MANAGEMENT SITUATION

CHAPTER II

MANAGEMENT SITUATION

This chapter describes the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands, as they are today and how they are expected to change under implementaton of the Forest Plan. Included is a description of the setting in which the Forest is managed, its resources and uses, demands placed on the Forest, and how those demands will be met through management of the Forest. The information used to create this description is a result of an analysis that determined supply and demand conditions as well as changes needed to correct present problems and prevent future ones. A more detailed assessment is given in Chapter III of the accompanying Final Environmental Impact Statement.

The second part of this chapter summarizes future conditions under direction of the Forest Plan and specifies both the type and the general location of activities that will occur. Expected future conditions of the Forest also reflect the way in which proposed management direction addresses planning questions.

The last part of the chapter summarizes research needs identified during the planning process.

THE PRESENT

SOCIAL AND ECONOMIC SETTING

SOCIAL SETTING

The Pike and San Isabel National Forest planning effort delineated areas called Human Resource Units (HRU) to geographically assess the social variables related to the different aspects of Forest resources. Social variables include both economic and cultural values. A Human Resource Unit is a geographic area of land that is characterized by particular patterns of cultural lifestyles, economic conditions, and topography. This concept was used to characterize the unique relationships residents of an area have with one another and with the land on and near National Forests and Grasslands.

Racial composition of minority populations within Human Resource Units and geographic locations of minorities, is available in the planning record (Planning Action 4, Analysis of the Management Situation). This document is available for review in the Forest Supervisor's Office, Pueblo.

The Forest is comprised of nine Human Resource Units, (Leadville, Salida, South Park, South Platte, Pikes Peak, Sangre de Cristo - Wet Mountain, Spanish Peaks, Comanche, and Cimarron) falling within three Social Resource Units, (Front Range, Arkansas, and Southern Plains) of the Southern Rocky Mountain and Plains Physiographic Regions. Social Resource Units are bigger and broader geographic areas than the Human Resource Units but have similar relationships and characteristics. See Figures II-1 and II-2 for locations of Human Resource Units and Social Resource Units.

The Forests, Grasslands and associated water areas play a vital role in the social and cultural life of the populations in or near the planning area. People's activities and attitudes have had a distinct influence on resource use and management of activities. Conversely, the management of resource use and development has affected people and their environment to some degree. The population in or near the planning area is dependent on Forest resources in varying degrees of intensity. One of the most important uses of Forest land is for watershed management. The watershed function of the Forest will be of increasing importance as the population of the planning area continues to increase. Recreation is an important industry in the planning area and generates a major portion of the economic base through tourism. There is an accelerating trend in outdoor recreation occurring on Forest land. The use of fuelwood by many households as a primary or supplementary source of heat energy has resulted in intensive collection of both dead and green wood from Forest land. Forage for livestock grazing is the principal resource use of the Grasslands, having considerable influence on local and regional economies. Wildlife on Forest land contributes significant monetary, recreation, and esthetic values to the planning area. Timber production is important to the local area. Mineral production, including oil and gas, occurs extensively on Forest land. The visual and environmental qualities of the Forest are of significant importance to local communities because of their value in attracting tourists. Residents benefit from employment generated directly and indirectly through mining, timber production, livestock grazing, recreational activities, tourism, and other resource related activities.

LEADVILLE HUMAN RESOURCE UNIT #1: This Human Resource Unit is comprised of Lake County which occupies a central position in the State of Colorado. Lake County consists of 242 thousand acres of which 64.5 percent is National Forest System land. Leadville is the major city in Lake County.

Major publics in the area include miners and mining operators, small business and industry owners, tourists, and recreationists. Mineral production dominates the employment sectors in Lake County. Residents and tourists utilize Forest land extensively for outdoor recreational activities for both summer and winter sports. The Turquoise Lake and Twin Lakes Recreation Areas, and Ski Cooper Ski Area are among the attractions found in the Unit. Other important uses of the Forest land include intensive fuelwood collection, wildlife habitat management, timber production, and watershed management.

Historically, mineral production and related industries have been and still are the prime factors in the labor market in Lake County. Mining accounts for 35 percent of the total employment.

Trade, services, and government provide the majority of the remaining nonagricultural employment. In March 1981, the unemployment rate in Lake County was 7.4 percent. Per capita income increased from $3,231 in 1970 to $5,374 in 1977. The total population of the Leadville Human Resource Unit increased about 24 percent between 1960 and 1980. Population and employment is expected to increase significantly by 2010 because of increased mineral production in the area. However, the area's high cost-of-living may have some effect on the population growth rate. Increased mineral production in Lake County would also have positive effects on employment in nearby human resource units.

The Leadville area has recently suffered severe unemployment due to a reduction of mining activity. Many residents are concerned with the possible diversification of the local economic base.

SALIDA HUMAN RESOURCE UNIT #2: This Human Resource Unit is comprised of the majority of Chaffee County which lies near the central part of the State of Colorado. Chaffee County consists of 664 thousand acres of which 68.1 percent is National Forest System land. Salida and Buena Vista are the two major cities in Chaffee County.

Major publics in the area include miners and mining operators, small business, ranchers and industry owners, government employees, recreationists, senior citizens, and tourists. Communities depend on Forest land for a variety of resources. The visual and environmental qualities of Forest areas are regarded highly because of their value in attracting tourists that provide a major portion of the local economic base. Mineral and timber production, grazing, wildlife habitat management and watershed management are ongoing activities in the Unit. Fuelwood collection for domestic heating is intensive because of rising energy fuel prices. National Forest System land provides numerous outdoor recreational opportunities in both summer and winter sports. Monarch Ski Area, located on the National Forest, provides skiing and other winter activities.

The recreation industry occurring in the area generates a major portion of the labor market in the Unit. Service, government, and trade are the major employment sectors. In March 1981, the unemployment rate in Chaffee County was 7.2 percent. Mining and agricultural activities also contribute significantly to the labor market and economic base of the Unit. Per capita income increased from $3,391 in 1970 to $4,909 in 1977. The total population of the Salida Human Resource Unit increased about 59 percent between 1960 and 1980. It is estimated that the population will continue to increase because of increased employment opportunities in mineral and recreation developments, and immigration of elderly people into the area.

SOUTH PARK HUMAN RESOURCE UNIT #3: This Human Resource Unit is comprised of the majority of Park County which lies almost exactly in the center of the State of Colorado. Park County consists of 1.3 million acres of which 46.7 percent is National Forest System land. Fairplay, Bailey and Lake George are the major cities in Park County.

Major publics in the area include ranchers and farmers, recreationists, miners and mining operators, small business and industry owners, government employees, and tourists Communities utilize the nearby Forest land for summer and winter recreational activities. Nearby ski areas include Breckenridge and Geneva Basin. Recreation is an important industry in the Unit and generates a major contribution to the local economy. Intensive fuelwood collection of both dead and green wood is occurring because of the high cost of energy fuels. Watershed management, including water storage and transmission facilities, is an important function of Forest lands. Water derived from Forest land is a necessary commodity for all users in the Unit. Other important uses of the Forest in the area include timber production, grazing, wildlife habitat management, and mineral production.

