooperative Fishery	10/6/78
AZ Game & Fish Department	10/6/78
AZ Department of Transportation	10/6/78
AZ Land Department	10/6/78
AZ State Parks	10/6/78
Department of Health Services	10/6/78
AZ Outdoor Recreation Coordination Committee	10/6/78
US Fish & Wildlife Service	4/3/79
<u>Government Councils</u>	
PAG (Pima Association of Governments)	10/6/78
SEAGO (Southeast AZ Governments)	10/6/78
SWNMCOG (Southwest N.M. Council of Governments)	10/6/78
<u>Indian Tribes</u>	
Bureau of Indian Affairs	10/20/78
San Carlos Tribe	10/20/78
Papago Tribe	10/6/78
<u>Military</u>	
Davis Monthan AFB	10/6/78
Ft. Huachuca	10/6/78
<u>Natural Resource Conservation Districts</u>	
#743 Winkelman	10/6/78
#702 Gila Valley (Safford)	10/6/78
#709 Whitewater Draw	10/6/78
#715 Hereford	10/6/78
#712 Pima	10/6/78
#741 San Pedro	10/6/78
#744 Willcox-San Simon	10/6/78
#739 Reddington	10/6/78
<u>Congressional Delegations</u>	
Dennis DeConcini (U.S. Senate)	7/21/78
Morris K. Udall (U.S. House of Representatives)	7/21/78
Barry Goldwater (U.S. Senate)	7/21/78

As a follow-up to these initial and later contacts, the following agency plans were reviewed to determine coordination needs and management opportunities to be considered in the Coronado National Forest planning effort.

Action Plan, Arizona Department of Transportation.
ADOT, May 1979.

AGF 1980a. Big Game Strategic Plans. 1980-1995. Arizona Game and Fish Department, Planning & Evaluation Branch.

AGF 1980b. Small Game Strategic Plans. 1980-1985 Arizona Game and Fish Department, Planning & Evaluation Branch. (Unpublished).

A Land Use Program for Arizona - Arizona Environmental Planning Commission, January, 1975.

Arizona Game and Fish Department Statewide Fish and Wildlife Plan, Arizona Game and Fish Department, 1976.

Arizona State Water Plan; Phase III, Arizona Water Commission, 1977.

BLM Wilderness Review, Arizona. Bureau of Land Management, Arizona State Office, November 1980.

Final General Management Plan, Coronado National Memorial, Arizona - U.S.D.I. Park Service, September 1976.

Identification of Areas within Arizona that do not Meet National Ambient Air Quality Standards. - Arizona Department of Health Services, August 1978.

Land Use and Policies, Mt. Lemmon Community Plan - Prepared for Pima County by University of Arizona, March 1979.

New Mexico Fish and Game Comprehensive Plan, Part II, Operation Section New Mexico Department of Game and Fish. (Unpublished) 1980.

Proposed Natural Areas in Arizona, A Summary - Natural Area Study Committee, Arizona Academy of Science, for Planning Division, OEPAD, Office of Governor, State of Arizona July 1976.

Statewide Comprehensive Outdoor Recreation Plan (SCORP) - Arizona Outdoor Recreation Coordinative Commission, Phoenix, Arizona December, 1977

The Comprehensive Plan, A Physical Development Guide For Eastern Pima County. Pima County, City of Tucson, City of South Tucson, Pima Association of Governments, Draft 1977.

ISSUE, CONCERN
OPPORTUNITY
DEVELOPMENT

Public comments from the 12 public workshops, written responses, the Huachuca unit public involvement process, the RARE II planning process and comments on the final EIS for the Santa Catalina Unit Plan were combined and analyzed using standard content analysis procedures. The packet of materials was sent to the Coronado National Forest technical workgroups. Their job was to read the publics' input and write issue statements, for their professional area. They were also to determine if the issues were long-range or short-range.

The numerous preliminary statements were read by an interdisciplinary team (ID team) composed of two people from each functional work group. The ID team checked for duplicates, combined statements and clarified them. These statements were categorized as Local/Regional/National and, as long-range or short-range. These statements were used by the Forest Supervisor and District Rangers to write issue statements which were to be dealt with in the Forest Land Management Planning Process.

The planning group again checked all public comments to make sure that topics mentioned in other contexts, such as a future goal, were part of the issue package.

In June 1978 the Forest Supervisor and the five District Rangers tentatively chose which issues should be dealt with in land management planning and which should be

handled in other ways. No attempt was made to prioritize issues. They were to be treated equally as to their consideration for resolution. Each issue was sorted according to the following criteria:

- A. Land and Natural Resources
 - 1. Allocation (what and where)
 - 2. Management practices
- B. Organizational Management
 - 1. Internal, including methods and techniques (i.e., how to)
 - 2. Interagency relationships
 - 3. External relationships (public)
- C. Economics
 - 1. Cost effectiveness
 - 2. Constraints
 - 3. External effects (on community, etc.)
- D. Legislative

The issues that fell into category "A" were to be the land management planning issues. The rest were called "Issues to be handled in other ways". The criteria that caused them to be so designated is shown in parentheses after the issue statement. They are grouped according to the way they were to be addressed.

LAND MANAGEMENT
PLANNING ISSUES

Fire	"The issue is, how much and what kind of (prescribed, man-caused, natural) fire should be allowed to burn, where, at what time of year, intensity, and how much private property/development protection should be provided."
Water	"The issue is, how the water produced on the Forest will be used."
Carrying Capacity	"The issue is, the need to establish carrying capacities (the number of people who can use an area while still protecting natural resources) and where they must be enforced."
Range	"The issue is, how much and where should Forest land be allocated for grazing and what relation does this bear to other uses (conflict between grazing and recreation), etc." "The issue is, the allocation of forage between grazing and wildlife."
Special Areas	"The issue is, where and how many utility corridors, commercial developments, access to inholdings, summer homes and apiary sites, etc., should there be." "The issue is, what areas should be designated as cultural and historic sites." "The issue is, the allocation of areas on the Coronado National Forest for research, or modification of management policies to enhance scientific research values."
Vegetation	"The issue is, where and how much vegetative manipulation should be done on the Coronado National Forest." "The issue is, how to allocate uses in riparian areas (e.g., fencing, grazing system)."
Law Enforcement	"The issue is, how much regulation and law enforcement and where."
Wilderness	"The issue is, how much wilderness and where it should be (after RARE II)." "The issue is, the difference in intensity of management in the different wilderness areas regarding recreation, wildlife, resources, grazing and fire management policies."

Recreation "The issue is, where are the caves and to what kinds of uses should they be allocated and how can they be managed (recreation, scientific, wilderness)."

"The issue is, where and how much land should be allocated for developed recreation (picnic/campgrounds) and which lands should remain undeveloped for dispersed recreation."

"The issue is, where to provide for visual resource integrity."

Forest Products "The issue is, to whom (citizen/non-citizen) and what type of (personal/commercial) forest products permits should be issued."

"The issue is, which harvest techniques/silvicultural systems for wood (timber and fuelwood) should be used on the Coronado National Forest (clear cut, snag policy, reforestation, green/dead wood)."

"The issue is, how much, where and for what objective should timber be harvested in the Forest."

"The issue is, should Christmas tree sales be made and where."

Roads and Trails "The issue is, the level of road and trail maintenance and standard for new roads and trails; where and how many (including signs)."

"The issue is, how to resolve the conflicts between trail users (bikers, horseback, motorcycles)."

"The issue is, what kind of and how much public access to special use areas."

"The issue is, adequate (for peak periods of use), legal, public access to and within the Forest that is environmentally acceptable and safe (roads and trails, stock tank maintenance, fuelwood cutting, bird watching, hunting, etc.)."

Landownership "The issue is, where and what kinds of land (private, state, etc.) should be acquired within the National Forest boundaries and which lands should be exchanged out of the National Forest System."

Wildlife "The issue is, a question of allocation of time and effort to threatened species in relation to other flora and fauna."

"The issue is, should other uses (mineral entry, recreation, etc.) be controlled in critical wildlife habitats."

"The issue is, should Cave Creek be designated as a National Zoological Area or a wildlife management area, and how other uses should be integrated in the decision, or should it remain unclassified."

"The issue is, where and how many fishing lakes should be in the Coronado National Forest?"

"The issue is, how much and where should wildlife resources and habitat be maintained for future generations; which species (e.g., beargrass habitat-javelina)."

"The issue is, where and how many areas should be designated as unique and critical wildlife habitats, research natural areas, and how they are to be managed."

"The issue is, how much, where and why predator and rodent control should happen."

ISSUES TO BE
HANDLED IN OTHER
WAYS

Study Plan for the Forest Land Management Plan "The issue is, the confusion resulting from overlapping jurisdictions and authorities with different regulations and laws and different goals and objectives." (B)

Goals and Objectives in the Forest Land Management Plan	"The issue is, how to define the value of non-commodity resources, such as visual resource, recreation and wildlife (in economic terms)." (C)
	"The issue is, that people don't know what the Forest Service is doing and why, and they want to be informed." (B)
	"The issue is, whether or not consumptive use of renewable resource is done in an environmentally sound fashion." (B)
	"The issue is, how much of different uses should be produced, where and how it will affect the quality of the Forest in the future." (B)
	"The issue is, the amount of preservation that the Forest Service practices in its conservation (wise use) of natural resources." (B)
	"The issue is, the weight of input from the vested interests in land management decisions in relation to the weight of the input from non-vested interests (and vice versa)." (B)
	"The issue is, how to coordinate interagency cooperation in Cave Creek (trapping, lake development, etc.)" (B)
	"The issue is, how to give wildlife resources equal weight with other resources in land management planning and Forest Service decision making." (B) (C)
Individual/Project Analysis	"The issue is, whether or not to use herbicides." (B)
Annual Budgeting Process	"The issue is, what priority should be given to closing mine shafts for safety reasons (people and cows)." (B)
Law Enforcement Plan	"The issue is, uniform and consistent law and regulation enforcement in the Coronado National Forest." (B)
Inform and Involve Program	"The issue is, people frustration faced with multiple requirements for permits from different levels of government." (B)
	"The issue is, the amount and how basic environmental education is to be done within the Coronado National Forest, and by the Forest Service." (B)
	"The issue is, the lack of information about the effects of fire (wildlife, vegetation, the environment)." (B)
	"The issue is, how to improve communication between the Forest Service and Forest users." (B)
Would Require Legislative Change	"The issue is, the destructive mining practices as a result of the 1872 mining law." (D)
	"The issue is, what fees should be charged for recreational use." (D)

ADDITIONAL PUBLIC REVIEW

Issue, Concerns, and Opportunities	This tentative list of Land Management Planning Issues selected by the Forest Supervisor and District Rangers was sent back to the public in June 1978 via "Forest Feedback", the planning newsletter. In an effort to get public feedback, a coupon was included in the newsletter for people to respond. Seventeen coupons were returned. The public pointed out two issues (water pollution or water quality and litter) which had indeed been left out of the adopted statements. The Coronado National Forest technical workgroups also reviewed the issues and added some management concerns of their own. In September 1978 the interdisciplinary team recommended a revised list of issues for forest planning. The final list was approved by the Supervisor and Rangers on September 19, 1978 and was published in
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"Forest Feedback" during December 1978. No further public comments were received on the list of issues during that time.

Alternative Formulation

During the period March 12 to March 26, 1979, the Coronado National Forest held a series of workshops to involve the public in the formulation of alternatives. No new issues, concerns or opportunities were identified as a result of these workshops which were held in the following communities.

<u>Community</u>	<u>Date</u>	<u>Persons in Attendance</u>
Green Valley, AZ	3/12/79	24
Sierra Vista, AZ	3/12/79	47
Tucson, AZ	3/13/79	15
Patagonia, AZ	3/14/79	20
Willcox, AZ	3/15/79	11
Douglas, AZ	3/19/79	51
Apache, AZ	3/20/79	40
Safford, AZ	3/21/79	26
Tucson, AZ	3/22/79	30
Arivaca, AZ	3/26/79	9
Nogales, AZ	3/26/79	15

SELECTED ISSUES, CONCERNS AND OPPORTUNITIES

On March 30, 1981 the Regional Forester approved the list of issues to be addressed in the Forest Land Management Planning Process. Preceding each is a short background statement.

Recreation and Visual Quality

Recreation is a major use of the Coronado. Demand for all types is rapidly increasing. The Forest Service is unable to provide for all this demand, present and future.

As the local and tourist populations increase around the Coronado, it becomes apparent that the demand for Forest use will exceed supply in some categories.

"The issue is, the need to establish carrying capacities (the number of people who can use an area while still protecting natural resources) and where they must be enforced."

"The issue is, should the present Off Road Vehicle Plan be revised and how."

"The issue is, where and how much land should be allocated for development recreation (picnic/campgrounds) and which lands should remain undeveloped for dispersed recreation."

"The issue is, where are the caves and to what kinds of uses should they be allocated and how can they be managed (recreation, scientific, wilderness)."

"The issue is, how to provide for visual resource integrity."

Wilderness

Three areas have been designated by Congress as Wilderness. Five additional ones were recommended for wilderness as a result of RARE II. Seven areas still remain in question.

"The issue is, how much additional wilderness and where it should be (after RARE II)."

The various Wilderness are not equally accessible to people and have different attractions to offer.

"The issue is, the difference in intensity of management in the different wilderness areas regarding recreation, wildlife, resources, grazing and fire management policies."

Wildlife and Fish

The diversity of plants and animals found on the Coronado are probably unique in the entire National Forest System. Management is complex and even complicated more by the varied demands placed on the forest.

"The issue is, a question of allocation of time and effort to threatened species in relationship to other flora and fauna."

"The issue is, should other uses (mineral entry, recreation, etc.) be controlled in critical wildlife habitats."

"The issue is, should Cave Creek or the South Fork of Cave Creek be designated as a National Zoological Area or a wildlife management area, and how other uses should be integrated in the decision, or should it remain unclassified."

"The issue is, how much, where and why predator and rodent control should happen."

"The issue is, where and how many fishing lakes should be in the Coronado National Forest."

"The issue is, how much and where should wildlife resources and habitat be maintained for future generations; which species (e.g., beargrass habitat-javelina)."

"The issue is, where and how many areas should be designated as unique and critical wildlife habitats, research natural areas, and how they are to be managed."

"The issue is should we reintroduce native wildlife and/or plant species into suitable and/or historical habitats (includes threatened and endangered species)."

Range
 Livestock grazing is a major use of the Coronado, however, as demand for other uses increases, there is potential for increased conflict between uses.

"The issue is, how much and where should Forest land be allocated for grazing and what relation does this bear to other uses (conflict between grazing and recreation),etc."

"The issue is, the allocation of forage between grazing and wildlife,"

Timber and Firewood
 Forest products, such as fuelwood, posts, poles, etc. are significant to some local users even though production is low compared to most other National Forests. Silvicultural techniques are one tool that can be used to meet various range, wildlife, watershed and recreation objectives.

"The issue is, to whom (citizen/non-citizen) and what type of (personal/commercial) forest products permits should be issued."

"The issue is, which harvest techniques/silvicultural systems for wood (timber and fuelwood) should be used on the Coronado National Forest (clear cut, snag policy, reforestation, green/dead wood)."

"The issue is, how much, where and for what objective should timber be harvested in the Forest."

"The issue is, should Christmas tree sales be made and where."

Diversity
 The Coronado includes a wide diversity of vegetation. In the past it has been manipulated through fire control, grazing, road construction, etc. There is question about what additional changes should be made.

"The issue is, where and how much vegetative manipulation should be done on the Coronado National Forest."

"The issue is, whether or not to use non-native species for revegetation."

"The issue is, how to allocate uses in riparian areas (e.g., fencing, grazing system)."

Soil and Water
 Competition for available water is rapidly increasing. Concerns have been expressed about the use, the quantity and quality of the water produced on the Forest.

"The issue is, how the water produced on the forest will be used, by whom, and what quality standards will be met."

The issue is, how should streams and lakes be classified as to use which implies the water quality standards they have to meet."

"The issue is, how much and where accelerated erosion should be tolerated."

Minerals

"The issue is, which areas should be withdrawn from mineral entry and which withdrawals should be restored."

Lands

While the Coronado is substantially solid blocks of federal land, there are places where lands would be better suited for private uses or where administration is more costly because of the ownership pattern. There are also places where private lands are really of a national forest character.

"The issue is, where and what kinds of land (private, state, etc.) should be acquired within the National Forest boundaries and which lands should be exchanged out of the National Forest System."

Special Areas

The pressure for development on Forest land is increasing either because private lands appear unsuitable or they are identified/used for more intensive uses.

"The issue is, where and how many utility corridors, commercial developments, access to inholdings, summer homes and apiary sites, etc., should there be."

"The issue is, the allocation of areas on the Coronado National Forest for research, or modification of management policies to enhance scientific research values."

Protection

Fire control has evolved into fire management on the Coronado National Forest. Many years of intensive control has resulted in a changed vegetation composition. There is increasing support for a more natural role of fire in the ecosystem and more use of fire as a tool to manipulate vegetation.

"The issue is, how much and what kind of (prescribed, man-caused, natural) fire should be allowed to burn, where, at what time of year, intensity, and how much private property/development protection should be provided."

Facilities (Roads Trails)

Access to Forest lands is becoming increasingly and restricted as development occurs around the Forest, and as users cause increased damage on adjacent lands. The Forest's transportation system has deteriorated over the past ten years while use has drastically increased.

"The issue is, the level of road and trail maintenance and standards for existing and new roads and trails; where and how many (Transportation Plans)."

"The issue is, how to resolve the conflicts between trail users (bikers, horseback, motorcycles)."

"The issue is, what kind of and how much public access to special use areas."

"The issue is, adequate (for peak periods of use), legal public access (roads and trails) to and within the Forest that is environmentally acceptable and safe roads and trails, stock tank maintenance, fuelwood cutting, bird watching, hunting, etc."

Law Enforcement

People look to the Coronado as a place to get away from it all, to relax in an unencumbered atmosphere. However, as uses increase, the conflict between users will increase.

"The issue is, how much regulation and law enforcement and where."

Cultural Resources

"The issue is, to what degree should archaeological and historical sites be interpreted to the public."

"The issue is, what archaeological and historical sites, should be nominated to the National Register of Historic Places."

MODIFICATION
OF ORIGINAL ICO'S

During the period from 1978 to 1983, the Southwest Regional Guide was completed and the Coronado National Forest issued a Proposed Forest Plan and D.E.I.S based on the original issues. The following agencies, governments, and Indian Tribes were sent copies of the Proposed Forest Plan and Draft E.I.S. in December 1982.

FEDERAL AGENCIES:

Army Corps of Engineers
Bureau of Indian Affairs
Bureau of Land Management
 Arizona State Office
 New Mexico State Office
 Safford District
 Las Cruces District
Bureau of Mines
Department of the Army,
 Fort Huachuca
Department of the Interior
Environmental Protection Agency
 Washington
 San Francisco
 Dallas
National Park Service
 Chiricahua National Monument
 Coronado National Memorial
 Saguaro National Monument
 Western Archaeological Center
U.S. Fish and Wildlife Service
U.S.D.A. Forest Service

STATE AGENCIES, NEW MEXICO:

New Mexico Department of Agriculture*
New Mexico Department of Commerce and Industry*
New Mexico Department of Energy and Minerals*
New Mexico Department of Finance and Administration
 State Planning Division*
 Historic Preservation Bureau*
New Mexico Department of Health and Environment
 Environmental Improvement Division*
New Mexico Department of Natural Resources
 Administrative Services Division*
 Game and Fish Division*
 State Forestry Division*
New Mexico State Land Office*

* Contacted through the New Mexico Clearinghouse,
Department of Finance and Administration.