The largest number of jobs occur in services, retail trade, agriculture, government, and mining. In March 1981, the unemployment rate in Park County was 6.0 percent. A large number of residents from the Platte Canyon area commute to the Denver metropolitan area for employment. The sale of land and water rights is contributing to the decline of the agricultural industry. Per capita income increased from $3,259 in 1970 to $4,128 in 1977. The total population of the South Park Human Resource Unit increased about 193 percent between 1960 and 1980. It is estimated that the population will continue to increase because of residential development in the Platte Canyon area near the Denver metropolitan area and immigration of elderly populations into the area.

SOUTH PLATTE HUMAN RESOURCE UNIT #4: This Human Resource Unit is comprised of Douglas and Jefferson Counties. Douglas and Jefferson Counties lie in the north-central part of the State of Colorado and are a part of the Denver metropolitan area. Both counties total 1.04 million acres of which 23 percent is National Forest System land. Major communities in the Unit include Castle Rock, Englewood, Sedalia, Littleton, Evergreen, Morrison, and Golden.

Major publics in the area include government and military employees, ranchers, farmers, fuelwood cutters, business and industry owners, recreationists, and tourists. Water development is one of the most important uses of the Forest land in the area. The watershed function of the Forest will become increasingly important as the population of the Front Range continues to expand. An important function of the Forest is to provide opportunities for recreation to residents and tourists. Outdoor recreation on Forest land occurs extensively year-round.

The Geneva Basin Ski Area is located within a short distance from the Denver metropolitan area. Communities depend on the Forest for fuelwood which is currently a primary source of heat for many families. Other important uses of the Forest include wildlife habitat management, timber production, mineral production, and military training.

The Denver metropolitan area is a regional center for numerous Federal agencies. Military installations, manufacturing, and medical facilities also contribute significantly to the local labor market and employment sectors. The largest number of jobs occur in manufacturing, trade, services, government, and construction. In March 1981, the unemployment rate in the Denver metropolitan area was 3.4 percent Per capita income increased from $4,270 in 1970 to $7,091 in 1977. The total population of the South Platte Human Resource Unit increased about 200 percent between 1960 and 1980. It is estimated that the population of the Unit will continue to increase rapidly for a number of reasons including increased job opportunities and retirement related immigration. The favorable climatic conditions coupled with other desirable amenities found in the Unit are generating an influx of population of all ages.

PIKES PEAK HUMAN RESOURCE UNIT #5: This Human Resource Unit is comprised of the majority of El Paso and Teller Counties. El Paso County lies in the east-central part of the State of Colorado. Teller County lies in the central part of the state directly west of Colorado Springs. Both counties total 1.7 million acres of which 13 percent is National Forest System land. Major communities in the Unit include the Colorado Springs metropolitan area and Woodland Park.

Existing publics include military personnel and other government employees, retirees, recreationists, tourists, small business and industry owners, and fuelwood cutters. One of the most important uses of Forest land is for watershed management The watershed function of the Forest will be of increasing importance as the population of the Pikes Peak Region continues to grow. Recreation is an important industry for the Unit. Forest lands provide numerous outdoor recreational opportunities in winter and summer sports activities for tourists and residents. Fuelwood is in great demand because of increased energy fuel prices. The visual and environmental qualities of the Unit are important because of their value in the recreation and tourist industry. Other important uses of the Forest land include timber production, mineral production, military training, experimental forest management, grazing, and wildlife management.

Military installations including the U.S. Air Force Academy and Fort Carson contribute significantly to the labor market of the Unit. The largest number of jobs occur in military, government, trades, and services. In March 1981, the unemployment rate in the Pikes Peak Region was 4.3 percent. Per capita income increased from $3,560 in 1970 to $4,824 in 1977. The total population of the Pikes Peak Human Resource Unit increased about 117 percent between 1960 and 1980 It is estimated that the population will continue to increase rapidly reaching .5 million by 2010.

SANGRE DE CRISTO-WET MOUNTAIN HUMAN RESOURCE UNIT #6: This Human Resource Unit is comprised of Custer, Fremont, and Pueblo Counties which lie in the south-central part of the State of Colorado. The counties total 3.0 million acres of which 10 percent is National Forest System land. Major communities in the Unit include Pueblo, Canon City, and Westcliffe.

Existing publics in the area include ranchers, farmers, miners and mining operators, government employees, business and industry owners, steel mill workers, recreationists, tourists, and fuelwood cutters. Forest lands provide opportunities for summer and winter recreational activities. Fuelwood collection is intensive because of its use as a primary source of heat energy by many households. The agricultural industry utilizes Forest land for cattle grazing. Watershed management is one of the most important functions of the Forest. Water derived from the Forest is a necessary commodity for all users. Other important uses of Forest land occurring in the Unit include timber production, mineral production, and wildlife habitat management. Esthetics and environmental qualities of the area are prime factors in the tourism and recreation industry.

The region has been recently dominated by primary metal industries, most notably the CF&I Steel Corporation Manufacturing comprises a large segment of the economic base and employment in the area. The largest number of jobs occur in services, manufacturing, government, and trade. In March 1981, the unemployment rate in the area was 6.3 percent. Per capita income increased from $2,523 in 1970 to $4,662 in 1977. Total population of the Sangre de Cristo-Wet Mountain Human Resource Unit increased by 11 percent between 1960 and 1980. It is estimated that population will increase only slightly by 2010.

SPANISH PEAKS HUMAN RESOURCE UNIT #7: This Human Resource Unit is comprised of Huerfano County and part of Las Animas County. Huerfano and Las Animas Counties lie in the south-central and southeastern parts of the State of Colorado, respectively. Both counties total 4.07 million acres of which 5 percent is National Forest System land. Major communities in the Unit include Walsenburg, La Veta, and Trinidad.

Existing publics include ranchers, farmers, coal miners, mining operators, government employees, business and industry owners, recreationists, tourists, and fuelwood cutters. Livestock grazing on Forest land is important to the agricultural industry locally and regionally. The esthetics and environmental qualities of the Spanish Peaks and surrounding areas are vital to the recreation and tourist industry for survival of some local communities. An important use of the Forest is for watershed management. Water derived on Forest land is an important commodity for all uses. The Forest offers numerous outdoor recreational opportunities for both summer and winter sports. Fuelwood collection occurs intensively on Forest land because of its use as a primary source of heat by many households.

The greatest number of jobs occur in services, trade, government, and agriculture. In March 1981, the unemployment rate in the area was 5.2 percent. Per capita income increased from $2,392 in 1970 to $4,355 in 1977 Total population of the Spanish Peaks Human Resource Unit decreased significantly by 23 percent between 1960 and 1980, with the greatest decrease occurring in Las Animas County. Population decreases occurred shortly after the decline of the coal production in Huerfano and Las Animas Counties. It is estimated that the Unit population will continue to decrease by 2010, with major decreases occurring in Las Animas County. Huerfano County population will increase only slightly because of an influx of elderly population into the area.

COMANCHE HUMAN RESOURCE UNIT #8: This Human Resource Unit is comprised of Baca County, part of Las Animas County, and Otero County. Baca, Las Animas, and Otero Counties lie in the southeastern part of Colorado. The counties total 5.5 million acres of which 8 percent is National Forest System land. Major communities in the Unit include Springfield, La Junta, and Rocky Ford.

Existing publics include farmers, ranchers, government employees, small business and industry owners, hunters, oil and gas companies, tourists, and recreationists. One of the Unit's greatest natural resources is rangeland. An important function of the Grassland is for livestock grazing. The local and regional economies in southeast Colorado are largely dependent on livestock and agricultural industries. The Comanche National Grassland produces approximately 102,000 animal unit months of forage annually. The Grassland is a favorite area for hunting small and big game, waterfowl, and upland game birds. The wildlife resources of southeast Colorado contribute about $1,000,000 annually from hunting and other wildlife related activities. Dispersed recreational opportunities are also available within the Unit The total annual estimated income from mineral and energy related activities on the Grassland is about $225,000.

Agricultural activities provide a large portion of the economic base for the Unit. The greatest number of jobs occur in agriculture, trade, services, and government. In March 1981, the unemployment rate was 4.4 percent. Per capita income increased $2,853 in 1970 to $4,386 in 1977. Total population of the Comanche Human Resource Unit decreased by 9 percent between 1960 and 1980. It is estimated that the population of the Unit will increase by 2010, with increases occurring in Baca and Otero Counties. However, Las Animas County will continue to decrease in population.

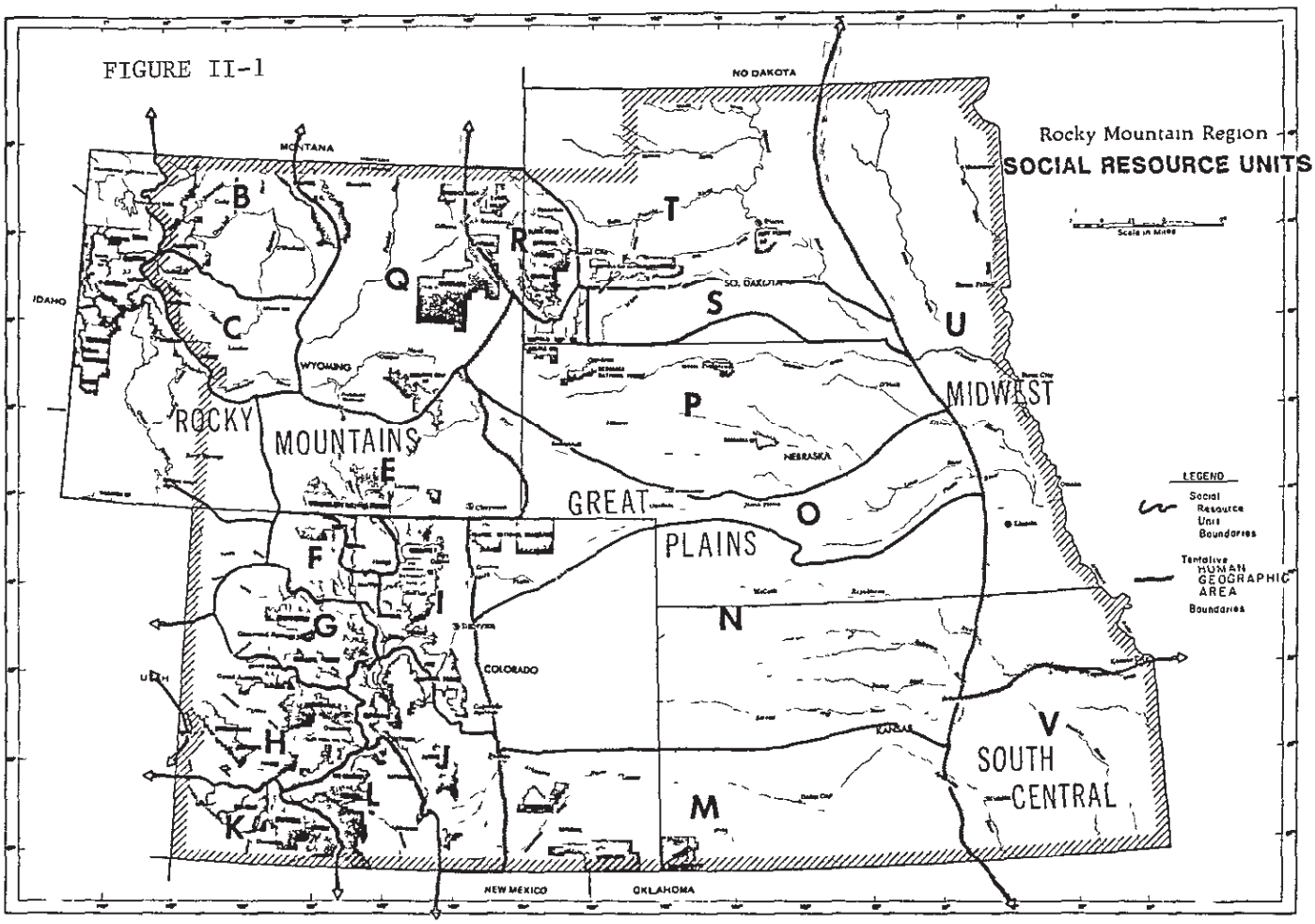
CIMARRON HUMAN RESOURCE UNIT #9: This Human Resource Unit is comprised of Morton County and a small portion of Stevens County, Kansas. Morton and Stevens Counties lie in the extreme southwestern part of Kansas. The major community in the Unit is Elkhart.

Existing publics include ranchers, farmers, grazing permittees, oil and gas companies, government employees, hunters, tourists, business and industry owners, and recreationists. Forage is the principal resource of the Cimarron National Grassland and has considerable influence on the local economy. There are 120 permittees that depend on National Grassland range during summer months.