STATE AGENCIES, ARIZONA:

Agriculture and Horticulture Commission*
Arizona Office of Tourism
Arizona State Land Department
 Phoenix Office*
 Tucson Office
Arizona Department of Transportation*
Arizona Department of Water Resources*
Arizona Bureau of Air Quality*
Arizona Game and Fish Department
 Phoenix Office*
 Tucson Office
Arizona Department of Mineral Resources

STATE AGENCIES, ARIZONA: (Continued)

Arizona State Parks*
Arizona Office of Economic Planning and Development
Arizona Division of Natural Resource Conservation
Arizona Natural Heritage Program*

* Contacted through the Arizona State Clearinghouse,
Office of Economic Planning and Development

COUNTY GOVERNMENTS, ARIZONA

County Boards of Supervisors of following Counties:

Cochise
Graham
Greenlee
Pima
Pinal
Santa Cruz

County Cooperative Extension Service Offices in:

Cochise County
Graham County
Pima County
Pinal County
Santa Cruz County

Pima County Assessor's Office
Pima County Department of Transportation and Flood Control
Pima County Parks and Recreation Department
Pima County Planning Department

COUNTY GOVERNMENTS, NEW MEXICO:

County Boards of Supervisors of following Counties:

Hidalgo
Grant
Luna

Hidalgo County Cooperative Extension Service

INDIAN GROUPS

San Carlos Apache Tribal Council
Papago Tribal Council

LOCAL GOVERNMENTS IN THE FOLLOWING COMMUNITIES:

Arizona:

Arivaca	Safford
Benson	San Carlos
Bisbee	San Manuel
Bowie	Douglas
Douglas	Sierra Vista
Green Valley	St. David
Mammoth	Sonoita
Marana	South Tucson
McNeal	Summerhaven
Nogales	Thatcher
Oracle	Tombstone
Oro Valley	Tucson
Patagonia	Willcox
Pima	

LOCAL GOVERNMENTS IN THE FOLLOWING COMMUNITIES: (Continued)

New Mexico

Animas
Lordsburg
Rodeo

CONGRESSIONAL DELEGATIONS:

Arizona

Hon. Barry Goldwater
Hon. Dennis De Concini
Hon. John J. Rhodes
Hon. Bob Stump
Hon. Eldon Rudd
Hon. Morris K. Udall

New Mexico

Hon. Pete Domenici
Hon. Harrison Schmitt
Hon. Manuel Lujan
Hon. Joe Skeen

Over 2500 responses were received from individuals, organizations, agencies and governments. External and internal comments received during the development and review of these documents, substantiated many of the original ICOs, caused some to be modified and some to be added. The modified list is shown in Chapter 1 of the D.E.I.S.

Direction from the Secretary of Agriculture prompted another public involvement phase relative to the wilderness issue and the re-evaluation of roadless areas. During August, 1983, statewide and local meetings were held on various Arizona National Forests. By conclusion of the comment period on September 30, 1983, many responses had been received relative to the roadless area re-evaluation. These substantiated and refined the I.C.O.s for roadless areas and were used during the development of the Arizona Wilderness Bill (PL98-406) as well as alternative development for resolution of the three wilderness study areas.

TREATMENT OF ICOs
IN ALTERNATIVES

Most issues (planning questions) were treated differently in all alternatives. This difference is reflected in the variation of certain outputs and management intensity from one alternative to another as a result of varying prescriptions.

The following goals and objectives (Table 1) were established to provide a measure for estimating the degree of issue resolution in each alternative.

Table 3 in Chapter 2 of the D.E.I.S. summarizes the individual issue resolution by alternative.

Table 1- Goals and Objectives to Resolve Major Issues

<u>Issue</u>	<u>Unit of Measure</u>	<u>Demand Expressed by Regional Guide</u>	<u>Demand Expressed by Issues & Concerns</u>	<u>Maximum Supply Limit by Year 2025</u>	<u>1981 Status</u>
<u>Recreation opportunity and diversity</u>					
Developed use	Thousand RVD	2655 by Year 2025	25 to 50% increase	2,715	1,181
Developed areas	Acres	NA	NA	6,740	3,990
Nongame use	Thousand RVD	56 by Year 2025	192(State wildlife goal by Yr.2030)	226	81
Hunting & Fishing use	Thousand RVD	158 by Year 2025	549(State wildlife goal by Yr.2030)	489	236
Other wilderness use	Thousand RVD	180 by Year 2025	Dependent on wilderness acres	813	123
Other dispersed	Thousand RVD	731 by Year 2025	NA	1,888	766
<u>Off road vehicle use</u>					
	Percent of Forest by classifications	NA	Varies depending on special interest.	Depends on availability and suitability by alternative	63% 21% 16%
<u>Wilderness system</u>					
	Total acres in system	NA	Varies from none to all wilderness study areas (90,800 acres)	429,990	339,190
	Number of Areas	NA	(3 areas)	11	8
<u>Wildlife resource management</u>					
	Acres of habitat improved annually	4,200	Forest should increase emphasis on wildlife resources. Also see wildlife related RVD goals	NA	7,966
<u>Range management:</u>					
<u>Allocation of forage to livestock grazing</u>					
	Thousand AUM of capacity	NA	Varies depending on special interest	408	326
<u>Balance of use with capacity</u>					
	Thousand AUM of permitted use	449 by Year 2025	Balance use with capacity. Time frame varies by special interest.	408	399
<u>Riparian area management</u>					
	Acres in acceptable ecological condition	All areas in satisfactory or better condition by Year 2030. 25% in satisfactory condition by Year 2000.	All areas in acceptable	36,807	1)

Table 1 - Goals and Objectives to Resolve Major Issues (Continued)

<u>Issue</u>	<u>Unit of Measure</u>	<u>Demand Expressed by Regional Guide</u>	<u>Demand Expressed by Issues & Concerns</u>	<u>Maximum Supply Limit by Year 2025</u>	<u>1981 Status</u>
<u>Fuelwood availability and harvest intensity</u>	Thousand cubic feet	NA	Demand for hardwood species far exceeds supply. 1980 harvest was 16,000 cords. Need to develop market for softwood species from excess timber.	250 (2,900 cords)	408 (4800 cords)
<u>Timber harvest intensity</u>	Thousand cubic feet	0	Maintain harvest level to at least equal local mill capacity of 91 MCF (445 MBF).	798 (3990 MBF)	499 (2495 MBF)
<u>Special land allocation</u>					
Research natural areas	Number of areas	Possible ecosystems identified.	4 additions suggested	NA	6
Zoological botanical	Number of areas	0	9 suggested	NA	0
<u>Watershed condition</u>	Watersheds in sat- isfactory or better condition	All watersheds to satisfactory or better condition by Year 2020.	All watersheds in satisfactory or better condition	21	13

Footnotes -

- 1) Inventory under way to classify areas and determine condition.

B -- Description of Analysis Process

INTRODUCTION

Appendix B describes the analysis process used in developing the range of alternatives discussed in Chapter 2 of this Environmental Impact Statement.

The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976 mandates preparation of National Forest System Land and Resource Management Plans. These plans are to provide for multiple use and sustained yield of goods and services from the National Forest System in a way that is sensitive to economic efficiency and maximizes long-term net public benefits in an environmentally sound manner [36 CFR 219.1(a) and (b)]. Regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969 require that all reasonable alternatives, including the Proposed Action, be vigorously explored and objectively evaluated [40 CFR 1502.14].

In order to meet these requirements, the Forest undertook a quantitative analysis incorporating economics into the process.

The purpose of this analysis is three-fold. First, it assures that each alternative contained the most cost-efficient combination of management practices which met the objectives of that alternative. Second, it provided a means to evaluate or compare alternatives for the purpose of choosing among them. Third, it allowed a quantitative starting point from which non-monetary values can be related and discussed.

Forest planning is a detailed analysis process. It is necessary to analyze the interrelationships between renewable and nonrenewable resources, economic trends, and the social aspects of distributing resources and services to society. The goal is to select the most economically efficient combination of management prescriptions that would achieve a given set of priced and nonpriced goals and objectives from the thousands of possible combinations of management prescriptions which could be applied throughout the Forest.

Computer modeling is an analytic technique designed to overcome the complexity of keeping track of the resulting resource outputs, environmental consequences, costs, benefits, and activity schedules applied to the land. This phase of the process is a tool for the manager to use in making a decision. Based on professional judgement and experience, adjustments in resource distribution are appropriate in order to satisfy implicit social-political implications, or intangible resource considerations which are not inherent in a mathematical model.

Requirements to be fulfilled in the planning process are described in [36 CFR 219.12]. A brief discussion of the steps used on the Coronado National Forest to complete the planning actions is described below.

Identification of Purpose and Need

Public issues, management concerns, and resource use and development opportunities were identified through public participation activities and coordination with other Federal agencies, State and local governments, and Indian tribes. The development of issues, concerns, and opportunities is described in detail in Appendix A.

Planning Criteria

Planning criteria guided the planning process through: 1) Identification of the kind and detail of resource inventories needed; 2) the development of benchmark runs for determining minimum and maximum levels of resource opportunities (decision space) responsive to issues, concerns and opportunities; 3) the formulation and evaluation of alternatives responsive to resolving issues, concerns, and opportunities; and 4) insuring net public benefits were maximized.

Inventory Data and Information Collection

Individual resource inventories were used to identify site specific areas having common environmental characteristics. Data was collected and stored in the Forest resource data base consistent with the available information and the level of detail needed.

Analysis of the Management Situation

The Analysis of the Management Situation (AMS) is a determination of the need to change management direction and of the ability of the Forest to supply goods and services in response to society's demands. The primary purpose for this analysis is to provide a basis for formulating a broad range of reasonable alternatives responsive to I.C.O.'s. During development of the AMS, benchmark runs with single resource emphasis were developed to define the Forest capability to supply various renewable resources on the Forest. Benchmarks were also developed to determine the most cost effective means of managing the Forest.

Formulation of Alternatives

Formulation of alternatives is described in Chapter 2. The primary objective is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits, consistent with resource integration and management requirements of [36 CFR 219.13 and 219.27].

The physical, biological, economic, and social effects of implementing each alternative considered in detail, provide the analytic basis for comparison of alternatives. This is presented in detail in Chapter 4. Chapter 2 presents the major environmental impacts in comparative form in a manner which shows the major differences between the Proposed Action and other alternatives to provide a clear basis for decision-making.

INVENTORY DATA

The following discussion presents concepts on how resource data was utilized to delineate capability areas, stratify the Forest into analysis areas based on suitability for management practices, and to determine production (resource opportunity) coefficients.

Capability areas are unique areas of land with respect to slope, landform, vegetation and soils. They form the basic unit for cataloging inventory data.

Analysis areas are aggregations of capability areas, not necessarily contiguous, which are similar with respect to existing vegetation, slope and legal/administrative status. These areas provide the framework for analysis, because individually they respond in a like manner to specific management prescriptions.

Production coefficients reflect the number of units per acre of a given resource that can be produced over a specific period of time. These coefficients were estimated by resource specialists using latest research findings, simulation models, literature reviews, field observations, and professional experience.

The expected value of the coefficient is assumed by the model to be known with certainty. This is required to reduce the complexity and magnitude of the modeling problem to manageable proportions. The variability in the real world is greater than what is shown in the model, but it is difficult to model the range of all variables and the probability of occurrence for each possible value in this range.

The development of alternatives is directly related to the ability of the Forest to supply resource outputs (opportunities) based on land capability determination. The mix of specific outputs in an alternative varies with the level of investment and the management emphasis applied to a specific analysis area.

Projected outputs over the planning horizon are based on the best scientific information available. Monitoring the implementation of an alternative is designed to confirm those projections or identify additional inventory needs, or identify needed changes in application of management prescriptions.

Simulation models used in the analysis process include:

- ECOSIM. This model computes timber yield tables for a wide range of stand densities and management controls. The reader is referred to ECOSIM: A System for Projecting Multiresource Outputs Under Alternative Forest Management Regimes by James J. Rogers, Joe Prosser, Lawrence D. Garrett, and

Michael G. Ryan. Administrative Report, Rocky Mountain Forest and Range Experiment Station, USDA Forest Service, Ft. Collins, Colorado, October, 1984.

- IMPLAN. This model was used to analyze economic impacts based on resource outputs. For further information see.
- IMPLAN User's Manual. Systems Application Unit for Land Management Planning, Forest Service, USDA. August 1982.

FORPLAN This is the Forest Planning Model. Underlying the FORPLAN model is a mathematical technique known as linear programming. For a more detailed understanding of aspects of linear programming and FORPLAN, the reader is referred to:

- Forest Service Land Management Planner's Introduction to Linear Programming by Brian Kent, USDA Forest Service Systems Application Unit for Land Management Planning, Fort Collins, Colorado. U.S. Government Printing Office: 1980-777-792/131, Region No. 8.
- Forest Planning Model (FORPLAN) User's Guide and Operations Manual by K. Norman Johnson, Daniel B. Jones, and Brian M. Kent, USDA Forest Service, Fort Collins, Colorado. May 1, 1980.

Sources of data include Forest Service inventories and records, other Federal and State records, and scientific research findings.

OVERVIEW OF THE FOREST PLANNING MODEL

This section of Appendix B presents the basic concepts used in the Forest Planning Model. Specific details related to these components, and development of alternatives are presented in more detail in other sections of this appendix.

Minimum Level

During the identification of analysis areas, estimates were made by resource specialists of naturally occurring outputs that are provided without direct management actions and associated costs. Output levels for water yield, dispersed and wildlife related recreation use, and livestock grazing capacity were estimated. Other resource opportunities are nonexistent. This minimum level of management provides for protection of soil and water resources, productivity of the land, life, health and safety of incidental users, and prevention of environmental damage to adjoining lands or downstream areas. This level of analysis is done outside the computer model and sets a base line for comparing alternatives to naturally occurring outputs.

The resource allocation model used in developing the Forest Plan is called FORPLAN (Johnson, K.N., et al 1980). FORPLAN is a linear programming model that simultaneously distributes specific land areas to individual management prescriptions, and schedules activities to achieve a specified set of objectives within certain constraints. Variables that are accounted for by the model include resource outputs, costs, benefits, and implementation practices. The Coronado National Forest used Version I of FORPLAN. The major components of the model are as follows:

Outputs (opportunities)

Outputs are an array of goods and services capable of being produced through management of National Forest lands. Measures of outputs are dependent on the product produced. They may or may not have a market value. The quantity of a specific output is dependent on the management emphasis (prescription) applied to a given area of land (analysis area). Outputs tracked and estimated in this planning effort are shown in the Coefficient Development Section of this Appendix.

Activities

Activities are specific management actions relative to managing the Forest and producing goods and services (outputs).

Activities that normally are used together to produce a desired effect were grouped into management practices. For example, the operation and maintenance of recreation sites is a management practice consisting of several activities or actions. For a listing of activities and management practices used, see the Prescription Development Section of this Appendix. Each management practice was assigned a cost depending of the type of land (analysis area) to which it was applied and the particular standards and guidelines for implementing the practice.

Analysis Areas As part of the planning process, the Forest assesses the current condition of its resources, determines the potential to produce a variety of goods and services, and predicts how the land will respond to a variety of management choices. Because of the complexity of predicting the Forest's widely varying response to different types and intensities of management, the Forest was subdivided into analysis areas based on variations in biological, physical, economic and social conditions.

Analysis areas are aggregations of acres, not necessarily contiguous, which are similar with respect to existing vegetation, slope, and legal/administrative status. One hundred fifty-three (153) analysis areas were included in the model. Refer to Analysis Area Development section of this appendix for a complete listing of analysis area identifiers. A complete listing of analysis areas and descriptions is available at the Coronado Forest Supervisor's Office.

Management Prescriptions A prescription is the set of assigned management practices (activities) and a schedule of application to achieve a desired quantity of goods and services, and environmental effects. Each prescription consists of standards and guidelines directing implementation of the prescription as well as resource production coefficients, costs, and scheduling options associated with the prescription.

A wide range of prescriptions was developed to meet legal requirements and to address public issues, management concerns, and opportunities developed early in the planning process. Prescriptions ranged from minimum to maximum production of the various goods and services.

The FORPLAN model distributed prescriptions to specific analysis areas while maximizing economic efficiency expressed by present net value and based on constraints used to meet goals and objectives of benchmarks or alternatives.

Prescription distributions were verified by determining if the prescription could be implemented in the analysis areas, and if the outputs, costs, environmental effects, and standards and guidelines were realistic for the Forest.

Prescriptions were developed by combining the least-cost management practices needed to achieve the objectives of a prescription. Cost efficiency was considered in developing prescriptions based on professional experience, and review of current literature and research findings by the Interdisciplinary Team.

Refer to Prescription Development section of this Appendix for a further description of prescriptions. A detailed listing of prescriptions by analysis areas is on file at the Forest Supervisor's Office.

Planning Horizon The planning horizon for the analysis is 100 years. Application of a prescription to an analysis area results in outputs and costs calculated in the model based on the coefficients for each time period within the planning horizon. The planning horizon is divided into ten time periods. Each one of the time periods is ten years in length.

Constraints Constraints are quantifiable limits placed on the model to control the level and mix of outputs and effects and to meet the objectives of each alternative.

In linear programming analysis, constraints override the objective function. Thus, if a predetermined level of outputs or minimum physical condition is entered as a constraint, it is always achieved or no feasible solution is found.

The following types of constraints were used during the formulation and evaluation of alternatives:

- Output Constraints - These are used to produce a specified amount of any resource, such as timber, livestock forage, or recreation.
- Budget Constraints - These are limitations on budgets for implementing the range of available prescriptions to insure financial feasibility.
- Prescription Constraints - These are limitations on the specific acreage or land area applied to a specific prescription.

- Non-declining Timber Yield - This is a requirement that the net merchantable cubic timber volume harvested in each period is greater than or equal to the volume harvested in the preceding time period.
- Ending Inventory - This maintains perpetual timber harvest. The inventory at the end of the planning horizon (net MCF) must be greater than or equal to the average inventory of the regenerated stands in the long run [36 CFR 219.16(a)(1)].
- Long Run Sustained Yield Link - This is a requirement that the net merchantable timber volume harvested (MCF) in the last period is less than or equal to long run sustained yield [36 CFR 219.16(a)(1)].
- Culmination of Mean Annual Increment - This is a requirement that the total yield from regenerated stands at harvest age is equal to or greater than 95-percent of the volume production corresponding to CMAI, as expressed in cubic measure [36 CFR 219.16(a)(2)(iii)]

The yield coefficients for timber used in FORPLAN were derived from the results of the "ECOSIM" models. The timber harvest requirements above are incorporated within the yield coefficients and are not achieved through application of specific constraints to the model.

Specific constraints used for each benchmark and alternative are described in the Benchmark Analysis and Alternative Sections of this Appendix.

Coefficients

A coefficient is a numerical quantification of the value of an output, the cost of a management prescription or amount of an output at a given point in time. Output and cost coefficients were developed by resource specialists on the Interdisciplinary Team. Output coefficients reflect the number of units per acre that can be produced over a specific period of time. These coefficients were based on either a simulation model or other data sources. Output coefficients were developed for sawtimber, fuelwood, permitted livestock use, grazing capacity, developed recreation, dispersed recreation, wilderness recreation, wildlife recreation, and soil loss. Water yield coefficients were also developed, but not entered into the FORPLAN Model.

Costs were estimated using Forest budget data from Fiscal Years 1980 & 1981. Costs include all resource practices and activities involved in a specific prescription. All cost data used in the model represents 1980 fourth quarter dollars.

Benefits were assigned based on 1985 Resource Planning Act (RPA) values. Recreation opportunity benefits were modified to represent the mix of opportunities available on the Coronado.

Refer to the Coefficients section of this appendix for the calculations and assumptions used to develop coefficients. A detailed listing of coefficients by prescriptions is on file in the Forest Supervisor's Office.

Objective Function

Objective functions are mathematical expressions of the criteria by which the model assigns land and resources (analysis areas) to various prescriptions. These can be either economic (e.g., maximize present net value for 100 years) or physical (e.g., maximize developed recreation for 100 years). All alternatives were developed using maximize present net value over 100 years as the objective function. Certain benchmarks maximized timber, range capacity, recreation, wildlife, and wilderness outputs prior to maximizing present net value.

PRESCRIPTION DEVELOPMENT

Prescriptions were developed through an Interdisciplinary (ID) approach using resource specialists with expertise covering all resource areas on the Forest.

Prescription development was based on all available data sources including field experience, literature reviews, research findings, and simulation models.

Standards and guidelines for all activities or potential activities occurring in each analysis area were developed by resource specialists according to their specific area of knowledge. In order to ensure specific minimum management re-

quirements were met [36 CFR 219.27], standards and guidelines were developed to reflect integration of resources in the development of specific management prescriptions. This was accomplished through interaction between resource specialists and through development and review of management prescriptions by District Rangers and Primary Staff Officers.

Prescription development followed a philosophy of building a broad range of management prescriptions to ensure appropriate consideration of the outputs and uses which lands are capable of providing, and building management intensity from low to integrated multi-management and unconstrained resource maximums.

Many prescriptions were developed. Some portray current management practices, while others portray practices needed to meet the minimum legal requirements associated with public land management. Some prescriptions maximize production of individual resources; some are more responsive to specific issues or concerns; and others apply to land requiring specialized management. All prescriptions included implementation timing for each activity.

Each management prescription was assigned quantities of resource output production by resource category and analysis area.

Costs varied by individual resource management practices within each prescription as applied to appropriate analysis areas. Resource values (benefits) were assigned for all prescriptions by resource category. Recreation benefits varied depending on the management intensity.

The following elements are common to all prescriptions:

A description of the multi-resource activities which will be carried out.

A description of the timing and intensity of the planned activities.

A statement of specific policies which apply to the uses and activities covered by the prescription.

Standards and guidelines for resource protection and use.

Mitigation measures and coordinating requirements needed to protect resources and the environment.

The prescriptions which were used in benchmark and alternative analysis are shown in Appendix C. Appendix C also summarizes the management emphasis and intensity.

Management prescriptions available by analysis area and complete details on the standards and guidelines contained in management prescriptions are on file at the Forest Supervisor's Office.