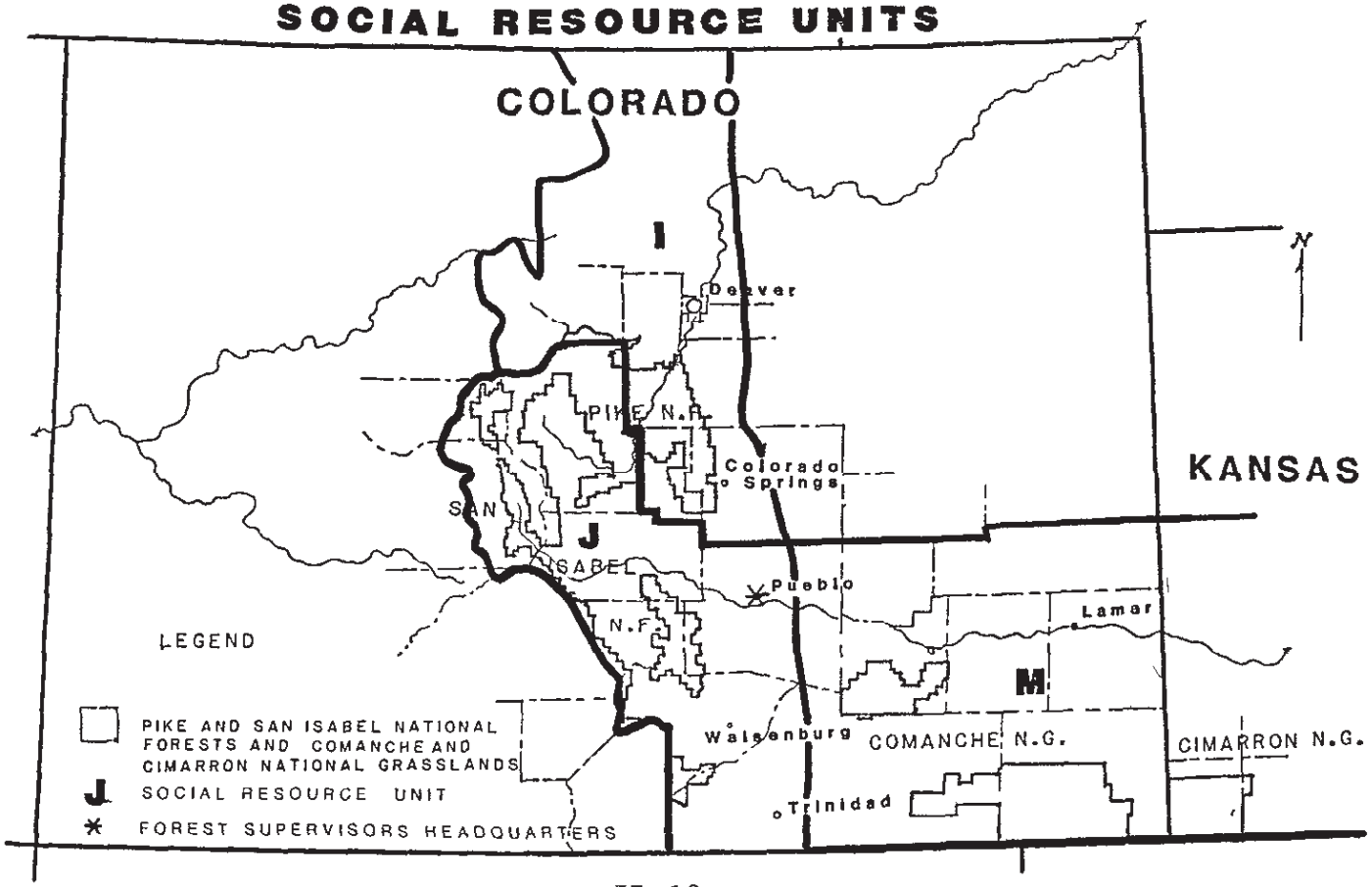
Oil and gas development has been a significant economic factor, providing local employment and contributing energy resources for the nation. Oil and gas is being produced from 23 oil and gas fields on National Forest System lands within the Unit. The Grassland provides recreational opportunities including hunting and picnicking. Hunting waterfowl, upland game birds, and small game are popular and create additional revenue for the Unit.

The greatest number of jobs occur in agriculture, services, oil and gas development, and trade. In March 1981, the unemployment rate in Morton County was 1.3 percent. Per capita income was $6,000 in 1977. Total population of the Cimarron Human Resource Unit increased by 2 percent between 1960 and 1980. It is estimated that the population of the Unit will increase only slightly by 2010. Figures II-1 and II-2 display locations of Human Resource Units and Social Resource Units.

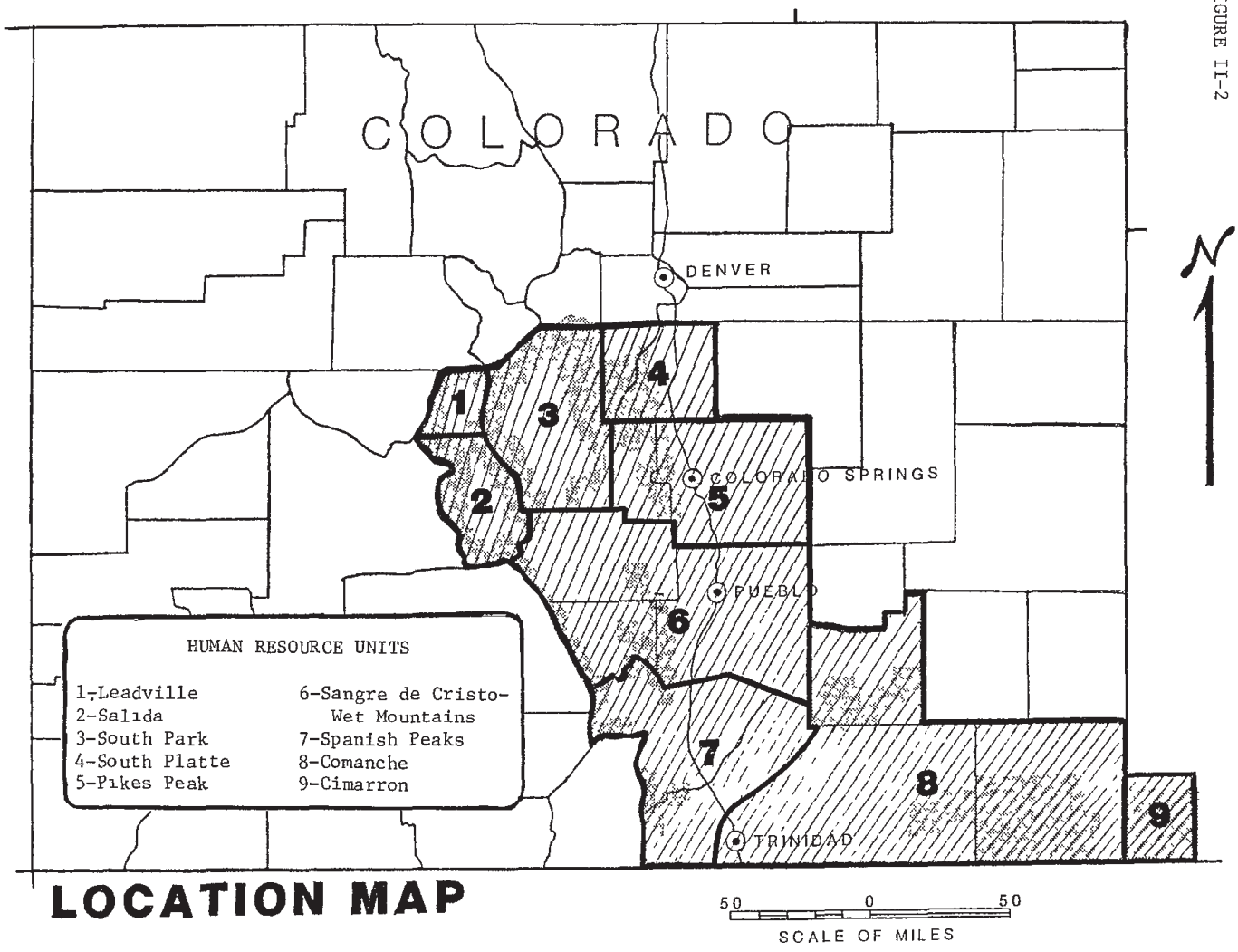
FIGURE II-1



GENERAL LOCATION MAP
SOCIAL RESOURCE UNITS



Pike & San Isabel National Forests
Comanche & Cimarron National Grasslands
HUMAN RESOURCE UNITS