ANALYSIS
AREA
DEVELOPMENT

Analysis areas are the basic land areas to which management prescriptions are applied to produce resource opportunities (outputs) and environmental effects. Their delineation is based on the level of analysis needed to address the issues, concerns, and management opportunities identified early in the planning process. Two names are attached to each analysis area in FORPLAN. The first name is called "level 1." The second is called "level 2." These two levels correspond to the criteria that were used to define the analysis areas.

Two criteria were considered during the development of analysis areas:

- 1) The capability and suitability of the land to produce various resources. This is expressed in the capability or terrestrial ecosystem types that were developed to delineate capability areas. These were assigned as level two identifiers in FORPLAN. These capability types are listed and defined in Table 1.
- 2) The availability of the land to produce or sustain various resources. These broad areas represent management implications that now affect or may in the

future affect the production of outputs. These were assigned as level one identifiers in FORPLAN. These are listed and defined in Table 2.

The resulting combinations of these two criteria led to the 153 different analysis areas as used in the FORPLAN model.

Table 1. Definition of Capability Area Types (CA)

<u>CA Type Code</u> (FORPLAN Code)	<u>Vegetative Type</u>	<u>Land Form Modifier</u>
1 P	Southwestern Desertscrub	Plains
1 H/M	Southwestern Desertscrub	Hills and Mountains
1 M	Southwestern Desertscrub	Mountains
2 P	Desert Grassland	Plains
2 P/H	Desert Grassland	Plains and Hills
3 P	Plains Grassland	Plains
4 M	Mountain Grassland	Mountains
5 H	Chaparral	Hills
5 H/M	Chaparral	Hills and Mountains
6 P	Broadleaf Woodland	Plains
6 P/H	Broadleaf Woodland	Plains and Hills
6 H/M	Broadleaf Woodland	Hills and Mountains
6 M	Broadleaf Woodland	Mountains
6 P/S	Broadleaf Woodland	Plains Savannah
7 P	Coniferous Woodland	Plains
7 P/H	Coniferous Woodland	Plains and Hills
7 H/M	Coniferous Woodland	Hills and Mountains
7 M	Coniferous Woodland	Mountains
8 M	Deciduous Forest	Mountains
9 A H/M	Coniferous Forest Pine-Oak Juniper	Hills and Mountains
9 B H/M	Coniferous Forest Ponderosa Pine	Hills and Mountains
9 C H/M	Coniferous Forest Douglas Fir- Pine	Hills and Mountains
9 D H/M	Coniferous Forest Spruce-Fir	Hills and Mountains
10 R	Dry Desert Riparian	
11 AR	Wet Deciduous Riparian	
11 BR	Dry Oak Riparian	
12 R	Wet Coniferous Riparian	

Narrative Description of Capability Area Types as Applied to the Coronado National Forest.

The 1P terrestrial ecosystem is characterized by nearly level to moderately sloping alluvial fans and piedmont plains (sometimes severely dissected) at elevations of about 2,100 to 4,900 feet. Dominant slopes range from 1 to 15 percent. The climate is steppe (hot). Mean annual air temperature ranges from about 62° to 72° F. Mean annual precipitation ranges from about 8 to 11 inches which comes as gentle rains in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is saguaro, palo verde, creosote bush, ocotillo, mesquite, catclaw, and brittle bush. The foothills and plains below the Catalina Mountains are a good example of 1P.

The 1H/M terrestrial ecosystem is characterized by moderately sloping to steep hills and rough mountain slopes at elevations of about 3,000 to 5,100 feet. Dominant slopes range from 25 to 40 percent. 1H/M is otherwise similar to 1P. The footslopes of the front range of the Catalina Mountains are typical of 1H/M.

The 1M terrestrial ecosystem is characterized by moderately steep to steep rough mountain slopes at elevations of about 3,000 to 5,500 feet. Dominant slopes are 40 to 60 percent. 1M is otherwise similar to 1P. The mountain slopes of the front range of the Catalina Mountains are typical of 1M.

The 2P terrestrial ecosystem is characterized by nearly level to moderately sloping alluvial fans and piedmont plains at elevations of about 3,500 to 5,500 feet. Dominant slopes range from 1 to 15 percent. The climate is steppe (hot). Mean annual air temperature ranges from about 59° to 70° F. Mean annual precipitation ranges from about 11 to 14 inches which comes as gentle rains in winter and high intensity localized thunderstorms in summer. The dominant native vegetation are grasses including, but not necessarily limited to, bush muhly, cane beardgrass, Texas bluestem, tobosa in limited areas, curly mesquite, black, sideoats, and hairy grammas. Incidental to major overstory amounts of mesquite also occur. The exotic Lehmanns lovegrass also is common. The mesquite grassland type seen from I-19 between Tucson and Nogales is typical of 2P.

The 2P/H terrestrial ecosystem is characterized by a complex of gently sloping to moderately steep hills and valley plains at elevations of about 3,500 to 5,500 feet. Dominant slopes range from 5 to 40 percent. 2 P/H is otherwise similar to 2P. A good example of 2 P/H can be seen from I-19 between Tucson and Nogales.

The 3P terrestrial ecosystem is characterized by grassed level to moderately sloping alluvial fans, valley and piedmont plains, tableland, and interspersed moderately sloping low hills at elevations of about 5,000 to 5,500 feet. Dominant slopes range from 1 to 15 percent with hills ranging up to 25 percent. The climate is humid subtropical. Mean annual air temperature ranges from about 56° to 64° F. Mean annual precipitation ranges from about 14 to 18 inches which comes as gentle rains in winter and high intensity localized thunderstorms in summer. The dominant vegetation is plains lovegrass, curly mesquite, vine mesquite, cane beardgrass, and hairy sideoats, little bluestem, and blue grama. The exotic weeping lovegrass commonly occurs. The valley plains (the main drainage ways) may have an overstory of emory oak. The grassland of the San Rafael Valley is typical of 3P.

4M is characterized by level to gently sloping basins and valley plains at elevations above 7,500 feet. Dominant slopes range from 0 to 5 percent. The climate is temperate continental. Mean annual air temperature ranges from 45° to 50° F. Mean annual precipitation ranges from about 24 to 30 inches which comes as snow in winter and thunderstorms in the summer. The dominant native vegetation is wheatgrass species, long tongue muhly, deer grass, bullgrass, pine drop seed, june grass, and sedge species. The open meadow area just below Rustler Park in the Chiricahuas is a good example of 4M.

5H is characterized by moderately sloping to moderately steep hills at elevations of about 4,800 to 5,500 feet. Dominant slopes range from 15 to 40 percent. The climate is humid subtropical. The temperature ranges from 52° to 58° F. Mean annual precipitation ranges from 16 to 21 inches which comes as gentle rains and some snow in winter, and high intensity localized thunderstorms in summer. The dominant native vegetation is mountain mahogany, desert ceanothus, manzanita, toumey, emory, silver leaf, and Arizona white oak and a scattering of Chihuahuahua, pinyon, and ponderosa pine. Turbinella oak may also be present. Much of the Santa Teresa Mountains have good examples of 5H.

5H/M is characterized by a complex of moderately sloping to steep hills and mountains at elevations of about 4,800 to 6,300 feet. Dominant slopes range from 25 to over 60 percent. 5H/M is otherwise similar to 5H. Much of the Santa Teresa Mountains are typical of 5H/M.

6P/S is characterized by nearly level to moderately steep sided tableland and piedmont plains at elevations of about 5,000 to 5,400 feet. Dominant slopes are 1 to 35 percent. The climate is humid subtropical. Mean annual air temperature ranges from 57° to 65° F. Mean annual precipitation ranges from about 14 to 18 inches which comes as low intensity rains in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is characteristic of an oak savannah which is what 6P/S is. Tree canopy cover is less than 5 percent. Grasses include plains lovegrass, curly mesquite, vine mesquite, little bluestem, cane beardgrass, hairy sideoats, and blue grama. The area north of the Mexico border to the Canelo Hills and Huachuca Mountains are good examples of 6P/S.

6P is characterized by nearly level to moderately sloping alluvial fans and piedmont plains at elevations of about 4,800 to 5,400 feet. Dominant slopes range from 1 to 15 percent. The climate is humid subtropical. Mean annual air temperature ranges from about 52° to 58° F. Mean annual precipitation ranges from about 16 to 19 inches which comes as low intensity rains in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is emory and Arizona white oak, alligator juniper, manzanita, and Juniperus Erythrocarpa. The flat wooded areas surrounding the San Rafael Valley are typical of 6P.

6P/H is characterized by a complex of gently sloping to moderately steep hills and piedmont plains at elevations of about 4,800 to 5,800 feet. Dominant slopes range from about 5 to 35 percent. 6P/H is otherwise similar to 6P. Much of the Canelo Hills area is representative of 6P/H.

6H/M is characterized by moderately sloping to moderately steep hills and mountains at elevations of about 4,800 to 6,300 feet. Dominant slopes are 25 to 40 percent. Good examples of 6H/M are found in any of the more mountainous oak types on the Coronado.

6M is characterized by moderately steep to steep mountains at elevations of about 5,000 to 6,300 feet. Dominant slopes are 40 to over 60 percent. Good examples of 6M are found in almost all of the Coronado's mountain ranges.

7P is characterized by nearly level to moderately sloping alluvial fans and piedmont plains at elevations of about 5,000 to 6,000 feet. Dominant slopes range from 1 to 15 percent. The climate is humid subtropical. Mean annual air temperature ranges from about 50° to 58° F. Mean annual precipitation ranges from about 17 to 22 inches which comes as gentle rains and snow in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is pinyon pine (mostly Mexican), alligator juniper, Arizona white oak, emory oak, and may have some Chihuahua pine.

7P/H is characterized by a complex of gently sloping to moderately steep hills and valley plains at elevations of about 5,000 to 6,200 feet. Dominant slopes range from 5 to 40 percent. 7P/H is otherwise similar to 7P.

7H/M is characterized by moderately sloping to moderately steep hills and rough mountain slopes at elevations of about 5,500 to 7,000 feet. Dominant slopes range from 25 to 40 percent. 7H/M is otherwise similar to 7P.

7M is characterized by moderately steep to steep rough mountain slopes at elevations of about 6,000 to 7,000 feet. Dominant slopes are 40 to 60 percent. 7M is otherwise similar to 7P.

8M is characterized by moderately sloping to moderately steep or steeper canyons and mountain slopes at elevations of about 7,500 to 9,300 feet. Dominant slopes are 15 to 40 percent. The climate is temperate continental. Mean annual air temperature ranges from about 44° to 50° F. Mean annual precipitation ranges from about 26 to 32 inches which comes as gentle rains and perhaps heavy snows in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is aspen, Rocky Mountain maple, box elder, ash, and New Mexican locust.

9AH/M is characterized by moderately sloping to moderately steep hills and rough mountain slopes at elevations of about 6,500 to 7,700 feet. Dominant slopes are 25 to 40 percent. The climate is on the border between humid subtropical and temperate continental. Mean annual air temperature ranges from about 49° to 55° F. Mean annual precipitation ranges from about 20 to 26 inches which comes as gentle rains and perhaps heavy snows in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is a mix of manzanita, Arizona white oak, silver leaf oak, alligator juniper, pinyon pine (dominantly Mexican), Chihuahua pine, and ponderosa pine.

9BH/M is characterized by moderately sloping to very steep mountain slopes at elevations of about 7,000 to 9,000 feet. Dominant slopes are 25 to 80 percent. The climate is temperate continental. Mean annual air temperature ranges from about 45° to 52° F. Mean annual precipitation ranges from about 22 to 26 inches

which comes mostly as snow in the winter and high intensity thunderstorms in summer. The dominant native vegetation is ponderosa pine, alligator juniper, some gambel oak, and madrone. Good examples of 9BH/M occur in the Pinaleno, Santa Catalina, Chiricahua, and Huachuca Mountains.

9CH/M is characterized by moderately sloping to very steep mountain slopes at elevations of about 6,800 to 9,000 feet. Dominant slopes are 25 to 80 percent. The climate is temperate continental. Mean annual air temperature ranges from about 45° to 50° F. Mean annual precipitation ranges from about 28 to 32 inches which comes as snow in the winter and high intensity thunderstorms in summer. The dominant native vegetation is Douglas fir and ponderosa pine. Good examples of this type occur in the Chiricahua, Huachuca, Pinaleno, and Santa Catalina Mountains.

9DH/M is characterized by moderately sloping to moderately steep mountain slopes at elevations of about 8,000 to 9,800 feet. Dominant slopes are 15 to 40 percent. The climate is boreal. Mean annual air temperature ranges from about 38° to 44° F. Mean annual precipitation ranges from about 30 to 35 inches which comes in winter as heavy snows and high intensity thunderstorms in summer. The dominant native vegetation is white fir, Douglas fir, scattered aspen, and in a few areas, high densities of Engelmann spruce and corkbark fir. Good examples of this type occur at the top of the Chiricahua, Santa Catalina, and Pinaleno Mountains.

10R is characterized by nearly level to gently sloping intermittent streams at elevations of about 4,300 to 4,800 feet. Dominant slopes are 0 to 5 percent. The climate is steppe (hot). Mean annual air temperature ranges from about 66° to 72° F. Mean annual precipitation ranges from about 8 to 10 inches which comes from gentle rains in winter and high intensity localized thunderstorms in summer. Because of its position, significantly larger amounts of moisture are available. 10R is a riparian zone whose native vegetation includes mesquite, desert seep willow, and desert broom. Gardner Canyon or the lower part of Cave Creek near Portal (off the Forest) is a good example of 10R.

11AR is characterized by nearly level to gently sloping intermittent streams at elevations of about 4,800 to 5,600 feet. Dominant slopes are 0 to 5 percent. The climate is steppe (hot). Mean annual air temperature ranges from about 56° to 64° F. Mean annual precipitation ranges from about 12 to 16 inches which comes from gentle rains in winter and high intensity localized thunderstorms in summer. Because of its position, significantly larger amounts of moisture are available. 11AR is a riparian zone whose native vegetation includes Fremont cottonwood, Arizona sycamore, a few emory oak and Arizona walnut, wolfberry, and Texas mulberry. Cave Creek, just south of Portal, is a good example of 11AR.

11BR is characterized by nearly level to gently sloping intermittent streams at elevations of about 4,600 to 5,600 feet. Dominant slopes are 0 to 5 percent. The climate is humid subtropical. Mean annual air temperature ranges from about 54° to 58° F. Mean annual precipitation ranges from about 16 to 19 inches which comes as gentle rains in winter and high intensity localized thunderstorms in summer. Because of its position, significantly larger amounts of moisture are available. 11BR is a riparian zone whose native vegetation is primarily large diameter emory oak, Arizona walnut, and alligator juniper. 11BR, especially on the Douglas District, is an extremely good fuelwood area.

12R is characterized by nearly level to gently to moderately sloping perennial, and frequently flowing intermittent streams at elevations of about 5,000 to 7,200 feet. Dominant slopes are 0 to 10 percent. The climate is humid subtropical to temperate continental. Mean annual air temperature ranges from about 46° to 52° F. Mean annual precipitation ranges from about 18 to 24 inches which comes as gentle rains and some snow in winter and high intensity localized thunderstorms in summer. Because of its position, significantly larger amounts of moisture are available. 12R is a riparian zone whose native vegetation primarily includes Arizona cypress, pinyon pine, apache pine, Chihuahua pine, ponderosa pine, Arizona white oak, Douglas fir, Arizona sycamore, silverleaf oak, aspen, emory oak, and Rocky Mountain maple. The South Fork of Cave Creek is a good example of 12R.

Table 2. Past and Future Management Considerations

<u>FORPLAN CODE</u>		<u>DESCRIPTION</u>
ALOTIS	-	All Isolated Mountain Ranges
ALLOTH	-	All Other Mountain Ranges
WILD	-	Areas Designated as Wilderness by Congress
BUNROB	-	Bunk Robinson Wilderness Study Area
ERNAOW	-	Existing Research Natural Areas outside a Wilderness Area
ERNAIW	-	Existing Research Natural Areas inside a Wilderness Area
PRORNA	-	Proposed Research Natural Areas
MADCAN	-	Madera Canyon
CAVECR	-	Cave Creek in the Chiricahua Mountains
HIREC	-	High Country Recreation Coniferous Forest Area
ALLREC	-	Low Country Recreation Grassland and Woodland Areas
RIPAR	-	Riparian Areas and Higher Ecosystem Extensions
CAVREC	-	Actual Developed Recreation Sites in Cave Creek
MADREC	-	Actual Developed Recreation Sites in Madera Canyon
DEVREC	-	Other Existing Developed Recreation Sites in the National Forest
GRAHAM	-	Mt. Graham Wilderness Study Area
WHITMR	-	Whitmire Canyon Wilderness Study Area
ERNARA	-	Existing Research Natural Areas inside a Wilderness Study Area

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Resource Outputs

Water Yield

Water yield was calculated for each ecosystem and then assigned to appropriate analysis areas and expressed as the average acre-feet produced per annum from the total area.

Water yield was related to existing Forest vegetation and analysis areas. A literature review was first conducted to establish the average annual yield that could be expected from various vegetative types. This review resulted in an average annual water yield coefficient for each ecotype found on the Forest.

In order to establish a baseline to work from, water yield from the entire Forest was calculated using the SCS (Soil Conservation Service) method. This was supplemented with data from U.S. Geological Survey (USGS) stream gaging stations located on or near the Forest that could be used for this purpose. The results of this analysis indicated that the average annual water yield from the Coronado National Forest is currently 146,000 acre-feet.

The coefficients used to estimate current water yield are as follows:

<u>Ecosystem/ Capability Area</u>	<u>Major Vegetation Dominant Range of Slopes</u>	<u>Water Yield Coefficients (average acre- inches per year)</u>
1P	Saguaro, palo verde, ocotillo, mesquite, catclaw, brittle bush 1 - 15%	.14
1HM	same as 1P except 25 - 40% slope	.17
1M	same as 1P except 40 - 100% plus slopes	.17

The coefficients used to estimate current water yield are as follows (Continued)

<u>Ecosystem/ Capability Area</u>	<u>Major Vegetation Dominant Range of Slopes</u>	<u>Water Yield Coefficients (average acre- inches per year</u>
2P	Mesquite, curly mesquite, hairy, black, and sideoats gramas 1 - 15%	.14
2PH	same as 2P except 5 - 40% slopes	.14
3P	Plains lovegrass, curly mesquite, blue, hairy, and sideoats gramas cane beardgrass 1 - 15%	.90
4M	Wheat grasses, long tongue muhly, deer grass, pine drop seed, June grass, sedge species 0 - 5%	2.30
5H	Mountain mahogany, desert ceanothus manzanita, Toumey, Emory, silver leaf and Arizona white oak, pinyon pine 15 - 40%	1.50
5HM	same as 5H except 25 - 60% slopes	1.18
6P	Emory and Arizona white oak, alligator juniper, manzanita 1 - 15%	1.07
6PH	same as 6P except 5 - 35% slopes	1.10
6HM	same as 6P except 25 - 40% slopes	1.21
6M	same as 6P except 40 - 60% plus slopes	1.20
6PS	Sparse canopy cover of Emory and Arizona white oak, and same grasses as 3P 1 - 35%	.69
7P	Mexican Pinyon Pine, alligator juniper Arizona white and Emory oak 1 - 15%	1.65
7PH	same as 7P except 5 - 40% slopes	1.55
7HM	same as 7P except 25 - 40%	1.70
7M	same as 7P except 40 - 60% plus slopes	1.50
8M	Aspen, Rocky Mountain maple, box elder, several species of ash, New Mexican locust 15 - 40%	2.20
9AHM	Manzanita, Arizona white and silver leaf oak, alligator juniper, Mexican pinyon, Chihuahua and Ponderosa Pine 25 - 40%	2.10
9BHM	Ponderosa Pine, alligator juniper, Gambel oak, madrone 25 - 80%	2.30
9CHM	Douglas fir, Ponderosa pine	2.21
9DHM	White, Arizona Corkbark, and Douglas fir, Engelmann spruce 15 - 40%	2.12

The coefficients used to estimate current water yield are as follows: (Continued)

<u>Ecosystem/ Capability Area</u>	<u>Major Vegetation Dominant Range of Slopes</u>	<u>Water Yield Coefficients (average acre- inches per year</u>
10R	Dry riparian like zone with mesquite desert and seep willows, desert broom 0 - 5%	.16
11AR	Riparian zone with Fremont cottonwood, Arizona sycamore, Arizona walnut, wolfberry 0 - 5%	.88
11BR	Riparian like zone with Emory oak, Arizona walnut, alligator juniper 0 - 5%	.81
12R	Riparian zone with Arizona cypress, Apache, Chihuahua, and Ponderosa pine, Arizona white and silver leaf oak, Douglas fir, Arizona sycamore, Rocky Mountain maple, aspen 0 - 10%	1.62

Potential Water Yield Increases

After establishment of current water yield coefficients, the potential increases that could be expected using vegetation management techniques were addressed. Literature was again reviewed to determine the average annual increases that could be expected. The findings of this search are summarized here by ecosystem/capability area groupings.

1P, 1HM, 1M, 2P, and 2PH: Because of low precipitation, high evaporation rates, and sparse vegetation, water yields for this group and their respective analysis areas cannot be expected to increase as a result of vegetation management. (Ffolliott and Thorud, 1975).

3P and 4M: Inherently low water yielding characteristics and limited acreage make water yield improvement practices unrealistic. (Ffolliott and Thorud, 1975).

5H and 5HM Assuming annual average precipitation of 16 to 21 inches, water yield increases of approximately 2.4 inches per year per acre treated could be expected (SCS Field Engineering Manual).

6P, 6PH, 6HM, 6M, 6PS, 7P, 7PH, 7HM, 7M, and 9AHM: Water yield increases of less than 0.50 inches per year per acre treated can be expected from these areas (Ffolliott and Thorud, 1975). This increase is not enough to be considered significant (Regional Direction, FSM 1922.24a R-3 Supplement 6, 1984).

8M: Very limited acreage makes water yield efforts impractical in this area.

9BHM: Assuming annual average precipitation of 22 to 26 inches, water yield increases of approximately 2.0 inches per year per acre treated could be expected (Ffolliott and Thorud, 1975). However, because of other higher valued resources and activities in 9BHM, this area is not generally available for water yield improvement treatments. Some of these higher valued activities or resources are recreation, wildlife, and visual quality.

9CHM and 9DHM: Assuming annual average precipitation of 28 to 35 inches, water yield increases of approximately 1.2 inches per year per acre treated could be expected (Ffolliott and Thorud, 1975). For the same reasons as 9BHM, 9CHM, and 9DHM are generally not available for treatment.

10R, 11AR, 11BR, and 12R: Vegetation management to increase water yields in riparian or riparian like areas would require the removal of trees critically important to recreation and wildlife. Because of this, water yield increases in these areas was not examined further.

In summary the potential water yield increases are as follows

<u>Ecosystem/Capability Area</u>	<u>On-site Potential Water Yield Increase Coefficients (acre-inches per year average)</u>
1P, 1HM, 1M, 2P, 2PH, 3P, 4M	Not significant
5H, 5HM	2.4 (Does not consider water transmission losses between treated sites and downstream uses)
6P, 6PH, 6HM, 6M, 6PS, 7P, 7PH, 7HM, 7M, 8M, 9AHM	Not significant
9BHM, 9CHM, 9DHM, 10R, 11AR, 11BR, 12R	Not considered because of other higher valued resources and activities

Recreation

Recreation coefficients were developed by interviewing District personnel and taking RIM recreation use data and assigning this information to analysis areas based upon existing use. This use was expressed as average Recreation Visitor Days (RVD) per acre for dispersed, wilderness, and developed area recreation; the proportion of the analysis area that was assigned to each management intensity by FORPLAN determined the distribution of RVD's among these three categories of recreation. Recreation use information was further tabulated by ecogroup; i.e., desert grassland, woodland, coniferous forest, and riparian, and also by type of activity; i.e., water recreation, non-motorized recreation, and so forth as appropriate for the areas. The resulting RVDs for each activity type occurring in a given ecogroup were divided by the number of acres in that ecogroup to arrive at a per acre average annual RVD use value. These values served as the current base for future use projections. Potential use or demand for developed and dispersed recreation was assumed to increase at the same rate as the population growth of southern Arizona which is estimated to be 2 percent. These values were increased by 2 percent per year until the practical potential by ecotype was reached. Practical potential was calculated using the R-3 model and was done by ecotype and aggregated into the four ecogroups mentioned previously in this section. Additionally, for developed recreation demand, the Forest's capability to meet demand was based on currently planned developments, mid to long range thoughts of past and present recreation staffs, NFRS inventories, and current Management Plans (Santa Catalina Planning Unit and the Madera Canyon Planning Unit). Potential use for wilderness recreation was projected using an assumed rate of increase of 3.5 percent per year.

Soil Loss

Soil loss was modeled through the planning process for estimating sheet and rill erosion under various management activities for all analysis areas. It is expressed in terms of an average annual tons/acre value for each time period.

Soil loss was calculated for present conditions per direction contained in R-3 Terrestrial Ecosystem Note 2550-5, April 1981--Universal Soil Loss Equation (USLE) and modeled for future activities. The Universal Soil Loss Equation calculates soil loss based on various environmental conditions.

The equation is $A = (R)(K)(L S)(P)$.

Where:

"A" is the computed on-site soil loss in tons per acre per year. It is not sediment yield.

"R" is the rainfall factor. It is the sum of the energy intensity for a normal years rainfall. The relationship is:

$$R = 25(P)^{1.5}$$

R = rainfall factor

P = 2 year, 6 hour rain event

"K" is the soil erodability factor which represents the capability of a soil surface to resist erosion. It is a function of the soil physical and chemical properties that effect soil erosion. Significant properties effecting soil erosion include texture, organic matter, structure and permeability.

The relationship is:

$$100 K = 2.1 M^{1.14} (10^{-4})(12-a)+3.25(b-2)+2.5(c-3)$$

M = (% silt + % very fine sand)(% silt + % very fine sand + % sand)

a = % organic matter

b = soil structure factor

c = soil permeability factor

LS is the slope effect factor. The relationship is:

$$LS = (a/72.6)^m(65.41 \sin^2 \theta + 4.56 \sin \theta + .065)$$

a = slope length in feet

θ = angle of slope

m = .5 for slopes greater than or equal to 5%;

.4 for slopes 3.5-4.5%; .3 for slopes 1.0-3.0;

.2 for slopes 1%

"L" is the slope length factor which considers distance from the origin of overland flow to a point where slope decreases, or a point of entry into a channel or where it becomes concentrated.

"S" is the slope gradient factor.

It is the ratio of soil loss from the field gradient to a 9 percent reference slope.

"C" is the cover management factor. It relates the effect of effective ground cover to the computation of erosion. This factor reflects response to management activities.

"P" is the management practice factor. This factor shows the effect of management practices such as contour tillage and strip cropping which would effect runoff. In wild land situations this factor is assumed to be 1.0 unless specific project work will effect this factor in a measurable way. This factor is for project level work and is not suitable for planning.

The Universal Soil Loss Equation was used to predict changes in soil loss through the planning horizon by applying factors to the current soil loss. Coefficients developed for changes in cover factors or soil loss provided estimates of soil loss for the variety of management activities that could or are taking place on the Forest.

The following assumptions were made in modeling soil loss:

Location and timing of future management activities within an analysis area cannot be specified. The impact will be assumed to be uniform over a representative area. Soil loss is calculated as a weighted average based upon soil types present within representative areas for the time period.

The activity is completed within the time period being modeled.

A relationship exists between production of biomass and plant canopy and can be correlated to production of effective cover.

A computer program was written and used as an aid in grouping and calculating USLE values by Terrestrial Ecosystems. Known cover classes and canopy densities were used for this process and were taken from Terrestrial Ecosystems Surveys.

The resulting cover classes and USLE predictions were then grouped by capability areas by major management Forest levels into coefficients of tons per acre per year for the current soil loss and the natural (geologic) soil loss as shown in Table 3.

Table 3. Generalized Table of Sheet and Rill Erosion Coefficients

<u>Capability Area:</u>	<u>1P</u>	<u>1HM</u>	<u>1M</u>	<u>2P</u>	<u>2PH</u>	<u>3P</u>	<u>4M</u>
Representative Map Unit:	55	325	325	5/61	62	56	**
Average Slope %:	8	30	60	10	25	10	4
Average Slope Length:	150	125	75	150	125	150	50
R Factor:	45.928	50.597	55.413	50.597	50.597	50.597	70.711
K Factor:	.2	.2	.24	.2	.2	.17	.49
Average Existing Cover %:	34	36	36	36	46	43	75
Current Soil Loss:	1.908	14.691	28.641	2.782	8.583	1.232	.204
Natural Soil Loss:	1.327	1.548	26.585	2.354	7.157	.546	.126
<u>Capability Area:</u>	<u>5H</u>	<u>5HM</u>	<u>6P</u>	<u>6PH</u>	<u>6HM</u>	<u>6M</u>	<u>6PS</u>
Representative Map Unit:	252	252	59	253	309	334	333
Average Slope %:	25	40	8	25	35	50	25
Average Slope Length:	125	100	150	125	100	80	125
R Factor:	55.413	55.413	50.597	50.597	52.987	52.987	50.597
K Factor:	.2	.2	.2	.2	.17	.2	.17
Average Existing Cover%:	53	53	41	60	60	55	58
Current Soil Loss:	3.925	7.416	1.056	2.640	3.300	8.322	2.571
Natural Soil Loss:	3.023	4.798	.744	1.998	1.931	7.975	1.516
<u>Capability Area:</u>	<u>7P</u>	<u>7PH</u>	<u>7HM</u>	<u>7M</u>	<u>8M</u>	<u>9AHM</u>	<u>9BHM</u>
Representative Map Unit:	57	57	255	254	**	310	311
Average Slope %:	8	15	30	50	30	40	50
Average Slope Length:	150	125	125	80	125	100	80
R Factor:	55.413	55.413	55.413	55.413	70.711	60.374	65.474
K Factor:	.2	.2	.2	.2	.1	.1	.1
Average Existing Cover %:	53	54	63	57	60	56	68
Current Soil Loss:	.707	1.599	4.073	7.527	2.336	3.512	2.860
Natural Soil Loss:	.398	1.292	2.847	6.917	1.625	2.050	2.584
<u>Capability Area:</u>	<u>9CHM</u>	<u>9DHM</u>					
Representative Map Unit:	308	312					
Average Slope %:	60	30					
Average Slope Length:	75	125					
R Factor:	70.711	76.080					
K Factor:	.1	.15					
Average Existing Cover:	72	80					
Current Soil Loss:	3.171	1.426					
Natural Soil Loss:	3.171	1.426					

** 4M and 8M are very limited in acres and no actual soil mapping unit has been established for them.
Data is based on scattered observations.

Future soil loss was modeled for each management prescription using soil loss tolerances established by the Soil Conservation Service as a guide in conjunction with current and natural soil loss coefficients.

No coefficients were developed for capability areas 10R, 11AR, 11BR, and 12R because they are primarily drainage type units where USLE is not applicable. With the available Forest data, no other method exists to reasonably estimate soil losses from these units.

Grazing

Grazing capacity was calculated for all capacity and potential capacity range categories. Areas such as developed recreation sites, research natural areas, and excessively steep sloped areas were classified as no capacity range and received a coefficient of zero. Grazing capacity was expressed as average animal unit months (AUM's) per acre.

The most recent Range Production Utilization study for each allotment, where available, was used in conjunction with R-3 Terrestrial Ecosystem Note 2550-18, May 1981 to estimate the forage production for each capability area by each major management area (level 1 identifier) on the Forest. These values were then applied to the R-3 RANGELAND Model formula to arrive at the capacity in acres/aum.

The formula is as follows:

$$\text{ACRES/AUM} = \frac{\text{lbs. of forage intake/AUM}}{(\text{Forage production lbs./acre}) \times (\text{A.U.F.}) \times (\text{G.I.})}$$

An AUM is an animal unit month or in other words one mature cow, or equivalent, grazing for one month. Forage intake in lbs./AUM equals 600 pounds of forage needed to sustain one AUM (RANGELAND Model).

Forage production in lbs./acre equals the estimated average pounds of forage produced on one acre of the appropriate capability area type.

The allowable use factor (A.U.F.) is the percentage of the forage production which can be used by grazing animals and allows for maintenance or needed improvement in range condition. Allowable uses were derived from current interviews with District Range Conservationists, current Production Utilization studies, and R-3 guidelines in Chapter 50, Range Analysis and Management Handbook, FSH 2209.21.

Grazing Intensity (G.I.) is a factor that is related to the level of management and the development of range structural improvements. A maximum grazing intensity factor of 1.0 would be used where management was intensive and range improvements were optimum.

Each Ranger District estimated the current capacity of each allotment on their District. A computer program was written to aid in the allocation of capacity appropriately over the Forest within the FORPLAN Model by analysis area, management prescription, level of grazing management, and time.

Five levels of livestock grazing management were considered for the purpose of analysis and projection of outputs. These levels were A, B, C, D, and E which range from no grazing (level A) to maximum grazing (level E). Specific definitions are contained in the DEIS (Glossary) under "Livestock Grazing Management Levels". Outputs associated with the various prescriptions are varying applications of management intensities and were dependent on specific prescription objectives. Projected outputs by prescription over time cannot be viewed as absolute in nature, but actually represent the estimated flow of outputs with varying management intensities over time. Actual output coefficients or total AUM outputs will be dependent on actual management intensity applied on an individual grazing allotment and actual rate of improvement in range condition and increase in forage production.

Current permitted use was determined by summarizing the permitted use on each allotment as of 1980. Direction in range administration on the Forest is to bring permitted AUMs in line with the grazing capacity of each allotment. This basic

goal has been incorporated into the current land management plan. Based on the current rate of progress and AUM capacity outputs under the preferred alternative, it is estimated that by the end of the second period or the beginning of the third that permitted use will balance with capacity. After this balance is reached, moderate levels of livestock increases might be expected. As time progresses into the final periods of the plan, allotments become more intensively managed and range conditions continue to improve. The projection of the current rate of progress is dependent on budget levels sufficient for operation and maintenance and range improvements as indicated in the preferred alternative. Lesser budget levels would most likely require a longer time frame for balancing permitted use with capacity.

Wildlife

The basis for wildlife recreation output coefficients came from a model developed under contract which suggested a method to calculate outputs for game, non-game, and threatened and endangered species. This model was modified by the R-3 Regional Office Wildlife Section and Region V of Arizona Game and Fish and was used to calculate the previously mentioned outputs. The following is an outline of how the coefficients were developed. The full methodology is available in the LMP files of the Coronado National Forest.

Recreation specialists on each Ranger District stratified fishing and hunting use (based on 1980 Arizona Game and Fish values) and non-game use (based on 1980 RIM data) by dispersed and non-dispersed activities. The terrestrial ecosystem in which the activity occurred was noted.

These RVD's by ecosystem group were then broken down into high and low access groups. Further divisions yielded an RVD sum by high or low access by management consideration (prescription). One main assumption used in these calculations was that 75% of the hunting occurred within a one half mile of a road (AGF, 1980). This assumption enabled use of the Recreation Opportunity Spectrum system. These RVD values were divided by the acres in the management consideration to give a coefficient in RVDs/acre/year.

The coefficients representing the current management situation were projected to the year 2080.

The following assumptions were used for calculation in each decade:

Game and Fish:

- Big Game - Improvement of big game habitat through improved range conditions, water development, and habitat improvement projects would be offset by continued aggressive fire suppression in high density animal population ecotypes, expanded mining activity, and increased demand for space by increased human population. Big game population numbers would remain the same as would hunting permit numbers (AGF 1980a). In addition, an alternate assumption of two percent growth per year was used to estimate potential wildlife recreation needs.
- Small Game - Analysis of State of Arizona strategic plans for cottontail, mourning dove, quail, pigeon, and squirrel showed generally a projected hunter demand through 1985 that matched the expected human population growth at a two percent increase per year. Coefficients for small game were allowed to follow human population growth (AGF 1980b).
- Fishing - Consultation with Will Hayes (Fisheries Specialist for Region V, AGF) revealed fisherman demands matching population growth through 1985. From 1985 through 2080, the AGF would match demand by increasing hatchery production. A two percent per year increase for fishing was used.
- Non-game - Review of Richards, et al. (1979:16) revealed a two percent increase in non-game use on the Coronado over an earlier planning period of 1979 to 1995. This two percent annual change was projected through 2080.

The following assumptions were used for calculation in each decade: (Continued)

Threatened and
Endangered
Species

- Occupied acres were described in another report, Analysis of Management Situation Part VIII, Wildlife and Fish, and in Part XVII Vegetation Management (Coronado National Forest, LMP files).
-

Timber

Because the Coronado National Forest is not a timber forest, stand data was sparse and largely out of date. The latest information was used from the only two Districts that have any timber cutting at all, the Catalina and Safford Ranger Districts. This data was entered into a program called ECOSIM which is resident at the Fort Collins Computer Center. This program helped develop the timing for various strategies of cutting. The most reasonable of these strategies were modeled in FORPLAN and as a result net merchantable timber volume in MCF (thousands of cubic feet) per period was tracked.

The net merchantable timber volume represents the volume of merchantable timber which is scheduled for harvest. It includes sawtimber and roundwood products. When the non-declining yield constraint is applied in FORPLAN, the level of timber production is equal to or greater than the harvest for the preceding period.

Fuelwood

The supply of fuelwood was subdivided into four categories: (1) Mesquite, (2) Junipers and oaks, (3) Timber species when not harvested for timber, (4) Dead and down of the above groups.

A basic fuelwood inventory was available for most of the Forest and was used to estimate current fuelwood availability by species and accessibility. This information in MCF/acre was then applied to appropriate capability areas. Continued fuelwood cutting at present levels or higher is dependent on accessibility. A key consideration to meeting the increasing demand for fuelwood is providing road access to areas of currently inaccessible suitable fuelwood producing land. The supply of preferred fuelwood on currently accessible areas will be seriously reduced by the present demand which is expected to continue to increase. The coefficients in the fuelwood output tables were developed with the above information and reflect outputs appropriate to the applicable management prescriptions.

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(continued)

Benefit Values

Outputs and benefit values displayed in Table 4 were tracked in FORPLAN. Benefit values were developed from the 1985 RPA Program. All values are in terms of 1980, 4th quarter dollars.

Hunting and fishing wildlife recreation benefits were calculated as a weighted average of big game use, other game use, and fishing use. Nongame wildlife recreation benefits were used as given. Other dispersed recreation benefits were calculated as a weighted average use figure for urban, rural, roaded natural, semi-primitive motorized, semi-primitive non-motorized, and primitive ROS classes. These were further categorized according to whether a prescription provided standard or less than standard recreation experience.

Wilderness recreation use benefits were calculated as a weighted average use figure for semi-primitive motorized, semi-primitive, and primitive ROS classes. These were further categorized according to whether a prescription provided standard or less than standard recreation experiences.

Developed recreation benefits were calculated as a weighted average use figure for urban, rural, and roaded natural, ROS classes. These were further categorized according to whether a prescription provided standard or less than standard recreation experiences.

Benefit values for grazing are based on Economic Research Service (ERS) studies of the costs and returns for permitted grazing on the Forest. The benefit value is applied to permitted use which is within capacity. Permitted use above capacity is assigned a zero benefit value.

All benefit values remained constant throughout the planning horizon.

Sawtimber benefit values used were calculated by the Forest based on historical information and are a weighted average of all species harvested. Values used for cable logging are reduced to reflect the higher cost for cable operations compared to conventional tractor logging. Benefit values for fuelwood were used as given.

Soil loss was modeled as a negative benefit (cost). Significant differences in PNW among alternatives did not occur from valuing soil loss.

Minerals values were calculated outside the model for energy related leases, locatable minerals, and mineral materials. The benefit value used for energy related leases was \$1.82 per acre. The benefit value used for locatable minerals was five-percent of market value. Market values for locatable minerals were computed on the basis of actual production and the "willingness-to-pay concept" for maintaining staked mining claims. The benefit value used for minerals materials was \$2.82 per ton.

Water yield benefits were calculated outside the model using a value of \$39.60 per acre foot for gross water yield estimates.

Mineral and water outputs remain constant between alternatives described in detail. These benefit values are calculated in the analysis of the alternatives; however, they do not effect the evaluation of alternatives based on PNW.

Table 4. Benefit Values for Outputs Used in FORPLAN Model

<u>Output Name</u>	<u>Unit of Measure</u>	<u>Benefit Value</u> (1980, 4th Quarter Dollars)
Livestock grazing permitted use	Animal Unit Month (AUM)	\$13.12/AUM
Livestock grazing capacity	Animal Unit Month (AUM)	<u>1</u> /
Fuelwood	Cubic feet	\$0.02822/Cubic foot (\$5.64 MBF)
Timber (tractor harvest)	Thousand Cubic Feet (MCF)	\$175/MCF (\$35/MBF)
Timber (cable harvest)	Thousand Cubic Feet (MCF)	\$ 50/MCF (\$10/MBF)
Hunting and fishing use	Recreation visitor day(RVD)	\$16.90/RVD
Nongame wildlife use	Recreation visitor day(RVD)	\$22.76/RVD
Dispersed recreation use	Recreation visitor day (RVD)	
Less than standard		\$6.04/RVD
Standard		\$11.43/RVD
Wilderness recreation use	Recreation visitor day (RVD)	
Less than standard		\$6.64/RVD
Standard		\$12.52/RVD
Developed recreation use	Recreation visitor day (RVD)	
Less than standard		\$4.56/RVD
Standard		\$8.60/RVD
Soil loss	Tons	\$-0.0005/ton

1/ Permitted use is valued up to the capacity. Permitted use beyond capacity is assigned a zero benefit value.