LOCATION MAP

FIGURE II-2

ECONOMIC SETTING

The forest and rangelands, and associated water areas, are important sources of basic raw materials for local, regional, and national economies. Changes in population in the planning area have had an important effect on the demand for outdoor recreation, wildlife, fish, timber, forage, and water.

Colorado is experiencing rapid population and economic growth. The majority of the state's growth is from new residents moving into the Front Range area which contains most of Colorado's population. The population of the planning area increased by 36.3 percent between 1970 and 1980. In general, the most rapid growth in the planning area is occurring in the Pikes Peak and South Platte Human Resource Units.

The total population of the Unit in 1980 was 950,641 with a racial composition of Caucasian American 756,513 (79.6%); American Indian 4,482 (.5%); Asian American 9,616 (1.0%); Black American 24,030 (2.5%); Spanish-American 109,883 (11.6%); and other races 46,117 (4.8%).

The median age for the Planning Unit in 1970 was approximately 29.4 years compared to 26.2 years for the State of Colorado. Of the total population residing in the planning area in 1977, 9.9 percent were 62 years of age or older.

Disabled or handicapped individuals comprise approximately two percent of the total population of the planning area.

Overall, trade, services, and government are the three largest industrial sectors in the Unit. Manufacturing firms and military installations contribute significantly to the labor market in the Colorado Springs, Pueblo, and Denver metropolitan areas. Mineral activities, including oil and gas development, are prime factors in the economy of the Leadville, and Cimarron Human Resource Units.

Agricultural industries create a substantial percentage of the total employment in the grassland areas. Ranching and other agricultural activities in other areas are still a basic source of employment and income for some families. Agriculture is, however, slowly diminishing in importance because of inflationary factors and lack of sufficient water resources.

Labor market information for March 1981 indicated a five percent unemployment rate for the Unit, excluding the Denver Standard Metropolitan Statistical Area which encountered a 3.4 percent unemployment rate during the same period as compared to 3.8 percent for the state Per capita personal income has been gradually increasing during the past few years, primarily due to inflationary factors.

Three economic impact areas (EIA) have been identified in the planning area. Figure II-3 displays these EIA's.

Economic Impact Areas are area where there is a potential for significant economic impact from Forest Service activities. Economic factors of population, income, and employment are assesssed for each EIA. Changes in these factors for each alternative are assessed in Chapter IV of the FEIS.

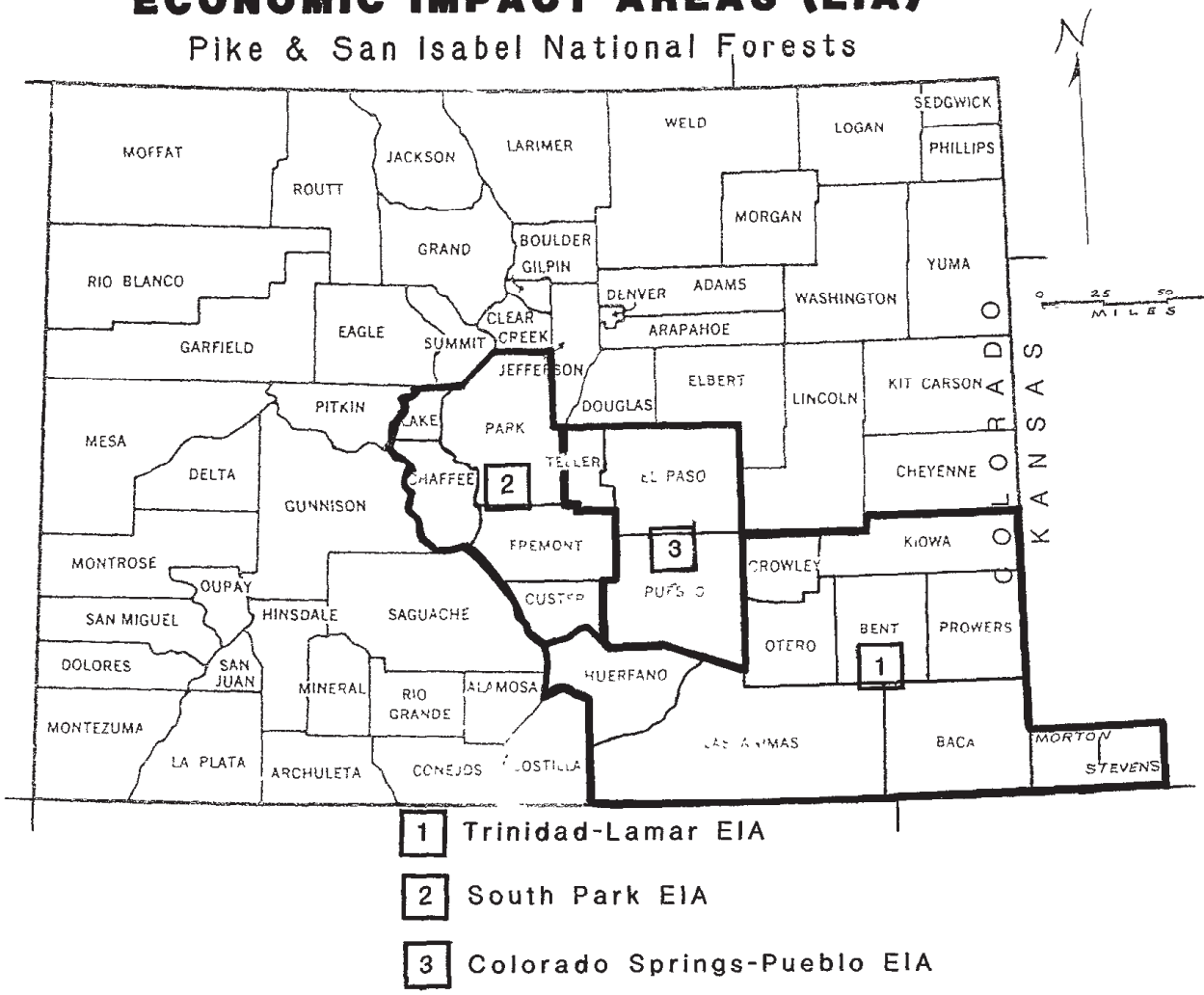
The economy of the Trinidad-Lamar EIA is characterized by the production of agricultural and food products, coal and mineral development, and the construction, resort, transportation and manufacturing industries. Pike and San Isabel National Forest lands total 689,700 acres in the EIA. There are 19,728 person years of employment, a total population (1977 base year) of 77,000, and a per capita income of $5,224 in this ten county area. The major communities in the EIA include Walsenburg, Trinidad, La Junta, Springfield, and Lamar, Colorado, and Elkhart, Kansas.

The economy of the Colorado Springs-Pueblo EIA is characterized by military installations and supporting services, and the construction, resort, and manufacturing industries. Pike and San Isabel National Forest lands total 400,760 acres in this EIA. There are 114,194 person years of employment, a total (1977 base year) population of 415,500, and a per capita income of $5,397 in this three county area. The major communities in the EIA include Pueblo, Fountain, Manitou Springs, Cripple Creek, and Colorado Springs.

The economy of the South Park EIA is characterized by the mining, manufacturing, construction, transportation, resort, and supporting service industries. Pike and San Isabel National Forest lands total 1,661,275 acres in this EIA. There are 11,530 person years of employment, a total (base year 1977) population of 52,400, and a per capita income of $4,500 in this five county area. The major communities in this EIA include Westcliffe, Canon City, Salida, Buena Vista, Leadville, and Fairplay.

ECONOMIC IMPACT AREAS (EIA)

Pike & San Isabel National Forests



1 Trinidad-Lamar EIA

2 South Park EIA

3 Colorado Springs-Pueblo EIA

FIGURE II-3

PHYSICAL AND BIOLOGICAL SETTING

The Forest lies within the Rocky Mountains and the Great Plains Physiographic Provinces. On the west, the Pike and San Isabel National Forests extend from the edge of the plains, about 5,000 feet in elevation, westward to the Continental Divide, with elevations ranging between 12,000 feet to over 14,000 feet. Colorado's highest peak, Mt. Elbert, at 14,433 feet elevation is included. Two major river systems originate on and drain the Forest area. They are the South Platte River to the north and the Arkansas River to the south. The several mountain ranges breaking up the area are interspersed with v-shaped canyons and broad glaciated valleys

The eastern slope of the Front Range is characterized by broad dissected benchlike erosional surfaces with the Rampart Range reaching up to 9,000 feet elevation at the southeast end and terminating in 14,110 foot Pikes Peak. Intermountain basins occur to the west across South Park, bounded on the west by the Mosquito Range and the Arkansas hills. Further to the west, the upper Arkansas River valley separates the Front Range and South Park from the high mountain peaks of the Continental Divide.

The easternmost range of the Rockies to the south is the Wet Mountains, dominated by 12,349 foot Greenhorn Mountain. The western edge of the San Isabel National Forest follows the crest of the Sangre de Cristo Range and is separated from the Wet Mountains by the broad Wet Mountain Valley. At the southern end of the Forest, the Spanish Peaks form two distinct volcanic cones rising to 13,626 feet elevation.

The Comanche and Cimarron National Grasslands lie within the Great Plains Physiographic Province. The Comanche National Grassland is within the High Plains, Raton, and Colorado Piedmont subdivisions with elevations ranging from 3,800 to 5,900 feet. The High Plains section consists of nearly flat topography with broad shallow depressions broken by low lying sandhills in the southeastern part. The Colorado Piedmont has more diverse elevations than the high plains. The Raton section includes parts of the western areas of the Comanche National Grassland and is characterized by steep walled canyons and mesa tops where the erosional forces of water and wind have carved these features.

The Cimarron National Grassland lies within the Southern High Plains section of the Great Plains Physiographic Province with elevations ranging from 3,150 to 3,700 feet. The area consists of upland plains and rolling to hilly, sandy land. Large areas of the upland are comparatively flat and featureless. The Cimarron River, an intermittent stream which flows only during periods of heavy upstream rainfall, passes through the area. The sandhills have hilly and rolling topography with sand dunes

of varying age and size. The majority of the two grassland areas are underlain by deposits of limestone, shale, sandstone, sand and gravel.

Plant and animal life varies by elevational range and climate. Temperature and precipitation extremes are encountered through the elevation zones from the prairie to the high peaks. Average mean temperature for the National Grasslands is 52 degrees and for the higher elevations on the mountainous Districts (i.e., Leadville area) the average mean temperature is 37 degrees. Precipitation averages between 10 - 17 inches annually on the National Grasslands to over 30 inches at higher elevations of forest land. Moving upward through the zones, the National Grasslands are characterized by short grass prairie with plains grasses, sandsage and yucca. Cottonwood grows in the major stream bottoms. The National Forests begin at the foothills with pinyon pine and shrubs and continue up through the montane zone with aspen, ponderosa pine and Douglas-fir forests. In the upper montane zone, aspen, lodgepole pine and spruce/fir forests are encountered. At higher elevation, the sub-alpine forests of predominantly Engelmann spruce and sub-alpine fir are found. Above timberline, from about 11,500 feet to the highest peaks, the alpine zone occurs.

Forest vegetation contributes to Forest character more than most landscape features. Its form, color, and texture, is easily discernible to the human eye. Society perceives it to have beauty and utility.

The hundreds of individual plant species which occur on the Forest and the Grasslands may be classified into less than a dozen vegetation types. Each type lends a unique character to the landscape and has an associated utility to society. Forest management is linked to vegetation treatment because vegetation influences other resource elements.

The various vegetation types of the National Forests provide habitat for a variety of game and nongame wildlife species. Some more common species include mule deer, elk, black bear, blue grouse and ptarmigan, snowshoe hare, and cottontail rabbit. Bighorn sheep inhabit several areas of the Forest. Fisheries include cutthroat, rainbow, brook, mackinaw, and brown trout.

Typical wildlife species on the National Grasslands are mule deer, white-tailed deer, antelope, coyotes, fox, many types of rodents, turkey, both bobwhite and scaled quail, lesser prairie chicken, mourning doves, bobcat, prairie dogs, jackrabbits, pheasants and many other small mammals, songbirds, reptiles and amphibians. There are a few ponds in the Grasslands that are stocked with several fish species.

A more thorough discussion of wildlife and fish including management indicator species and threatened and endangered animals is contained in Chapter III of the Final Environmental Impact Statement.