COEFFICIENT
DEVELOPMENT
(continued)

Costs

The Coronado National Forest model includes costs for all management practices and activities. Costs were based on Forest budget data for Fiscal Years 1980 & 1981. In addition to Forest Service expenditures, costs were also estimated for livestock grazing permittee investments and costs incurred by State Game and Fish Departments related to management of wildlife on the National Forest. Budget constraints are applied to Forest Service costs only.

Costs varied with the prescription because, the types of investment and level of operations and maintenance varied depending on the standards and guidelines applied to a given analysis area.

Some costs, such as operation and maintenance, occur annually. Other costs, such as construction and reconstruction occur periodically. Investment costs were incorporated within the period in which they occurred or averaged over several periods so that they could be added to annual costs. The resulting annual value was assumed to remain constant for that period.

All costs are valued as 4th quarter 1980 dollars.

Management practices and activities used are shown in Table 5.

Table 5. Management Practices and Activities

<u>Code</u>	<u>Management Practice</u>	<u>Description</u>
DU-1	Dispersed Recreation	Includes expenditures for the management, operation, and maintenance of dispersed recreation and visitor information recreation facilities. Includes planning, inventory, administration, operation, maintenance, management, resource treatment, administration of special use permits.
DU-2	Visual Resource Inventory and Planning	Includes expenditures for the management, protection, and enhancement of visual resources. Includes inventories, planning, and mitigation.
DU-3	Cultural Resource Management	Includes expenditures for the management, protection, and enhancement of cultural sites for public and scientific use. Includes planning, inventories, evaluation, protection, and enhancement.
DU-4	Trail Construction-Reconstruction	Includes expenditures for construction and reconstruction of trails. Includes bridges, retaining walls, rights-of-way, trailhead facilities, and similar structures necessary for visitor use, safety, and resource protection. Includes preconstruction, construction, and construction engineering.
DU-5	Developed Recreation-Operation & Maintenance	Includes expenditures for the management, operation, and maintenance of developed recreation and visitor information recreation facilities. Includes planning and inventory, administration, operation, maintenance, resource treatment, administration of recreation special use permits, and collection of recreation area use revenues.
DU-6	Developed Recreation Construction-Reconstruction	Includes capital investments necessary to complete proposed developments.

Table 5. Management Practices & Activities (Continued)

DU-8	Wilderness Management	Includes expenditures for management, operation, and maintenance of the wilderness resource and related facilities such as trails. Includes planning, inventory, administration, operations, and maintenance. Does not include expenditures for the management, operation, and maintenance of other resources and related facilities within the wilderness area.
DU-9	Wilderness Trail Construction-Reconstruction	See Code DU-4.
DU-10 & DU-11	Wildlife & Fish Operation and Maintenance	Includes expenditures for planning, management, administration, and maintenance of wildlife and fish habitat improvements.
DU-12 & DU-61	Threatened and Endangered Plant Species Habitat Improvement	Includes expenditures for structural and nonstructural improvements that benefit Threatened and Endangered plants. Includes special endangered species cultural measures as authorized under the Knutson-Vandenberg Act of June 9, 1930 as amended.
DU-13 & DU-61	Fish Habitat Improvement	Includes expenditures for structural and nonstructural improvements that benefit fisheries including Threatened and Endangered species. Includes special fish cultural measures as authorized under the Knutson-Vandenberg (K-V) Act of June 9, 1930 as amended.
DU-14 & DU-61	Game Habitat Improvement	Includes expenditures for structural and nonstructural improvements that benefit wildlife including Threatened and Endangered species. Includes special wildlife cultural measures as authorized under the Knutson-Vandenberg (K-V) Act of June 9, 1930 as amended.
DU-15 & DU-61	Nongame Wildlife Habitat Improvement	See Codes DU-13 & DU-14 above.
DU-16	Range Operation & Maintenance	Includes expenditures for managing the forage resource used by domestic livestock, including maintenance of range structural improvements, allotment management, range analysis, planning and administration.
DU-17 & DU-18	Range Improvements	Includes expenditures for construction of improvements for range management purposes, including fences, water development, and other range structures, revegetation of lands to establish forage cover, including re-establishing forage cover by natural revegetation, forage maintenance, and temporary protective fence construction and maintenance until area is open to grazing.
DU-60	Timber Stand Improvement	Includes expenditures for noncommercial, intermediate cuttings, and other treatments to improve the composition, constitution, condition, and increment of a timber stand.
None	Insect and Disease	Includes expenditures for planning, directing, and coordinating the Insect and Disease Management Program. Includes detection and evaluation surveys. Funds included with benefiting practice.
DU-19, DU-21 & DU-32	Timber Management	Includes expenditures for timber sale preparation, timber sale administration, timber management plans, silvicultural examinations, timber purchaser road reconstruction, and road construction engineering.

Table 5. Management Practices & Activities (Continued)

DU-34 & DU-46	Soil/Water Management	Includes expenditures for soil and water resource planning, evaluation monitoring, administration, inspection and maintenance of soil and water improvements, including dams. Includes developing and administering plans for soil and water resource improvement, special studies, and monitoring the effects of land use on the soil and water resource.
DU-33 & DU-45	Soil/Water Improvements	Includes expenditures for restoring and improving soil and water resources on Forest Service administered lands. Includes measures to improve or restore the quality of productivity of the soil, reduce erosion, and improve the quantity or timing of waterflow.
DU-36	Energy Minerals Management	Includes expenditures for oil and gas, coal, geothermal, and uranium minerals. Includes administration of permits and leases.
DU-36	Non-Energy Mineral Management	Includes expenditures for nonenergy minerals, minerals materials, and administration of permits and leases. Also includes, mining law compliance and administration.
DU-38	Human Resource Programs	Includes all expenditures for providing human and community development programs.
DU-40	Land Management Planning	Includes planning for the Land Management Plan, compliance with the National Environmental Policy Act, and Implementation of the Land Management Plan.
DU-39, DU-41, DU-42 & DU-44	Land Ownership Management	Includes expenditures for processing, approval and administration of permits. Includes leases, easements, amendments, rights-of-way grants, and Federal Energy Regulatory Commission license and permits. Also includes, expenditures for land status maintenance, land ownership planning and exchange proposals.
DU-43	Land Line Location	Includes expenditures necessary to identify legal boundaries of National Forest lands. Specific items include corner search, boundary location, and related maintenance.
DU-47, DU-48 & DU-50	Existing Road and Trail Operation and Maintenance	Includes expenditures for system inventory, transportation system planning, and maintenance of roads and trails included on the National Forest.
DU-49 & DU-51	Road & Trail Construction-Reconstruction	Includes expenditures for construction and reconstruction of system roads and trails.
DU-52	Facilities-Capital Investments	Includes expenditures for the construction of offices, dwellings, warehouses, and other related facilities.
DU-53 & DU-54	Facilities Maintenance	Includes expenditures for the maintenance of structural improvements used for fire and general administrative purposes such as offices, dwellings, lookout towers, warehouses, fences, water systems, telephone systems, and other related facilities.
DU-55	General Administration	
DU-56	Forest Fire Protection	Includes expenditures for fire prevention, detection, maintenance of fire equipment and initial attack forces, and supporting fire aviation operations for initial attack.

Table 5. Management Practices & Activities (Continued)

DU-56	Emergency Forest Fire Funds	Includes all expenditures for suppressing fires on Forest lands or endangering Forest Service administered lands. Includes false alarms, purchasing, reconditioning, and replacement of equipment and supplies expended or necessary for actual suppression.
DU-57	Fuel Treatment	Includes expenditures to dispose, reduce, manipulate and/or modify forest fuels and for fire management.
None	Forest Law Enforcement	Includes expenditures for the enforcement of laws governing the management of National Forest lands. Funds included with benefiting practice.
DU-58	Coop Law Enforcement	Includes expenditures for the enforcement of State and local law on National Forest System lands as provided for by agreements with States or political subdivisions thereof.

Table 5. Management Practices & Activities (continued)

ACTIVITIES

<u>Code</u>	<u>Description</u>
A01	Recreation planning and inventory.
A02	Cultural resource management.
A03	Visual resource inventory and planning.
A05	Recreation site construction.
A06	Recreation site rehabilitation.
A07	Visitor information services planning.
A08	Visitor information services--full service management.
A09	Visitor information services--reduced service management.
A11	Developed recreation sites--full service management.
A13	Developed recreation sites--reduced service management.
A14	Dispersed recreation--full service management.
A15	Dispersed recreation--reduced service management.
A16	Recreation management--private and other public sector.
B01	Wilderness planning and inventory.
B02	Wilderness area--full service management.
B03	Wilderness area--reduced service management.
C01	Fish and wildlife prescriptions.
C02	Wildlife surveys and coordination.
C03	Non-structured wildlife habitat improvement.
C04	Non-structured fish habitat improvement.
C05	Non-structured threatened or endangered plant habitat improvement.
C06	Structural wildlife habitat improvement.
C07	Structural fish habitat improvement.
C08	Structural threatened or endangered plant habitat improvement.
C09	Wildlife habitat maintenance.
C10	Fish habitat maintenance.
C11	Threatened and endangered plant habitat maintenance.
C12	Wildlife and fish cooperation with other agencies and groups.
D01	Range resource planning and inventory.
D02	Range resource management.
D03	Range forage improvement.
D04	Range forage improvement maintenance.
D05	Range structural improvements.
D06	Maintenance of range structural improvements.
E00	Timber resource management planning and inventory.
E05	Timber stand improvement.
E06	Timber sale preparation.

Table 5. Management Practices & Activities (Continued)

E07	Timber harvest administration.
F01	Water resource planning.
F02	Water resource inventory.
F03	Water resource monitoring.
F04	Water uses management.
F05	Water resource improvement.
F06	Water resource improvement maintenance.
G01	Mining law compliance and administration.
G02	Minerals management - oil and gas.
G04	Minerals management - geothermal.
G05	Minerals management - uranium.
G06	Minerals management - non-energy.
G07	Minerals management - common minerals material.
H02	Youth conservation corps program.
H03	Young adult conservation corps program.
H04	Senior community service employment program.
H06	Volunteers in the National Forests.
H07	Other human resource programs.
J01	Special use management (non-recreation).
J04	Withdrawals, modifications, and revocations.
J05	Land status maintenance.
J06	Property boundary location.
J07	Property boundary and corner maintenance.
J10	Encroachment.
J11	Land ownership planning.
J12	Land adjustment planning.
J13	Land exchange.
J15	Land acquisition.
J18	Rights-of-way acquisition.
J22	Forest land and resource planning.
552	Order 3 soil inventory.
553	Order 4 soil inventory.
K03	Soil resource planning.
K04	Soil monitoring.
K05	Soil resource improvement.
K06	Soil resource improvement maintenance.
L01	Transportation system planning and inventory.
L05	Arterial road reconstruction.
L09	Collector road reconstruction.
L10	Local road preconstruction.
L11	Local road construction engineering.
L12	Local road construction.
L13	Local road reconstruction.
L19	Road maintenance.
L20	Trail inventory and planning.
L21	Trail preconstruction.
L22	Trail construction and reconstruction.
L23	Trail system management.
L24	Fire, aviation and other construction and reconstruction.
L25	Fire, aviation and other facility maintenance.
L28	Dam administration and management.
P01	Fire management planning and analysis.
P02	Fire prevention.
P03	Fire detection.
P04	Initial attack forces.
P07	Forest fire support and facilitating services.
P08	Initial attack fire suppression action.
P09	Escaped fire suppression.
P10	Fuel management inventory.
P11	Treatment of activity fuels.
P12	Treatment of natural fuels.
P14	Fuel treatment area maintenance.
P15	Vegetation treated by burning.

Table 5. Management Practices & Activities (Continued)

P16	Air resource management.
P17	Air quality and visibility coordination.
P19	Aerial transportation of personnel.
P20	Aerial transportation of goods.
P21	Aerial application of materials.
P22	Aerial platform.
P24	Law enforcement.
P25	Cooperative law enforcement.
P27	Cooperative search and rescue.
P34	Insect and disease management - surveys and technical assistance.
P35	Insect and disease management - suppression.
P36	Insect and disease management plan inputs.
T02	General administration.
254	Administration of water uses.
255	Water uses inventory.
478	Commercial nonconvertible products sale and administration.
479	Free-use and administrative free-use administration.
908	Forest plan implementation.

ANALYSIS
REQUIREMENTS

Economic Efficiency (Present Net Value) Present net value (PNV) is the measure of economic efficiency used to maximize benefits realized from management of the Forest. It is defined as the discounted difference between the dollar value of all priced outputs and the dollar value of all expenditures for management and investment. The greater the PNV, the greater the net economic return.

Priced outputs that are included in PNV are all recreation visitor days (RVD), livestock grazing capacity measured in animal unit months (AUM), timber in thousands of cubic feet (MCF), and fuelwood (MCF). It does not include nonpriced benefits such as threatened and endangered species habitat maintenance or enhancement, maintenance of natural and scientific areas, protection of cultural resources, or visual quality protection. These nonpriced benefits together with the sum of PNV yield net public benefit, which is a more inclusive measure of total social welfare.

The dollar values used in calculating PNV are defined as the "willingness-to-pay-price," whether or not that price is actually collected by the Forest. PNV is, therefore, not synonymous with cash flow. The willingness-to-pay values represent potential dollar returns within the total economy.

Cost efficiency is a driving force in planning. Assumptions were necessary in determining projected future use levels and prices and costs to develop cost efficient prescriptions. Current use and supply levels were assumed to be at or near equilibrium. Anticipated levels of future use were developed for the Analysis of the Management Situation. Projected future use was derived from historical use, industry projections, and population projections. Standards and guidelines were developed to satisfy current and future use while still maintaining resource objectives.

PNV is a measure of the cost-efficient use of the Forest resources. However, resource management must be based on sound biological, physical, and social principles as well. Because it is not possible to assign dollar values to all resources, the final decision is the quantifiable PNV plus consideration of the non-quantifiable Forest resources.

A comparison of cumulative benefits, costs, and present net value between benchmarks is displayed in Table 8 of this Appendix. Economic efficiency between alternatives in relationship to the max PNV assigned value benchmark are displayed in Table 13, Chapter 2 of the D.E.I.S.

Minimum
Management
Requirements

The regulations for the National Forest Systems Land and Resource Management Planning [36 CFR 219] specifies: 1) The minimum legal management requirements to be met for accomplishing the goals and objectives of the National Forest System [36 CFR 219.17]; 2) the minimum requirements for integrating individual Forest resource planning into the Forest plan [36 CFR 219.14 through 219.26]. These are collectively called Minimum Management Requirements (MMRs).

The minimum legal requirements defined in [36 CFR 219.27] can be categorized as either resource protection requirements that must apply to all management prescriptions or to prescriptions which specify practices involving; 1) vegetative manipulation of tree cover for any purpose, 2) timber harvest and cultural treatment, or 3) even-aged silviculture.

The Forest complied with [36 CFR 219.27] primarily within the specific standards and guidelines associated with the individual resource management practices developed for prescription levels.

The Low Intensity prescription level contains the standards and guidelines for minimum management requirements to be present in all prescriptions. The Low Intensity level is the least management activity and cost to meet legal requirements.

Standards and guidelines which comply with requirements involving vegetative manipulation of tree cover or silvicultural practices were developed primarily for prescription levels other than Low Intensity where these types of activities were emphasized.

The minimum resource integration requirements specified in [36 CFR 219.14 through 219.26] were achieved through the Forest's planning process and in prescription standards and guidelines.

Social Impact
Analysis

Social Impact Analysis is defined in FSM 1973 as "the determination of how Forest Service policies and actions affect the quality of people's lives or social well-being. The primary goal is to enable managers to take into account important social concerns in making decisions. Social Analysis is accomplished by comparing current social conditions in an area influenced by Forest Service actions with conditions likely to occur as a result of implementing management alternatives."

The objectives of social impact assessment are to:

- Determine in a systematic manner the social effects of Forest Service planning and decision-making.
- Provide the decision-maker with an assessment of social effects which can be considered along with the assessments of economic, physical, and biological effects in order to make a balanced decision which promotes the goal of attaining "productive and enjoyable harmony between man and his environment."
- Satisfy the requirements of the law (NEPA, NFMA, CEQ) and of Forest Service policy (FSM 1973).

The social analysis is conducted in accordance with "Guidelines for Social Impact Assessment", Region 3.

The following steps are used in the social analysis:

- Delineate geographic zones of influence that will be used to assess the effects of National Forest management on social variables. The first zone is the primary zone which is made up of the multi-county area (used in IMPLAN) and the sub-areas, which are a breakdown of local areas having a strong dependence on the National Forest.
- The secondary zone of influence comes from outside the primary zone, consisting of non-local and generally amenity uses.
- The third zone is the Native American and consists of the Indian tribes or groups using the Forest.

- Eight social variables affected by National Forest management are evaluated for each alternative. The variables are

- Employment
- Income
- Population
- Community Lifestyle
- Social Organization
- Relationship to Minority Groups
- Land Use Patterns
- Attitudes, Beliefs, Values

Economic Impact Analysis

The IMPLAN model is used to respond to the [36 CFR 219] Planning Requirements for Economic Impact Analysis. It has been designed to provide the planning analyst with a regional input-output model for any applicable area, and perform evaluations of potential economic effects in support of the planning process.

The outputs for each alternative (FORPLAN results) are entered into the IMPLAN model. The resulting figures for employment, income and population are evaluated against the current situation baseline for effects on the sub-areas.

The inputs used by the IMPLAN model are-

- Timber, Sawtimber (MMBF)
- Timber, Products (MMBF)
- Fuelwood, Commercial (MMBF)
- Fuelwood, Personal (MMBF)
- Picnicking (MRVD)
- Camping (MRVD)
- Skiing Downhill (MRVD)
- Dispersed, Non-Motorized Recreation (MRVD)
- Dispersed, Motorized Recreation (MRVD)
- Snowmobiling (MRVD)
- Hunting, Big Game (MRVD)
- Hunting, Small Game (MRVD)
- Wildlife, Non-Game (MRVD)
- Fishing (MRVD)
- Livestock, Cattle (MAUM)

The outputs are changes in employment and income (Forest Service generated) by sector. Eighty-nine sectors are impacted in the Forest Service program. The most significantly impacted sectors are shown in tables in Chapters 3 and 4. They are:

- Logging and Sawmills,
- Wholesale Trade,
- Retail Trade,
- Lodging,
- Restaurants and Bars,
- Amusement and Recreation,
- Livestock, and
- Oil and Gas Development

The economic analysis is based on the "IMPLAN User's Manual", August 1982 and IMPLAN, the Forest Service Model to assess economic impacts required by NEPA, and NFMA. The analysis is conducted in accordance with "Guidelines for Social Impact Assessment", Region 3.

A social impact assessment panel consisting of all District Rangers, was formed to assess the social impacts on: Lifestyle, social organization, land use patterns, and attitudes, beliefs and values. The panel members met originally with their employees to assess the current situation (Chapter 3). Later the panel met to determine the effects of the management alternatives. The panel was given employment and income data and other additional information from the ID team. Under their guidance, an analysis was written and reviewed. Refer to Chapter 4 of the Environmental Impact Statement.

BENCHMARK
ANALYSIS

Early in the planning process an analysis of the management situation was completed to determine the ability of the planning area to supply goods and services [36 CFR 219.5 (e)]. The purpose of the analysis was to evaluate all potentials for multiple use in formulating a reasonable range of alternatives. Benchmarks representing a broad range of feasible options were generated through the FORPLAN model to identify opportunities for resolution of issues, concerns, and opportunities; and, to delineate the maximum and minimum limits of the decision space in which feasible alternatives for resource mixes could be considered, given physical, biological, and legal criteria.

The current and low intensity management directions were included as benchmarks. Maximum benchmark analysis falls into two categories. The first, monetary benchmarks, projected maximum present net value of those resources having an established market value or an assigned value. Biological benchmarks, maximized outputs of timber, recreation, wildlife, water yield, range, watershed condition and wilderness.

Table 6 provides a description of each benchmark developed. Each description includes an objective function. When the objective function specifies assigned values it includes all resources having an established value. When the objective function specifies market values it includes only those resources having an established market value (timber, fuelwood, grazing capacity and developed recreation use).

Table 7 displays benchmark outputs in decreasing order of present net value. The difference in the fifth period output from the maximum present net value (assigned values) benchmark is also shown.

An apparent anomaly in Table 7 has a good explanation. The Maximize Grazing benchmark produces more timber and fuelwood than the Maximize Timber benchmark. The reason for this is that only outputs for the first five decades are shown in this table. The Maximize Grazing benchmark constitutes a departure alternative for timber and fuelwood; after the fifth decade the levels of these outputs fall down to below what they would have achieved under the Maximize Timber benchmark.

Table 8 displays present net value, present value cost, and present value benefits in decreasing order of present net value and compares benchmarks to the maximum present net value (assigned values) benchmark. The difference in present net value from the maximum present net value benchmark is also shown.

Table 6. Benchmark Descriptions

<u>Purpose</u>	<u>Objective Function</u>	<u>Constraint</u> ^{1/}	<u>Discussion</u>
<u>Maximize PNV Assigned Values</u>			
To project future resource uses, outputs and costs which will maximize Present Net Value (PNV) based on all resources having an assigned value.	Maximize Present Net Value (assigned values) for 10 periods.	None	This is an economic benchmark. The PNV produced in this run is used as the reference point to evaluate the impact on PNV resulting from constraints applied in other runs. This run represents the most cost-efficient manner of managing the Forest based on all resources having an assigned value.
<u>Maximize PNV Market Values</u>			
To project future resource uses, outputs, and costs which will maximize Present Net Value of those outputs which have an established market value. Market values are assigned to sawtimber, fuelwood, livestock grazing capacity and developed recreation use.	Maximize Present Net Value (market value) for 10 periods.	None	This is an economic benchmark. This run represents the most cost-efficient method of managing the Forest based on only those resources having established market values. It serves as a basis for comparing quantities of market outputs with those in the maximum Present Net Value (assigned value) Benchmark. This benchmark provides a limited level of issue resolution.
<u>Low Intensity</u>			
To define the minimum management to meet legal requirements.	Maximize Present Net Value (assigned values) for 10 time periods.	<u>Prescriptions</u> Only low intensity prescriptions were allowed into solution.	This benchmark meets only minimum management standards required by regulation. It establishes the base level for all resource outputs. All other alternatives meet or exceed these levels. This benchmark does not adequately respond to most issues and concerns.

^{1/} Timber legal and policy constraints such as non-declining yield, culmination of mean annual increment, long termed sustained yield link, and ending inventory constraints apply to all benchmarks except for the maximize grazing benchmark.

Table 6. Benchmark Descriptions (Continued)

Current Direction

To evaluate the consequences of continuing with the current management program.

Maximize Present Net Value (assigned values) 10 time periods.

Prescription
Only current management prescriptions were allowed into solution. These prescriptions force a budget constraint equal to FY 1980.

This is the No Action Alternative. It establishes a base line from which to measure changes in current management emphasis.

Maximize Period 1 Timber

To maximize net merchantable timber in thousand cubic feet in Period 1.

1. Maximize net merchantable timber in thousand cubic feet in Period 1.

1. Floor on timber yield in million cubic feet equal to 98% of the biological potential established in the maximize timber run.

This benchmark was used for timber analysis purpose. It results in the same outputs and effects as maximizing timber for 10 time periods.

Then

2. Maximize Present Net Value (assigned values) for 10 time periods.

Period				
1	2	3	4	5
8.0	8.0	8.0	8.0	8.0

Maximize Grazing Capacity

To project the maximum potential of the Forest to produce grazing capacity in animal unit months.

1. Maximize grazing capacity for 10 time periods.

1. Range

Floor on grazing capacity in thousand animal unit months equal to or greater than 98% of the biological potential established in the max grazing capacity run.

This is a biological benchmark. It establishes the maximum level of grazing capacity to be used for emphasizing grazing outputs on the Forest while integrating other resource outputs in a cost effective manner. No limits are placed on demand. Supply is limited to the biological capability of the ecosystem to produce on suitable lands.

Then

2. Maximize Present Net Value (assigned values) for 10 time periods.

Period				
1	2	3	4	5
3415	3667	3878	3961	4002

It also provides a basis for determining the opportunity costs associated with this objective. This benchmark is responsive to concerns expressed about grazing.

Table 6. Benchmark Descriptions (Continued)

Maximize Wildlife

To project the maximum potential of the Forest to produce wildlife and fish user days.

1. Maximize non-game wildlife and hunting & fish use for 10 time periods.
2. Maximize Present Net Value (assigned values) for 10 time periods.

1. None
2. Wildlife

Floor on wildlife and fish use in thousand recreation visitor days equal to or greater than the biological potential established in the max non-game and hunting and fishing runs.

This is a biological benchmark. This benchmark represents the most cost-efficient method of managing the Forest under an objective of maximizing the biological potential of wildlife opportunities. It also provides a basis for determining the opportunity costs associated with this objective. This benchmark specifically addresses issues regarding wildlife.

Non-game

Period				
1	2	3	4	5
982	1136	1364	1644	1969

Hunt & Fish

Period				
1	2	3	4	5
2473	2953	3480	4087	4806

Maximize Watershed Condition

To maximize Present Net Value while emphasizing watershed condition Forest-wide.

1. Minimize soil loss for 10 time periods.
2. Maximize Present Net Value (assigned values) for 10 time periods.

1. None
2. Ceiling on soil loss in thousand tons equal to or less than 102% of the soil loss established in minimize soil loss run.

This benchmark represents the most cost-efficient method of managing the Forest while maximizing watershed condition. It provides a basis for determining opportunity costs associated with this emphasis. This benchmark is highly responsive to concerns expressed about watershed conditions.

Table 6. Benchmark Descriptions (Continued)

Maximize Water Yield

To project the maximum potential of the Forest to produce water.

None

None

This is a physical benchmark. It establishes the high level of water yield to be used for emphasizing water yield on the Forest. It was developed outside the FORPLAN model because of the limited potential to increase water yield. Supply is limited to the biological capability of the ecosystem to produce on suitable lands.

Maximize Recreation

To project the maximum potential of the Forest to produce non-wildlife related recreation.

1. Maximize recreation visitor days separately for developed, dispersed, and wilderness use for 10 time periods

1. None

2. Maximize Present Net Value (assigned values) for 10 time periods.

2. Recreation

Floor on thousand recreation visitor days set equal to or greater than the physical potential established in the max recreation use runs.

Period (Developed)
No constraint necessary due to cost efficiency.

Period (Non-Wilderness Dispersed)

1	2	3	4	5
8186	9984	12159	14829	18057

Period (Wilderness Dispersed)

1	2	3	4	5
3066	3738	4554	5557	6770

This is a physical benchmark. It establishes the base level of non-wildlife related recreation to be used for emphasizing recreation opportunities.

This benchmark represents the most cost efficient method of managing the Forest under an objective of producing high levels of non-wildlife related recreation opportunity. It also provides a basis for determining the opportunity costs associated with this objective. This benchmark addresses concerns regarding recreation opportunity and experience diversity.

Supply is limited by (1) capability of the ecosystem to withstand recreational activities and (2) areas classified as wilderness through Congressional legislation.

Maximize Wilderness Acres

To project future resource outputs, costs and effects associated with maximizing the opportunity for new wilderness designation.

Maximize Present Net Value (assigned values) for 10 periods.

Wilderness acres equal to the three wilderness study areas (90,800 acres) plus the existing wilderness areas (339,190 acres)

This is a physical benchmark. It establishes the maximum acres for wilderness opportunities while managing the Forest in the most cost efficient manner. It provides a basis for determining the opportunity costs associated with this objective. The benchmark is responsive to the wilderness issues.

Table 6. Benchmark Descriptions (Continued)

Minimize Wilderness Acres

To project future resource outputs, costs, and effects associated with minimizing the opportunity for new wilderness designation.

Maximize Present Net Value (assigned values) for 10 periods.

Wilderness acres equal to the existing wilderness areas (339,190 acres)

This is a physical benchmark. It maintains wilderness opportunities (acres) at existing levels while managing the Forest in the most cost efficient manner. It provides a basis for determining the opportunity costs associated with this objective. The benchmark is responsive to the wilderness issues.

Maximize Wilderness Acres While Maintaining 1981 Output Levels For Other Resources

To determine the level of new wilderness opportunities compatible with maintaining other resource opportunities at or near 1981 levels.

1. Maximize wilderness acres for 10 time periods.

1. Ceiling on wilderness acres equal to existing and three study areas. (429,990 acres)
 Floor on grazing capacity, fuelwood, and timber harvest and developed recreation use equal to or greater than the following for fifth time period.
 Grazing capacity - 3260 MAUM
 Timber harvest - 0.75 MMCF
 Fuelwood harvest - 4078 MCF
 Developed recreation use - 11,800 MRVD

This benchmark establishes the level of new wilderness acres compatible with sustaining current resource opportunities by the end of the planning period. It provides a basis for determining the opportunity costs associated with these objectives. This benchmark is responsive to some issues but not others.

2. Maximize PNV (assigned values) for 10 time periods.

2. Wilderness acres equal to 429,990 Floor equal to or greater than 98% of the resource outputs obtained from above run.

	Period				
	1	2	3	4	5
<u>Timber</u>	4.0	4.0	4.0	4.0	4.0
<u>Fuelwood</u>	3811	3959	4065	4009	3996
<u>Developed Use</u>	12343	13411	13326	12662	11563
<u>Grazing Capacity</u>	3333	3510	3692	3762	3798

Table 7. Average Annual Output by Benchmark with Change in Fifth Period
Compared to Max PNV Assigned

Benchmarks in Decreasing Order of Cumulative PNV Over the Planning Horizon	Change In Fifth Period Outputs	Period				
		1	2	3	4	5
Output: <u>Developed Recreation (MRVD)</u>						
Max PNV Assigned		1,547	1,911	2,198	2,460	2,715
Max Recreation	0	1,547	1,910	2,198	2,460	2,715
Max Wildlife	0	1,547	1,910	2,198	2,460	2,715
Max Wilderness Acres	0	1,547	1,910	2,198	2,460	2,715
Max Watershed	0	1,547	1,910	2,198	2,460	2,715
Max Timber	0	1,547	1,910	2,198	2,460	2,715
Min Wilderness Acres	0	1,547	1,910	2,198	2,460	2,715
Max Grazing	0	1,547	1,910	2,198	2,460	2,715
Max Wilderness Acres with 1981 Outputs	0	1,547	1,910	2,198	2,460	2,715
Current	-1280	1,287	1,395	1,427	1,434	1,435
Low Intensity	-2075	1,299	1,318	1,210	999	640
Max PNV Mkt.	0	1,547	1,910	2,198	2,460	2,715
Minimum Level	-2715	0	0	0	0	0
Output: <u>Other Dispersed Recreation (MRVD)</u>						
Max PNV Assigned		808	985	1,199	1,462	1,781
Max Recreation	+25	819	999	1,216	1,483	1,806
Max Wildlife	+77	842	1,027	1,251	1,525	1,858
Max Wilderness Acres	+23	818	998	1,215	1,481	1,804
Max Watershed	-26	796	970	1,182	1,441	1,755
Max Timber	+27	820	1,000	1,218	1,485	1,808
Min Wilderness Acres	+107	856	1,044	1,271	1,550	1,888
Max Grazing	+2	808	986	1,200	1,464	1,783
Max Wilderness Acres with 1981 Outputs	-18	799	975	1,187	1,448	1,763
Current	+71	839	1,024	1,246	1,521	1,852
Low Intensity	-69	776	946	1,152	1,407	1,712
Max PNV Mkt.	-88	768	936	1,140	1,391	1,693
Minimum Level	-1336	202	246	300	365	445
Output: <u>Other Wilderness Recreation (MRVD)</u>						
Max PNV Assigned		357	436	531	648	789
Max Recreation	-31	343	419	510	622	758
Max Wildlife	-95	314	383	467	569	694
Max Wilderness Acres	+24	368	449	547	667	813
Max Watershed	+23	368	448	546	666	812
Max Timber	-34	342	417	508	620	755
Min Wilderness Acres	-145	292	356	433	529	644
Max Grazing	-3	356	434	529	645	786
Max Wilderness Acres with 1981 Outputs	-75	323	394	481	586	714
Current	-214	260	317	387	472	575
Low Intensity	-152	288	352	428	523	637
Max PNV Mkt.	-66	328	399	486	594	723
Minimum Level	-789	0	0	0	0	0

Table 7. Average Annual Output by Benchmark with Change in Fifth Period
Compared to Max PNVD Assigned (Continued)

Benchmarks in Decreasing Order of Cumulative PNVD Over the Planning Horizon	Change In Fifth Period Outputs	Period				
		1	2	3	4	5
Output. <u>Wildlife Recreation (MRVD)</u>						
Max PNVD Assigned		349	416	498	591	699
Max Recreation	+4	351	418	501	595	703
Max Wildlife	+16	356	425	510	605	715
Max Wilderness Acres	-8	345	411	493	585	691
Max Watershed	-8	347	412	492	584	691
Max Timber	+5	351	419	501	595	704
Min Wilderness Acres	+18	358	427	511	606	717
Max Grazing	-56	335	386	458	543	643
Max Wilderness Acres with 1981 Outputs	-59	334	384	456	540	640
Current	-73	324	384	450	534	626
Low Intensity	-225	269	282	334	401	474
Max PNVD Mkt.	-73	326	374	443	529	626
Minimum Level	-538	83	98	115	136	161
Output <u>Grazing Capacity (MAUM)</u>						
Max PNVD Assigned		335	346	356	366	376
Max Recreation	-1	335	346	356	366	375
Max Wildlife	-2	335	345	355	365	374
Max Wilderness Acres	0	336	347	357	368	376
Max Watershed	-4	335	347	354	364	372
Max Timber	-3	333	344	354	365	373
Min Wilderness Acres	-2	335	345	356	366	374
Max Grazing	+26	346	369	388	397	402
Max Wilderness Acres with 1981 Outputs	+15	342	360	378	387	391
Current	-6	334	344	354	363	370
Low Intensity	-102	306	295	286	278	274
Max PNVD Mkt.	-46	333	331	330	329	330
Minimum Level	-102	306	295	286	278	274
Output: <u>Permitted Livestock Use (MAUM)</u>						
Max PNVD Assigned		353	344	352	366	376
Max Recreation	-1	353	344	351	366	375
Max Wildlife	-2	353	344	350	365	374
Max Wilderness Acres	0	354	345	353	368	376
Max Watershed	-4	353	343	350	364	372
Max Timber	-3	351	342	350	364	373
Min Wilderness Acres	-2	353	344	351	366	374
Max Grazing	+26	358	367	386	397	402
Max Wilderness Acres with 1981 Outputs	+15	354	358	378	387	391
Current	-6	350	341	351	363	370
Low Intensity	-102	327	296	281	277	274
Max PNVD Mkt.	-46	351	330	325	328	330
Minimum Level	-376	0	0	0	0	0

Table 7. Average Annual Output by Benchmark with Change in Fifth Period Compared to Max PNV Assigned (Continued)

Benchmarks in Decreasing Order of Cumulative PNV Over the Planning Horizon	Change In Fifth Period Outputs	Period				
		1	2	3	4	5
Output	Net Merchantable Timber Volume (MCF)					
Max PNV Assigned		0	0	0	0	0
Max Recreation	0	0	0	0	0	0
Max Wildlife	0	0	0	0	0	0
Max Wilderness Acres	0	0	0	0	0	0
Max Watershed	0	0	0	0	0	0
Max Timber	+798	798	798	798	798	798
Min Wilderness Acres	0	0	0	0	0	0
Max Grazing	+1339	715	1,048	1.161	1.264	1,339
Max Wilderness Acres with 1981 Outputs	+551	473	494	516	537	551
Current	+430	430	430	430	430	430
Low Intensity	+75	75	75	75	75	75
Max PNV Mkt.	0	0	0	0	0	0
Minimum Level	0	0	0	0	0	0
Output:	Fuelwood Sold (MCF)					
	<u>(includes green, dead & down and topwood)</u>					
Max PNV Assigned		198	188	142	95	95
Max Recreation	+1	199	188	142	96	96
Max Wildlife-PNV	-10	199	188	137	84	85
Max Wilderness Acres	-3	190	179	136	92	92
Max Watershed-PNV	+5	179	169	135	100	100
Max Timber-PNV	+1	199	188	142	96	96
Min Wilderness Acres	+8	208	197	150	103	103
Max Grazing-PNV	+198	314	310	305	293	293
Max Wilderness Acres with 1981 Outputs	+305	381	400	407	401	400
Current	+143	234	227	241	239	238
Low Intensity	-95	0	0	0	0	0
Max PNV Mkt.	-31	68	64	64	64	64
Minimum Level	-95	0	0	0	0	0

Table 8. Comparison of Present Value Benefits, Present Value Costs, and Present Net Value of Benchmarks to Maximum PNV Assigned Benchmark over the 100 Year Planning Horizon (millions of 1980 dollars discounted at four-percent).

Benchmarks	Present Value Benefits	Present Value Costs	Present Net Value	Difference in PNV from Max PNV Assigned
Max PNV Assigned	1262.3	274.8	988.5	
Max Recreation	1262.7	274.9	987.8	-0.7
Max Wildlife	1262.1	275.9	986.2	-2.3
Max Wilderness Acres	1259.5	274.8	984.7	-3.8
Max Watershed	1257.7	274.0	983.7	-4.8
Max Timber	1265.0	281.7	983.3	-5.2
Min Wilderness Acres	1258.2	275.3	982.9	-5.6
Max Grazing	1259.5	328.3	931.2	-57.3
Max Wilderness Acres with 1981 Outputs	1236.9	336.2	900.7	-87.8
Current	742.2	183.2	559.0	-429.5
Low Intensity	617.5	139.7	477.8	-510.7
Max PNV Mkt.	543.5	233.8	309.7	-678.8

The section on Economic Efficiency Analysis explained the difference between market and assigned values for priced outputs. The benchmarks displayed in Table 9 were developed to examine the effects, if any, that market versus assigned values have on output levels. The Max PNV (Assigned Values) Benchmark has benefit values assigned to all outputs. The Max PNV (Market Values) Benchmark has benefit values assigned to only market outputs.

At present, it is National policy to provide most Forest outputs either at no charge to consumers, as is the case of water, or at a charge less than the willingness to pay price, as is the case of developed recreation. Based on the comparison of market values and assigned values, it is apparent the Coronado National Forest ranks high in resource outputs which the public would be willing to pay for, even though benefit dollars are not actually collected by the Forest for these outputs. They include all forms of recreation. Timber and fuelwood harvest are not cost effective practices when valued only for the resulting wood products. Therefore, under the Maximize PNV with Market Value benchmark over 980,000 acres are assigned to a low intensity prescription; this results in less fuelwood being produced under the Market Value benchmark. Some fuelwood products are generated in both benchmarks as a result of other activities. Livestock grazing appears to be cost effective only at moderate levels.

When considering only market values, the most cost effective approach to management on the Coronado National Forest is through low intensity prescriptions Forest-wide with exception of maximum recreation emphasis in existing and new developed recreation sites. When considering all priced outputs, a larger PNV results which indicates that taxpayers, as owners of this National Forest, can realize a much larger net return on their investment.

Table 9. Comparison of Average Annual Outputs for Max PNV (Market Values) and Max PNV (Assigned Values) Benchmarks

Outputs	Period				
	1	2	3	4	5
<u>MARKET VALUES</u>					
Net Sawtimber (MCF)					
PNV Mkt.	0	0	0	0	0
PNV Assigned	0	0	0	0	0
% Change	0	0	0	0	0
Fuelwood (MCF)					
PNV Mkt.	68	64	64	64	64
PNV Assigned	198	188	142	95	95
% Change	-66	-66	-55	-33	-33
Grazing Capacity (MAUM)					
PNV Mkt.	333	331	330	329	330
PNV Assigned	335	346	356	366	376
% Change	-1	-4	-7	-10	-12
Developed Recreation (MRVD)					
PNV Mkt.	1,547	1,910	2,198	2,460	2,715
PNV Assigned	1,547	1,911	2,198	2,460	2,715
% Change	0	0	0	0	0
<u>ASSIGNED VALUES</u>					
Dispersed Recreation (MRVD)					
PNV Mkt.	768	936	1,140	1,391	1,693
PNV Assigned	808	985	1,199	1,462	1,781
% Change	-5	-5	-5	-5	-5
Wildlife Recreation (MRVD)					
PNV Mkt.	326	374	443	529	626
PNV Assigned	349	416	498	591	699
% Change	-7	-10	-11	-10	-10
Wilderness Recreation (MRVD)					
PNV Mkt.	328	399	486	594	723
PNV Assigned	357	436	531	648	789
% Change	-8	-8	-8	-8	-8

FORMULATION of ALTERNATIVES

The formulation of alternatives is the culmination of planning actions specified in (36 CFR 219.12(a) through 219.12(f)). The requirements of (36 CFR 219.12(f) for formulation of alternative are discussed in Chapter 2. The National Forest Interdisciplinary Team used a four step process to formulate a range of alternatives which would provide a basis for identifying an alternative maximizing net public benefits, consistent with resource integration and management requirements of (36 CFR 219.13 through 219.27). That process is described below.

- 1) Forest issues were identified through public involvement efforts. Management concerns were also identified through an internal analysis. Issues and management concerns were then consolidated into issue (demand) statements which would be specifically addressed in development of alternatives and the subsequent recommendation of a Proposed Action.

Public involvement efforts and issue and concern statements are described in detail in Chapter 1 and Appendix A.