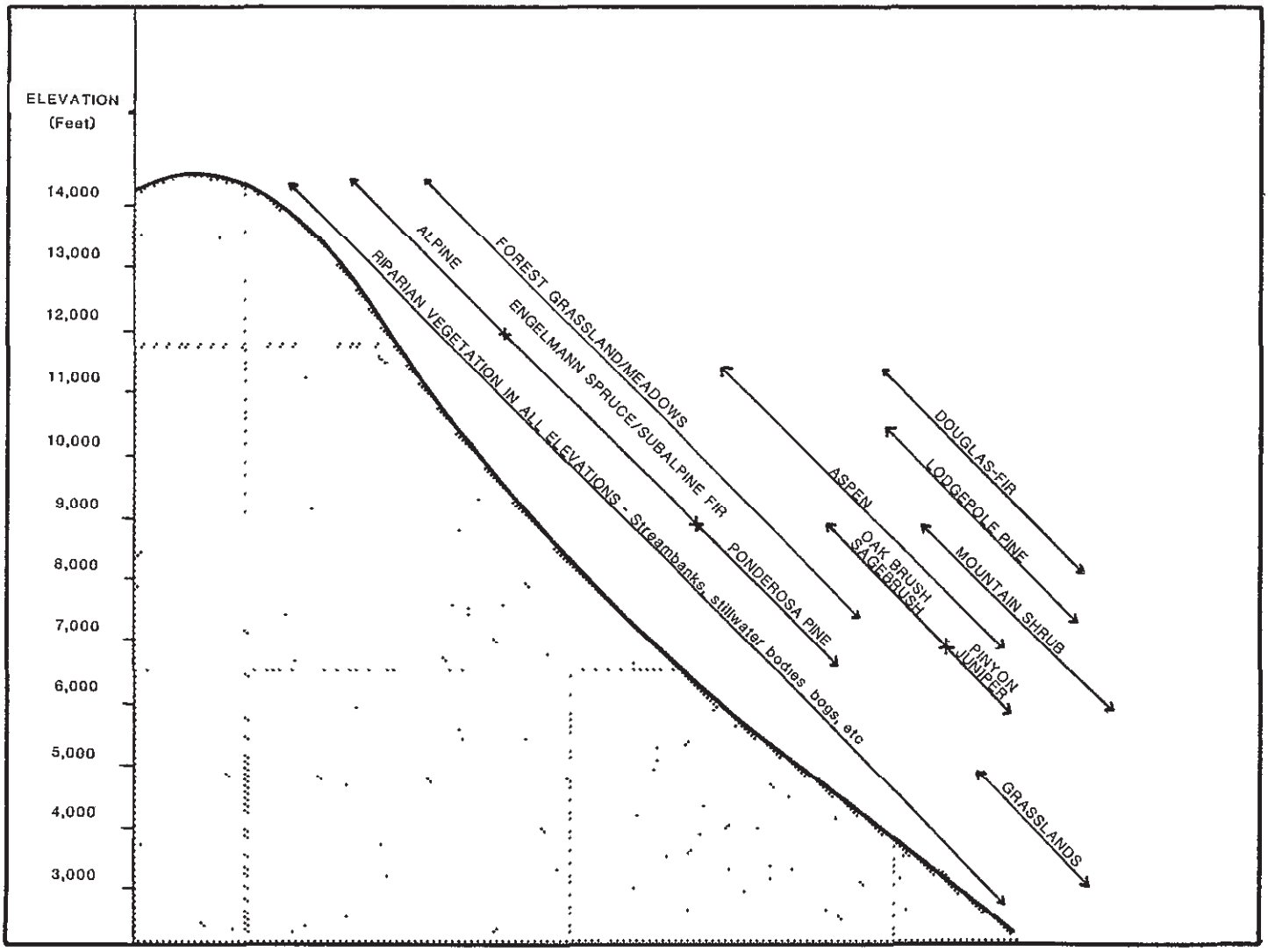
Vegetation is a dynamic resource. It will change over time through natural succession. The way it will change is based on factors that effect the vegetation and the site on which it is growing. The Forest Reserves were established prior to 1900. Since that time Forest managers have largely controlled the factors that affect vegetation and growing conditions.

Forest managers control these conditions to provide and maintain healthy, vigorous ecosystems, capable of producing a range of goods, services and conditions. There are consequences associated with not managing the vegetation on the forest.

Past control of fire and low levels of vegetation treatment have resulted in large areas of the Forest achieving a mature vegetation condition, characterized by low vigor, high mortality, insect and disease infestations, and greater risk of wildfire. A more balanced distribution of age and size classes improves vegetation variety, vigor and growth, reduces the risk of disease and insect problems, reduces the potential for wildfire, and improves wildlife habitat and visual quality. In addition to improving the health and vigor of the Forest, vegetation treatment also results in more and better wood products to serve local and national needs.

The following discussions display current condition, management needs, and expected forest condition without management. Figure II-4 displays elevation ranges for forest vegetation.

FIGURE II-4 GENERAL ELEVATION RANGE FOR GRASSLANDS & FOREST VEGETATION



Alpine - Alpine vegetation grows above native tree elevation limits. It is characterized by grasses, grasslike plants, forbs, low shrubs, and poorly formed trees. Alpine provides a unique opportunity for scenic viewing particularly during the early summer when wildflowers are in bloom. The most important factor controlling the distribution and growth of alpine plants is available soil moisture. Wildlife habitats provided by this type supports elk, bighorn sheep and mountain goats. Ptarmigan and pika are unique to the type. Livestock, particularly sheep, graze the alpine in designated range allotments.

Treatments which modify alpine vegetation are infrequently applied. Due to a short growing season and harsh climatic conditions, vegetation after disturbance is very slow to recover. Alpine vegetation will perpetuate itself unless there is severe ground disturbance

Aspen - The aspen vegetation type occupies six percent of the Forest and typically occurs at lower elevations interspersed with grasslands, meadows, mountain brush, and other forest types. Aspen stands on the Forest are typically mature to overmature with high disease and mortality levels.

Aspen is important to recreation use. It is an important visual feature in the landscape character of the Rocky Mountains Physiographic Province. Aspen color and texture contribute to the character in many ways These include edge contrast between aspen and conifer stands, aspen islands in large meadows, and massive textural blocks all occurring in the midground and background. In the foreground distance zone, aspen form and texture are important features. Color is a dominant element in all distance zones. Color contrasts with surrounding coniferous vegetation, nonforest areas, bare rock, water and sky. The color change between seasons attracts many forest visits year round.

Mountain grasslands and associated aspen ranges furnish forage for a large segment of the livestock industry in Colorado. Many aspen sites support a luxuriant understory of forbs and grasses These areas are important summer rangelands for both cattle and sheep.

The aspen ecosystem is important to wildlife. Deer and elk use aspen under six feet in height for forage. They use taller aspen for thermal and hiding cover. Aspen sprouts above snowcover are critical to winter diet in some areas. The grass, forb and shrub understory provide a summer food source as more forage is present than in conifer stands.

Aspen forests are prime elk calving and deer fawning habitat. This is especially true on south slopes within one-quarter mile of water between winter and summer range.