- 2) Individual resource inventories were completed to identify site specific areas having common environmental characteristics. Data were collected and stored in the Forest resource data base. An Analysis of the Management Situation (AMS) was conducted to describe the existing condition of the Forest and to identify resource management opportunities (supply). Chapter 3 summarizes the AMS.
- 3) Primary objectives were developed for an array of alternatives that were responsive to issues and concerns. The objectives were tailored to provide a wide range of Forest management alternatives. Alternative emphasis included balancing permitted numbers with range capacity, timber and fuelwood production, recreation management, watershed condition improvement, wildlife management, riparian habitat improvement and additional wilderness recommendations. Six alternative scenarios were developed with varying degrees of issue and concern resolution. Chapter 2 provides a detailed discussion of alternatives eliminated from detailed study and those alternative considered in detail.
- 4) This step involved an evaluation of all benchmark runs presented in the preceding section of this appendix.

Each benchmark first had to meet the test of maximizing present net value. These runs were then assessed for their ability to conform to the alternative scenarios previously developed.

The purpose; criteria and assumptions; the relationships to issues, concerns, and opportunities; and relationship to benchmarks are described in Chapter 2.

In accordance with (36 CFR 219.16(3)), departures from base sale schedules were considered. None of the criteria requiring a departure were met.

The constraints used in the Coronado's model for alternatives considered in detail are shown in Table 10. The objective function for all alternatives was to maximize present net value.

Constraints normally common to all alternatives such as minimum management requirements (MMRs), nondeclining yield (NDY), culmination of mean annual increment (CMAI), long-term sustained yield link (LTSY-L), and ending inventory (EI), were not applied as right-hand-side constraints in FORPLAN because they were built into timber harvest yield tables available for all alternatives.

In the analysis, constraints were placed on the alternatives as a set-of-constraints to achieve the objectives of each alternative. Constraints were not applied incrementally. The effects of individual constraints cannot be specified because individual constraints within a set of constraints are interdependent. Discussions of effects of constraints deal with the effects of the set-of-constraints as a whole. The changes in PNV, PVC, and PVB between the alternatives are a result of applying different sets of constraints to the maximum PNV benchmark and are displayed in Chapter 2.

The sets-of-constraints were developed by the Interdisciplinary Team and reviewed by the Forest Management Team. Based on the collective experience and expertise of the team, the least cost constraints were selected to achieve the objectives of the alternative. The set-of-constraints applied was therefore, the most cost effective means of achieving the objectives of the alternative.

Table 10 - Alternative Descriptions

<u>Alternative Goals</u>	<u>Objective Function</u>	<u>Type of Constraints</u> ^{1/}	<u>Discussion</u>																					
<u>Proposed Action</u>	<u>Maximize present net value (assigned values)</u>	<u>Output</u>																						
Resolve the maximum number of issues and concerns and provide the maximum mix of resource opportunities within estimated future budget constraints.		(1) Floor on grazing capacity in period 5 of 3600 MAUM per decade.	(1) Grazing constraint used to achieve the highest capacity possible given other constraints.																					
		(2) Floor on fuelwood harvest in period 5 of 2300 MCF per decade.	(2) Fuelwood constraint used to achieve the highest capacity possible given other constraints.																					
		(3) Floor on developed recreation use in period 5. Floor - 15650 MRVD per decade.	(3) At least enough new developed sites are required to supply local needs in Sierra Vista.																					
		(4) New wilderness acres. Bunk Robinson - 0 Whitmire Canyon - 0 Mt. Graham - 32,845	(4) Without the "0" constraints, small unmanageable acres for wilderness prescriptions would be assigned to two wilderness study areas. The Mt. Graham acreage constraint is used to define the manageable sized area for that wilderness study area that is consistent with other management objectives.																					
		(5) ZBAs (Zoological-botanical areas.) Two areas for 4240 acres.	(5) These constraints protect unique qualities of ZBAs by preventing some uses (such as more intensive livestock grazing and fuelwood cutting) from detracting from desirable wildlife and vegetative characteristics.																					
			<u>Budget</u>																					
	(6) Forest Service costs in thousands of dollars per decade.	(6) The budget was constrained to reflect realistic (but optimistic) budget expectations.																						
		<table border="0"> <tr> <td></td> <td></td> <td colspan="5" style="text-align: center;"><u>Period</u></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">60000</td> <td style="text-align: center;">70730</td> <td style="text-align: center;">70730</td> <td style="text-align: center;">70730</td> <td style="text-align: center;">70730</td> </tr> </table>			<u>Period</u>							1	2	3	4	5			60000	70730	70730	70730	70730	
		<u>Period</u>																						
		1	2	3	4	5																		
		60000	70730	70730	70730	70730																		

^{1/} Timber legal and policy constraints such as nondeclining yield, culmination of mean annual increments long term sustained yield link, and ending inventory constraints apply to all alternatives.

Table 10 - Alternative Descriptions (continued)

<u>Alternative Goals</u>	<u>Objective Function</u>	<u>Type of Constraints</u> ^{1/}	<u>Discussion</u>										
		<u>Prescription</u>											
		(7) Assign Prescription 7AH to riparian areas.	(7) Prescription P7AH insures protection of riparian areas; it meets the goals of the Regional Guide to have riparian areas in satisfactory condition by 2030.										
		(8) Assign Prescription 7H to higher ecosystem extensions.	(8) Prescription P7H is similar to P7AH but extends protection to higher ecosystem extensions.										
		(9) Assign Prescription P41 to coniferous forest lands.	(9) P41 is a timber harvesting prescription that emphasizes wildlife values; it includes the protection of astrophysical values in the Mt. Graham area.										
		(10) Assign Prescription P3L to Cave Creek.	(10) P3L maximizes dispersed and wildlife recreation values in those parts of Cave Creek that are outside the ZBA.										
		<u>Prescription</u>	Same as benchmark. Serves as no action alternative.										
A. Continue current management direction.	Maximize present net value (assigned values).	Only current prescriptions available. This also constrains the budget to approximately \$5800 thousand dollars per year.											
		<u>Output</u>											
B. Meet 1980 RPA resource objectives as assigned in the Regional Guide.	<u>Objective Function</u> Maximize present net value (assigned values).	Floors on livestock grazing, dispersed recreation use, wilderness use, hunting and fishing use, nongame use and developed recreation use. Wilderness acre constraints for each of the three wilderness study areas.	This alternative was designed to estimate the outputs and effects resulting from attempting to achieve RPA objectives assigned to the Forest. Objectives for livestock grazing and developed recreation use were modified after reviewing benchmarks for maximum supply potentials. Wilderness acre objectives were set based on review of maximize grazing capacity benchmarks.										
		Livestock grazing MAUM <u>Periods</u>											
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1	2	3	4	5									
3550	3690	3930	4020	4060									

Table 10 - Alternative Descriptions (continued)

<u>Alternative Goals</u>	<u>Objective Function</u>	<u>Types of Constraint</u>	<u>Discussion</u>															
		<p style="text-align: center;">Developed recreation MRVD</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: center;"><u>Periods</u></th> </tr> <tr> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> <th style="text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15,000</td> <td style="text-align: center;">19,000</td> <td style="text-align: center;">21,000</td> <td style="text-align: center;">24,000</td> <td style="text-align: center;">26,000</td> </tr> </tbody> </table>	<u>Periods</u>					1	2	3	4	5	15,000	19,000	21,000	24,000	26,000	
<u>Periods</u>																		
1	2	3	4	5														
15,000	19,000	21,000	24,000	26,000														
		<p style="text-align: center;">Dispersed recreation MRVD</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: center;"><u>Periods</u></th> </tr> <tr> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> <th style="text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">6064</td> <td style="text-align: center;">6435</td> <td style="text-align: center;">6728</td> <td style="text-align: center;">7020</td> <td style="text-align: center;">7313</td> </tr> </tbody> </table>	<u>Periods</u>					1	2	3	4	5	6064	6435	6728	7020	7313	
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6064	6435	6728	7020	7313														
		<p style="text-align: center;">Wilderness recreation MRVD</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: center;"><u>Periods</u></th> </tr> <tr> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> <th style="text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1493</td> <td style="text-align: center;">1584</td> <td style="text-align: center;">1656</td> <td style="text-align: center;">1728</td> <td style="text-align: center;">1800</td> </tr> </tbody> </table>	<u>Periods</u>					1	2	3	4	5	1493	1584	1656	1728	1800	
<u>Periods</u>																		
1	2	3	4	5														
1493	1584	1656	1728	1800														
		<p style="text-align: center;">Hunting and Fishing MRVD</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: center;"><u>Periods</u></th> </tr> <tr> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> <th style="text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1306</td> <td style="text-align: center;">1386</td> <td style="text-align: center;">1449</td> <td style="text-align: center;">1512</td> <td style="text-align: center;">1575</td> </tr> </tbody> </table>	<u>Periods</u>					1	2	3	4	5	1306	1386	1449	1512	1575	
<u>Periods</u>																		
1	2	3	4	5														
1306	1386	1449	1512	1575														
		<p style="text-align: center;">Nongame MRVD</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: center;"><u>Periods</u></th> </tr> <tr> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">4</th> <th style="text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">466</td> <td style="text-align: center;">495</td> <td style="text-align: center;">517</td> <td style="text-align: center;">540</td> <td style="text-align: center;">562</td> </tr> </tbody> </table>	<u>Periods</u>					1	2	3	4	5	466	495	517	540	562	
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1	2	3	4	5														
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		<p style="text-align: center;">Wilderness Acres</p> <p style="text-align: center;">Bunk Robinson - 0</p> <p style="text-align: center;">Whitmire Canyon - 0</p> <p style="text-align: center;">Mt. Graham - 0</p>																
C. Achieve implementable wilderness areas for three wilderness study areas by adjusting boundaries to eliminate most concerns.	Maximize present net value (assigned values).	<p>New Wilderness Areas</p> <p>Bunk Robinson - 11,034</p> <p>Whitmire Canyon - 11,494</p> <p>Mt. Graham - 49,402</p>	This alternative was designed to estimate the outputs and effects resulting from managing the three wilderness study areas as wilderness in the future. Boundaries were adjusted to eliminate most concerns the public and management.															
D. Emphasize recreation, watershed and wildlife values and opportunities. Other opportunities such as fuelwood harvest and livestock grazing would be secondary considerations.	Maximize present net value (assigned values).	<p><u>Output</u></p> <p>(1) Floor and ceiling on developed recreation use in fifth period.</p> <p style="padding-left: 20px;">Floor - 11,800 MRVD</p> <p style="padding-left: 20px;">Ceiling - 21,525 MRVD</p> <p>(2) New wilderness acres</p> <p style="padding-left: 20px;">Bunk Robinson - 15,960</p> <p style="padding-left: 20px;">Whitmire Canyon - 12,840</p> <p style="padding-left: 20px;">Mt. Graham - 61,585</p>	This alternative was designed to address many issues, concerns and opportunities related to watershed condition, livestock grazing riparian area management, recreation opportunities, wildlife values and wilderness. It provides the opportunity to evaluate outputs and effects resulting from the resolution of one side of various issues.															

Table 10 - Alternative Descriptions (continued)

<u>Alternative Goals</u>	<u>Objective Function</u>	<u>Types of Constraint</u>	<u>Discussion</u>
		<u>Output (continued)</u>	
		(3) New Research Natural Areas Ten areas for 8,269 acres.	
		(4) New Zoological-Botanical Areas Eight areas for 37,290 acres.	
		(5) Manage roadless areas for primitive recreation opportunities: Whetstone - 37,028 acres Dragoon - 29,672 acres North End - 30,934 acres Tumacacori - 46,142 acres	
		<u>Prescription</u>	
		(1) Prescription P41 assigned to riparian areas and higher ecosystem extensions.	
		(2) Prescription P2L assigned to coniferous forest areas.	
E. Sustain opportunities for timber, fuelwood, developed recreation use, and livestock grazing on lands primarily suitable for that type of use. By the fifth time period, attempt to achieve 1981 levels of output wherever possible.	Maximize present net value (assigned values).	<u>Output</u>	This alternative was designed to give a more reasonable look at meeting RPA Objectives and to address issues, concerns and opportunities related to wilderness, livestock grazing, timber and fuelwood harvest and recreation uses. It provides the opportunity to evaluate outputs and effects resulting from the resolution of one side of various issues.
		(1) Floor on fuelwood harvest in period 5 of 2500 MCF per decade.	
		(2) Floor on livestock grazing in period 5 of 3760 MAUM per decade.	
		(3) Floor and ceiling on developed recreation use in period 5. Floor - 11,800 MRVD per decade Ceiling - 21,525 MRVD per decade	
		(4) New wilderness areas: Bunk Robinson - 11,034 Whitmire Canyon - 0 Mt. Graham - 61,985	
		<u>Prescription</u>	
		(1) Assign Prescription 2H to coniferous forest lands.	

ESTIMATING THE
EFFECTS OF
CONSTRAINTS
APPLIED TO
BENCHMARKS AND
ALTERNATIVES

As described in preceding sections, benchmarks and alternatives were developed to achieve different sets of goals and objectives responding to the ICOs in different degrees. Set-of-constraints were applied to achieve the goals and objectives of each benchmark and alternative. The most cost effective set-of-constraints were used to develop the benchmarks and alternatives. Use of sets-of-constraints to achieve the goals and objectives in a benchmark or alternative causes a reduction in PNV from the Max PNV benchmark because costs are increased and/or benefits are reduced in order to satisfy the constraint. The reduction in PNV is called the opportunity cost (trade-off) of the set-of-constraints. The trade-offs associated with the sets-of-constraints are shown in Table 8, Chapter 2 of the D.E.I.S. for the alternatives and Table 7, Appendix B for the benchmarks.

The constraints having the greatest impact on PNV were:

- 1) Budget constraints to hold alternative costs within reasonable budget expectations. These constraints held down PVC but also limited the amount of investment work and also significantly reduced PVB.
- 2) Developed recreation opportunity constraints during the planning horizon. These constraints limited PVC and the amount of investment work which significantly reduced PVB.
- 3) Increased grazing capacity for the RPA Alternative. This increased PVC due to increased investments in structural and nonstructural improvements, and watershed improvement to implement intensive grazing systems. This results in reduced PVB because of the increased costs without corresponding increases in benefits.

C - Management Prescriptions

OVERVIEW

These prescriptions were used for the development of alternative Forest plans. Detailed management practices, standards and guidelines for each are available for review at Coronado National Forest Offices. Some prescriptions were not selected for use in the Proposed Forest Plan. All prescriptions result in multiple uses and resource opportunities.

Table 1 at the end of this Appendix summarizes the actual individual prescription allocation by alternative. Table 2 of this Appendix shows the aggregation of prescriptions into management areas.

Low Intensity Prescriptions

Minimum management intensity to meet legal requirements. Operation and maintenance activities are at a low level. New investments are non-existent except for those generated by non-Forest Service activities.

PRESCRIPTION: #30

Description: Includes all vegetative and land form types that have been determined to be suitable for wilderness designation.

Management Emphasis and Intensity: Manage for wilderness values while providing livestock grazing and providing recreation opportunities that are compatible with maintaining wilderness values and protecting resources. Work will be confined to operation and maintenance activities. No direct resource improvement.

PRESCRIPTION: #31

Description: Includes those lands that have been determined to be suitable for designation as research natural areas.

Management Emphasis and Intensity: Manage to provide opportunities for nondisruptive research and education. Use restrictions will be imposed as necessary to keep areas in their natural or unmodified condition. There will be no harvest of forest products, including fuelwood. Work will be confined to operation and maintenance activities. No direct resource improvement.

PRESCRIPTION: #32

Description: Lands supporting existing recreational developments. Average slopes less than 15%.

Management Emphasis and Intensity: Manage for a variety of developed recreation opportunities while mitigating the impact on the unique physical, biological and cultural resources. Visual quality objectives will be met. Other activities maintain or enhance the recreational opportunities. Watershed conditions will be maintained or sites closed. Work will be confined to operation and maintenance activities. No direct resource improvement.

PRESCRIPTION: #33

Description: Steep, rugged lands that may be visible from major travel routes. These lands have generally been determined as incapable of or unsuitable for sustained wood harvest and livestock grazing. Slopes are generally greater than 40%. Includes all vegetative types except major riparian areas.

Management Emphasis and Intensity: Manage for visual resources and semi-primitive dispersed recreation opportunities, including those related to wildlife. Visual quality objectives will be met. Work will be confined to operation and maintenance activities. No direct resource improvement.

PRESCRIPTION: #34

Description: Lands capable and suitable for timber harvest, livestock grazing, and game habitat management. Average slopes are 0-40%. All vegetative types including coniferous forest and major riparian areas.

Management Emphasis and Intensity: Manage to protect and perpetuate the basic resources. Meet minimum legal requirements associated with management of public lands and natural resources at the least cost. Those resource outputs that occur are those that can be sustained without new investment or major rehabilitation measures. Watershed stabilization would be limited to those watersheds in less than satisfactory condition. Mitigate the impacts on cultural resources and wildlife habitats. Visual quality objectives will be met. Watershed conditions will be maintained through control of activities. Timber harvest is limited to salvage of dead or dying trees along existing roads. There is no fuelwood harvest.

Moderate
Intensity
Prescriptions

Continuation of current management intensity within existing (1980) budgets. Operation and maintenance activities are at a moderate level. New investment activities are at a moderate level. New investment activities are at a low to moderate level.

PRESCRIPTION #1L

Description: Steep, rugged lands, some of which may be visible from major travel routes. These lands have generally been determined as incapable of or unsuitable for sustained wood harvest and livestock grazing. Slopes are generally greater than 40%. Includes all vegetative types except major riparian areas.

Management Emphasis and Intensity: Manage for visual resources and semi-primitive recreation opportunities, including those related to wildlife. Visual quality objectives will be met.

PRESCRIPTION: #2L

Description: Coniferous forest lands that are suitable for a wide variety of recreational and special uses. Includes both suitable and unsuitable (regeneration problems) timber producing lands. Timber harvest is limited to lands determined to be capable and suitable for timber harvest using tractor logging systems.

Management Emphasis and Intensity. Manage for dispersed recreation opportunities. Uses such as electronic sites and observatories will be permitted on special sites. Sawtimber and fuelwood harvest will be compatible with the recreation oriented opportunities and are done for salvage and sanitation purposes. Visual quality objectives will be met. Watershed conditions will be maintained or improved.

PRESCRIPTION #3L

Description: Undeveloped grasslands, woodlands coniferous forest and riparian areas that have a high attraction to recreationists. Many are near developed recreation sites and are influenced by the presence of these sites, although not developed themselves. Includes all slope ranges. Includes known essential habitats for threatened and endangered plants and animals.

Management Emphasis and Intensity Manage for a wide variety of dispersed recreation opportunities while protecting or maintaining the unique physical, biological and cultural resources. Visual quality objectives will be met. Other activities should maintain or enhance the recreational opportunities. Watershed conditions will be improved or maintained.

PRESCRIPTION: #3AL

Description: Lands that are now supporting recreational developments. Average slopes less than 15%.

Management Emphasis and Intensity. Manage for a variety of developed recreational opportunities while mitigating the impact on the unique physical, biological and cultural resources. Visual quality objectives will be met. Other activities maintain or enhance the recreational opportunities. Watershed conditions will be improved or maintained.

PRESCRIPTION: #4L

Description: Lands capable and suitable for fuelwood harvest, livestock grazing, and game habitat management. Average slopes are 0-40%. Includes all vegetative types.

Management Emphasis and Intensity: Manage for a sustained harvest of livestock forage and fuelwood while maintaining existing game animal habitat and soil resources. Mitigate the impacts on cultural resources and nongame wildlife habitats. Visual quality objectives will be met. Dispersed recreation activities may occur except for those that adversely affect the productivity of the land or resources. Watershed conditions will be improved or maintained.

PRESCRIPTION: #7(A)L

Description: Undeveloped lands that have been identified as supporting flora and fauna associations that are unique enough to require special management practices. Includes identified riparian ecotypes. Includes known, essential habitats for threatened and endangered plants and animals.

Management Emphasis and Intensity: Manage to perpetuate the unique wildlife or vegetative species. Improve and manage riparian areas (as defined by FSM 2526, Riparian Watershed Management) to benefit riparian dependent resources. Dispersed recreation activities and other uses will be allowed to the extent they do not degrade the unique values. Facilities will be allowed and maintained for the purpose of protecting these resources.

PRESCRIPTION: #7(B)L

Description: Undeveloped lands that have been identified as supporting flora and fauna associations that are unique enough to require special management practices. Includes identified higher ecosystem extensions. Includes known, essential habitats for threatened and endangered plants and animals.

Management Emphasis and Intensity: Manage to perpetuate the unique wildlife or vegetative species while producing livestock forage and fuelwood on a basis compatible with sustaining the unique resources. Recreation activities and other uses may occur to the extent they do not degrade the unique values. Visual quality objectives will be met. Facilities will be allowed and maintained for the purpose of protecting these resources.

PRESCRIPTION: #8L

Description: Includes those lands that have been determined to be suitable for designation as research natural areas.

Management Emphasis and Intensity: Manage to provide opportunities for nondisruptive research and education. Use restrictions will be imposed as necessary to keep areas in their natural or unmodified condition. There will be no harvest of forest products including fuelwood.

PRESCRIPTION: #8AL

Description: Includes those lands that have been determined to be suitable for both wilderness designation and designation as research natural areas.

Management Emphasis and Intensity: Manage for wilderness values and uses while providing opportunities for nondisruptive research and education. Use restrictions will be imposed as necessary to keep areas in their natural or unmodified condition. There will be no harvest of forest products including fuelwood.

PRESCRIPTION: #9L

Description: Includes all vegetative and land form types that have been determined to be suitable for wilderness designation.

Management Emphasis and Intensity: Manage for wilderness values while providing livestock grazing and providing recreation opportunities that are compatible with maintaining wilderness values and protecting resources. Lightning fires may be used as prescribed fires to meet wilderness resource objectives.

PRESCRIPTION: #22L

Description: Lands capable and suitable for fuelwood harvest, livestock grazing and game habitat management. Average slopes are 0-40%. Includes all vegetative types except coniferous forest areas.

Management Emphasis and Intensity: Manage for a sustained harvest of live-stock forage while maintaining existing game animal habitat and soil resources. Mitigate impacts on cultural resources and nongame wildlife habitats. Visual quality objectives will be met. Dispersed recreation activities may occur except for those that adversely affect the productivity of the land or resources. Watershed conditions will be improved or maintained. Fuelwood cutting will be limited to occasional personal use.

High Intensity
Prescriptions

Operation and maintenance activities and new investment activities are increased as necessary to resolve issues and concerns, and increase resource opportunities.

PRESCRIPTION #1H

Same description and emphasis as P1L. Management intensity is increased for dispersed recreation operation and maintenance activities and wildlife habitat improvement.

PRESCRIPTION #2H

Same description and emphasis as P2L. Management intensity is increased for dispersed recreation operation and maintenance activities to provide high quality experiences. Timber management activities are increased to improve vigor of stands which results in improved wildlife habitat and increased fuelwood opportunities. Road maintenance is increased to support increased activity in resource management.

PRESCRIPTION #3H

Same description and emphasis as P3L. Management intensity is increased for dispersed recreation operation and maintenance activities (including road maintenance) to create high quality experiences.

PRESCRIPTIONS #4H and 22H

Same description and emphasis as P4L and P22L. Management intensity is increased for range and watershed operation, maintenance and investment activities to shorten the time span for improving rangeland and watershed conditions. Wildlife habitat improvement opportunities are increased. Road maintenance and construction is increased to improve recreation and fuelwood harvest opportunities.

PRESCRIPTIONS #7H and #7AH

Same description and emphasis as P7L and P7AL. Management intensity is increased for all operation, maintenance and investment activities necessary to maintain or improve the condition of riparian areas and higher ecosystem extensions.

PRESCRIPTIONS #8H and #8AH

Same description and emphasis as P8L and P8AL. Management intensity is increased for operation and maintenance activities to totally manage recreation activities within research natural areas.

PRESCRIPTION #9H

Same description and emphasis as P9L. Management intensity is increased for wilderness recreation operation, and maintenance activities (including trail maintenance) to increase the experience level.

PRESCRIPTION: #3BH

Description: Lands that are suitable and capable of supporting existing or new recreational developments. Average slopes less than 15%.

Management Emphasis and Intensity: Manage for a variety of developed recreation opportunities while mitigating the impact on the unique physical, biological and cultural resources. Manage for high quality recreation experience. Visual quality objectives will be met. Other activities maintain or enhance the recreational opportunities. Watershed conditions will be improved or maintained.

PRESCRIPTION: #6H

Description: Lands that are capable and suitable for livestock grazing, fuelwood harvest, and intensive game animal habitat management. Slopes are generally less than 40%. Includes all vegetative types.

Management Emphasis and Intensity: Manage for intensive game animal habitat maintenance and improvement. Production of livestock forage and fuelwood will be compatible with management of the game habitat. Visual quality objectives will be met or exceeded. Impacts on cultural resources and habitats for other wildlife will be fully mitigated. Dispersed recreation activities may occur except for those that adversely affect productivity of the land or resources. Watershed conditions will be improved.

PRESCRIPTION: #14H

Description: Undeveloped lands that have been identified as supporting flora and fauna associations that are unique enough to require special management practices, including formal designation as a zoological or botanical area. Includes known, essential habitats for threatened and endangered plants and animals.

Management Emphasis and Intensity: Manage to perpetuate the unique wildlife or vegetative species. Improve and manage riparian areas (as defined by FSM 2526, Riparian Watershed Management) to benefit riparian dependent resources. Recreation activities and other uses may occur to the extent they do not degrade the unique values. Facilities may be allowed and maintained for the purpose of protecting these resources. Visual quality objectives will be met or exceeded.

PRESCRIPTION: #15H

Description: Steep, rugged lands some of which may be visible from major travel routes. These lands have generally been determined as incapable of or unsuitable for sustained wood harvest and livestock grazing. Slopes are generally greater than 40%. Only applicable to the Dragoon, Peloncillo, Pedragosa, Galiuro, Santa Teresa, Greasewood, Winchester and Whetstone Mountain Ranges. These are the more isolated areas where high value improvements are generally lacking.

Management Emphasis and Intensity: Manage for visual resources and semi-private recreation opportunities, including those related to wildlife. Manage for high quality experience level. Visual quality objectives will be met. Management intensity for wildfire suppression emphasizes the least cost techniques.

PRESCRIPTION: #16H

Description: Lands capable and suitable for fuelwood harvest, livestock grazing and game habitat management. Average slopes are 0-40%. Includes all vegetative types except major riparian areas. Only applicable to the Dragoon, Peloncillo, Pedragosa, Galiuro, Santa Teresa, Greasewood, Winchester and Whetstone Mountain Ranges. These are the more isolated areas where high value improvements are generally lacking.

Management Emphasis and Intensity: Manage for a sustained harvest of livestock forage and fuelwood while maintaining existing game animal habitat and soil resources. Mitigate the impacts on cultural resources and nongame wildlife habitats. Visual quality objectives will be met. Dispersed recreation activities

may occur, except for those that adversely affect the productivity of the land or resources. Watershed conditions will be improved or maintained. Management intensity for wildfire suppression emphasizes the least cost techniques.

PRESCRIPTION: #17H

Description: Lands that are capable and suitable for livestock grazing, fuelwood harvest, and intensive game animal habitat management. Slopes are generally less than 40%. Includes all vegetative types. Only applicable to the Dragoon, Peloncillo, Pedragosa, Galiuro, Santa Teresa, Greasewood, Winchester and Whetstone Mountain Ranges. These are the more isolated areas where high value improvements are generally lacking.

Management Emphasis and Intensity: Manage for intensive game animal habitat maintenance and improvement. Production of livestock forage and fuelwood will be compatible with management of the game habitat. Visual quality objectives will be met or exceeded. Impacts on cultural resources and habitats for other wildlife will be fully mitigated. Dispersed recreation activities may occur except for those that adversely affect productivity of the land or resources. Watershed conditions will be improved. Management intensity for wildfire suppression emphasizes the least cost techniques.

PRESCRIPTION: #19H

Description Includes those lands that have been determined to be suitable for designation as research natural areas.

Management Emphasis and Intensity: Manage to provide opportunities for nondisruptive research and education. Use restrictions will be imposed as necessary to keep areas in their natural or unmodified condition. There will be no harvest of forest products, including fuelwood. Lightning fires may be used as prescribed fires to meet natural area objectives.

PRESCRIPTION: #19AH

Description: Includes those lands that have been determined to be suitable for both wilderness designation and designation as research natural areas.

Management Emphasis and Intensity: Manage for wilderness values and uses while providing opportunities for nondisruptive research and education. Use restrictions may be imposed as necessary to keep areas in their natural or unmodified condition. There will be no harvest of forest products including fuelwood. Lightning fires may be used as prescribed fires to meet natural area objectives.

PRESCRIPTION: #20H

Description: Includes all vegetative and land form types that have been determined to be suitable for wilderness designation.

Management Emphasis and Intensity: Manage for wilderness values while providing livestock grazing and providing recreation opportunities that are compatible with maintaining wilderness values and protecting resources. Natural and man-set fire will be used under prescribed conditions to meet wilderness objectives. Manage for a high quality wilderness recreation experience.

PRESCRIPTION: #21H

Description: Includes all vegetative and land form types that have been determined to be suitable for wilderness designation. Only applicable to the Dragoon, Peloncillo, Pedragosa, Galiuro, Santa Teresa, Greasewood, Winchester and Whetstone Mountains. These are the more isolated areas where high value improvements are generally lacking.

Management Emphasis and Intensity: Manage for wilderness values while providing livestock grazing and providing recreation opportunities that are compatible with maintaining wilderness values and protecting resources. Natural and man-set fires

may be used as prescribed fires to meet wilderness objectives. Manage for a high quality wilderness recreation experience. Management intensity for wildfire suppression emphasizes the least cost techniques.

Maximum
Intensity
Prescriptions

Maximum management intensity to emphasize specific resources. Operation and maintenance activities and new investment activities are increased to levels necessary to sustain the emphasized resource at maximum levels. Other resources are maintained to meet all legal requirements as a minimum. Some may be increased or improved along with the emphasized resource.

Developed, dispersed, and wilderness recreation opportunities and experiences are maximized through application of the previous high intensity prescriptions. Watershed improvement is maximized through application of the high intensity and maximum intensity prescriptions.

PRESCRIPTION: #2M

Description: Lands capable and suitable for timber harvest using either tractor or cable logging systems. Average slopes are 0-40%. Includes mixed conifer and spruce-fir types.

Management Emphasis and Intensity: Maximize timber harvest while meeting at least minimum legal standards for other resources. Use any available or reasonable predictable technology to harvest and regenerate timber except fertilizers or genetically improved stock.

PRESCRIPTION: #40

Description: Lands suitable for livestock grazing. Average slopes are 0-40%. All vegetative types including coniferous forest and major riparian areas. Does not include existing or recommended wilderness areas, existing research natural areas or developed recreation sites.

Management Emphasis and Intensity: Manage to maximize livestock grazing capacity using available and reasonable technology. Meet at least the minimum legal constraints for other resources.

PRESCRIPTION: #41

Description: All lands capable and suitable of supporting various native wildlife species. Does not include developed recreation sites.

Management Emphasis and Intensity. Improve and maintain wildlife habitat to provide the maximum diversity for all existing or previously existing species with emphasis on game, special interest nongame and threatened and endangered species. Use any available or reasonably predictable technology to achieve these results. Meet at least minimum legal constraints for other resources.

Table 1. Acres by Management Prescription for Each Alternative (M Acres)

Management Prescription	Alternative					
	PA	A	B	C	D	E
(M Acres)						
<u>Low Intensity</u> (Minimum management to meet legal requirements.)						
P30	Wilderness	225.1	0	0	0	0
P31	Natural Area	0.9	0	0	0	0
P32	Developed Recreation	0	0	0	0	0
P33	Semi-Primitive Dispersed Recreation	26.2	0	0	0	0
P34	Multiple Use	134.8	0	0	0	0

Table 1. Acres by Management Prescription for Each Alternative (M Acres) (Continued)

Management Prescription	Alternative						
	PA	A	B	C	D	E	
(M Acres)							
<u>Current (Moderate) Intensity</u> (Continuation of current management levels within existing budgets).							
P1L	Semi-Primitive Dispersed Recreation	0	100.5	0	0	0	0
P2L	Dispersed Rec/Timber	0	31.9	0	0	30.6	0
P3L	Motorized Dispersed Recreation	9.2	14.9	0	0	0	0
P3AL	Developed Recreation	4.0	4.0	0	0	0	0
P4L	Livestock/Game/Fuelwood	380.3	748.8	0	0	0	0
P7L	Unique/Fuelwood	14.8	17.4	0	0	0	0
P7AL	Unique/Dispersed Rec.	20.7	25.7	21.6	0	0	21.6
P8L	Natural Area	0	3.8	0	0	0	0
P8AL	Natural Area/Wilderness	0	5.7	0	0	0	0
P9L	Wilderness	36.0	333.5	0	0	0	0
P9L	Wilderness Study Area	0	90.8	0	0	0	0
P22L	Livestock/Game	123.3	349.5	0	0	0	0
<u>High Intensity</u> (Increased management to resolve I.C.O.s.)							
P1H	Semi-Primitive Dispersed Recreation	48.0	0	73.1	105.7	53.2	72.2
P2H	Dispersed Rec./Timber	0	0	0	0	0	30.6
P3H	Motorized Dispersed Recreation	0.4	0	0	0.7	0.7	0.4
P3BH	Developed Recreation	0.2	0	6.7	6.7	4.7	4.7
P4H	Livestock/Game/Fuelwood	0	0	8.2	8.2	0	364.0
P6H	Game/Livestock	241.9	0	0	734.6	705.7	374.1
P7H	Unique/Fuelwood	2.3	0	0.8	0	0	17.1
P7AH	Unique/Dispersed Recreation	3.8	0	0.9	6.0	11.8	13.2
P8H	Natural Area	0	0	0	0	0	0
P8AH	Natural Area/Wilderness	0	0	0	0	0	0
P9H	Wilderness	1.9	0	1.8	1.9	2.4	1.8
P14H	Zoological/Botanical	2.8	0	0.1	0.1	9.3	0.4
P15H	Non-motor Dispersed	40.0	0	38.6	50.7	32.1	40.0
P16H	Livestock/Game Fuelwood	251.3	0	147.7	98.1	33.8	223.4
P17H	Game/Livestock	2.5	0	2.5	281.0	227.3	143.0
P19H	Natural Area	3.6	0	3.6	3.6	6.1	3.6
P19AH	Natural Area/Wilderness	4.7	0	4.7	4.7	5.3	4.7
P20H	Wilderness	84.9	0	283.2	346.0	345.4	346.0
P21H	Wilderness	47.7	0	48.5	70.3	76.5	58.8
P21H	Primitive Recreation	0	0	0	0	143.8	0
P22H	Livestock/Game	0.9	0	0	3.5	0	0
<u>Maximum Intensity</u> (Maximum management to emphasize single resources.)							
P2M	Timber	0	0	0	0	0	0
P40	Livestock	0	0	1079.6	0	0	0
P41	Wildlife	14.3	0	4.9	4.7	37.8	6.9

Table 2. Final Prescription Allocation by Management Area.^{1/}

No.	Management Area Emphasis	Management Prescriptions	Thousand Acres By Alternatives					
			PA	A(Current)	B(RPA)	C	D	E
1	Manage for visual resources and semi-primitive non-motorized and motorized dispersed recreation opportunities.	P33	26.1	0	0	0	0	0
		P1L	0	100.5	0	0	0	0
		P1H	31.6	0	73.1	105.7	53.3	72.2
		P15H	40.0	0	38.6	50.7	32.1	40.0
		Sub Totals	97.7	100.5	111.7	156.4	85.4	112.2
2	Manage for a variety of dispersed recreation opportunities. Timber and fuelwood harvest benefit recreation and wildlife values.	P34	0.6	0	0	0	0	0
		P2L	0	31.9	0	0	30.6	0
		P2H	0	0	0	0	0	30.6
		P1H	16.4	0	0	0	0	0
		P41	13.7	0	0	0	0	0
Sub Totals	30.7	31.9	0	0	30.6	30.6		
3	Manage for a wide variety of dispersed recreation opportunities	P3L	9.2	14.9	0	0	0	0
		P3H	0.4	0	0	0.7	0.7	0.4
		P6H	4.8	0	0	0	0	0
		P41	0.4	0	0	0	0	0
Sub Totals	14.8	14.9	0	0.7	0.7	0.4		
3A & 3B	Manage for a variety of developed recreation opportunities. (Existing and new sites)	P3AL	4.0	4.0	0	0	0	0
		P3BH	0.2	0	6.7	6.7	4.7	4.7
Sub Totals	4.2	4.0	6.7	6.7	4.7	4.7		
4	Manage for sustained production of livestock forage, fuelwood, and game animal habitat.	P34	134.2	0	0	0	0	0
		P4L	380.3	748.8	0	0	0	0
		P4H	0	0	0	0	0	364.0
		P6H	237.1	0	0	0	0	0
		P16H	251.3	0	0	0	0	223.4
		P17H	2.5	0	0	0	0	0
		P22L	123.3	0	0	0	0	0
		P22H	0	0	0	0	0	0
Sub Totals	1128.7	748.8	0	0	0	587.4		
6	Manage for intensive game animal habitat maintenance and improvement. Production of livestock forage and fuelwood will be compatible with management of the game habitat.	P4H	0	0	0	8.2	0	0
		P6H	0	0	0	733.4	699.5	374.1
		P16H	0	0	0	98.1	33.8	0
		P17H	0	0	0	280.7	221.3	143.0
		P22H	0	0	0	3.5	0	2.8
		P41	0	0	0	4.5	0	0
Sub Totals	0	0	0	1128.4	954.6	519.9		

Table 2. Final Prescription Allocation by Management Area.^{1/} (Continued)

No.	Management Area Emphasis	Management Prescriptions	Thousand Acres By Alternatives					
			PA	A(Current)	B(RPA)	C	D	E
7	Manage to perpetuate the unique wildlife or vegetative species. Other resource uses will be compatible with sustaining the unique resources.	P7L	14.8	17.4	0	0	0	0
		P7H	2.3	0	0.8	0	0	17.1
		P7AL	20.7	25.7	21.6	0	0	21.6
		P7AH	3.8	0	0.9	6.0	11.8	13.6
		P41	0	0	0	0	37.2	3.0
	Sub Totals		41.6	43.1	23.3	6.0	49.0	55.3
8	Manage to provide opportunities for nondisruptive research and education. (Research Natural Areas)	P8L	0	3.8	0	0	0	0
		P8H	0	0	0	0	0	0
		P19H	3.4	0	3.8	3.8	6.1	3.8
		P41	0	0	0	0	0.6	0
	Sub Totals		3.4	3.8	3.8	3.8	6.7	3.8
8A	Manage for wilderness values and uses while providing opportunities for nondisruptive research and education. (Research Natural Areas)	P31	0.9	0	0	0	0	0
		P8AL	0	5.7	0	0	0	0
		P8AH	0	0	0	0	0	0
		P19AH	2.7	0	2.0	1.9	8.6	1.9
	Sub Totals		3.6	5.7	2.0	1.9	8.6	1.9
9	Manage for wilderness values while providing livestock grazing and recreation opportunities that are compatible with wilderness. (Existing and New Areas)	P30	225.1	0	0	0	0	0
		P9L	36.0	333.5	0	0	0	0
		P9H	1.8	0	1.8	1.9	1.8	1.8
		P20H	86.9	0	286.9	349.6	330.2	349.7
		P21H	47.8	0	48.5	70.3	73.1	58.8
	Sub Totals		397.6	333.5	337.2	421.8	405.1	410.3
14	Manage to perpetuate the the unique wildlife or vegetative species. (Zoological-Botanical Areas)	P14H	4.2	0	0.2	0.8	21.0	0
		Sub Total		4.2	0	0.2	0.8	21.0
14W	Manage for wilderness values while perpetuating the unique wildlife or vegetative species. (Zoological-Botanical	P20H	0	0	0	0	12.8	0
		P21H	0	0	0	0	3.5	0
	Sub Totals		0	0	0	0	16.3	0
22	Manage for sustained production of livestock forage and game animal habitat. Fuelwood harvest is restricted to occasional removal of dead and down material.	P22L	0	349.5	0	0	0	0
		Sub Totals		0	349.5	0	0	0

Table 2. Final Prescription Allocation by Management Area.^{1/} (Continued)

No.	Management Area Emphasis	Management Prescriptions	Thousand Acres By Alternatives					
			PA	A(Current)	B(RPA)	C	D	E
40	Manage to maximize livestock grazing capacity while meeting at least minimum legal requirements for other resources	P4H	0	0	8.1	0	0	0
		P16H	0	0	147.7	0	0	0
		P17H	0	0	2.5	0	0	0
		P40	0	0	1079.6	0	0	0
		P41	0	0	3.7	0	0	0
	Sub Totals		0	0	1241.6	0	0	0
PR	Manage for primitive recreation opportunities.	P9H	0	0	0	0	0.6	0
		P20H	0	0	0	0	45.6	0
		P21H	0	0	0	0	97.6	0
	Sub Totals		0	0	0	0	143.8	0
WS	Manage to protect future wilderness values. (Wilderness Study Areas)	P9L	0	90.8	0	0	0	0
		Sub Totals		0	90.8	0	0	0
Grand Totals			1726.5	1726.5	1726.5	1726.5	1726.5	1726.5

^{1/} The Interdisciplinary Team made minor changes in prescription allocations to create manageable boundaries for research natural areas, zoological areas, and wilderness areas.