More songbirds are normally observed in aspen forests than in coniferous forests. Aspen provides food, nest sites, and cover for warblers, vireos, blue grouse, owls, thrushes, kinglets, and a variety of other birds. Small mammals such as shrews, moles and mice use aspen forests. Aspen understory and leaf litter provides their food, cover and nest sites. Aspen along riparian zones is one of the basic foods for beaver.

Overmature aspen stands are sometimes decadent and provide cavities and insects for bird and mammal species. Aspen stands are usually in close proximity to conifer stands that can provide cover during aspen regeneration.

Aspen management in transitory big game range helps support the animals longer in the spring and fall. This takes pressure off summer and winter range and provides extra forage during mild winters.

Aspen regenerates almost exclusively through root sprouting. This results in clones which are genetically identical to the trees from which they originated. Trees within one clone are very homogeneous in such characteristics as rate of growth, form, vigor, resistance to disease, and time of leaf break and leaf fall. These characteristics often vary widely between clones due to genetic and site differences.

To stimulate root sprouting the majority of aspen clones require a major disturbance that results in the removal of most or all of the existing trees. Wildfire has historically been the primary disturbance initiating root sprouting. Control of wildfire has permitted many aspen stands to become overmature with little success in regenerating. In the absence of disturbance, either natural or manmade, much of the aspen will convert to conifer types in 100 to 200 years.

Resource values will suffer if the aspen is not treated and allowed to convert to conifer forest. This will result in loss of the above described wildlife habitat conditions, reductions in forage supplies, and adverse impacts on the recreation settings associated with the aspen type. In order to maintain aspen on the Forest, 270 acres will require vegetation treatment annually. The Forest has 27,000 acres of aspen which are approximately 100 year old stands and are approaching maturity. Treatment will insure continuing these aspen stands.

Douglas-fir - Douglas-fir occupies about 16 percent of the Forest. It typically occurs on steep, north-facing slopes at lower elevations and is frequently the only conifer vegetation in a large area. On south-facing slopes, Douglas-fir occurs sparsely on rocky ridges, steep hillsides, and canyon slopes.

Douglas-fir is a long-lived species which is valued for wildlife habitat diversity, scenic quality, and cover on big game winter range. Douglas-fir also contributes to watershed protection and is a desired commercial tree species. The Douglas-fir type has not been treated in the past resulting in mostly mature and overmature stands. Very little acreage of early successional stages of Douglas-fir are known to exist on the Forest.

Douglas-fir is a climax species that reproduces from seed. Without treatment, stands mature and die, but perpetuate the Douglas-fir type. Currently the stands have a relatively uniform age structure. Natural succession will perpetuate the current uniform distribution.

Gambel Oak - Oak brush vegetation commonly occurs at lower elevations on the Forest. At its lower elevation range, it is frequently associated with pinyon and juniper trees. At its upper limit it is often interspersed with aspen, Douglas-fir, or ponderosa pine.

The Gambel oak type provides watershed protection, retards snowmelt, provides browse for wildlife and domestic stock, and is a popular firewood species. Gambel oak is capable of reaching tree size on some sites. This savannah type provides highly productive useable forage for wildlife and livestock. The mature trees provide cavities for small mammal dens and non-game bird nests. Food production for deer and turkey is highest on these sites. Gambel oak stands are often thick and animal mobility is severely restricted and the more palatable grasses and forbs are shaded out.

Currently, the majority of the Gambel oak type is estimated to be in an early seral stage. A more balanced structural distribution would improve this type for wildlife and domestic stock and increase the landscape's visual diversity.

Grasslands (Comanche and Cimarron National Grasslands)

Vegetation consists primarily of short and mid-grasses. Cottonwood trees and willows are largely restricted to major stream bottoms. Juniper trees and shrubs occur in low lying areas and on slopes in areas of broken topography, such as canyons and draws. Shrubs consist of sand sagebrush, four-wing saltbrush, true mountain mahogany, rubber rabbit brush, wax current, clove current, boulder raspberry, small soapweed,

skunkbush sumac, common hackberry, walkingstick cholla, Longs grape, wınterfat, yucca and sacahuısta.

Major mıd-grasses are sıdeoats grama, galleta, and sand dropseed. Major short grasses are blue grama and buffalo grass Other species include Indian rıcegrass, crested wheatgrass, western wheatgrass, bıg, lıttle and sand bluestem grass, sand love, New Mexıco needle grass, akalı sacaton and three awn.

Forbs make up a portion of the vegetatıve cover. Some of the more common forbs are Russıan thıstle, Kochıa, sunflower, poverty weed, nıght shade, evenıng star, snow-on-the-mountaın, gourds, Devil's claw, croton, mılkweed, and pig weed. Other specıes ınclude asters, bush mornıng glory, daısies, penstemons, shooting star, evening prımrose, and wooly verbena. Astragulus and delphinium are also found ın favorable years.

Forage production on the National Grasslands yields from 715 to 2050 pounds per acre per year dependıng upon soil type and elevation. Management ıs dırected at improving and maintaınıng forage production whıle provıding protection for other resource values.

Grasslands and Meadows - Grassland and meadow vegetatıon types occur throughout the Forest ınterspersed wıth all other vegetation types. Most grasslands support, or are capable of supportıng, numerous kınds of perennıal grasses and forbs. Herbage productıon on mountain grasslands occasıonally exceeds 3,000 pounds per acre; however, yıelds of 1,000 to 2,000 pounds per acres are much more common.

Many of these open parks may be the result of fıre. The forage produced ın the mountainous grassland and meadow vegetation types is available for both wıldlıfe and domestıc stock. The open nature of these vegetation types provıdes a great deal of scenıc varıety. Management ıs typıcally directed at ıncreasing forage whıle maıntaınıng vısual qualıty.

Lodgepole pıne - Lodgepole pıne occurs on the Forest primarıly in even-aged stands of fire origın. Lodgepole pıne ıs typically a seral species whıch, in the long-term absence of major disturbance, wıll be replaced by more shade tolerant specıes generally Engelmann spruce and subalpine fir. On some sıtes, however, where sıte condıtions or lack of a seed source prevent the establishment of more tolerant specıes, lodgepole may form a vırtual climax plant communıty. Lodgepole pıne occupies about 8 percent of the Forest and provıdes scenıc beauty, wıldlıfe habıtat, fırewood and other wood products.

Lodgepole pine ıs an aggressıve pıoneer into dısturbed sıtes. Exıstıng stands wıll deterıorate ın 200 to 300 years. As lodge-

pole pine matures and loses vigor, it becomes highly susceptible to attack by the mountain pine beetle. Under the right stand conditions, individual beetle infestations can multiply into an epidemic. The long-term solution to control pine beetle epidemics is to create a mosaic of age and size classes in lodgepole pine and to apply intermediate cultural treatments which promote vigorous, disease-free trees.

Mistletoe also heavily infects large amounts of lodgepole pine on the Forest. Approximately 95 percent of lodgepole pine stands on the Forest are considered to be stagnated (extremely slow or stopped growth) and should be treated. Following disturbance, natural regeneration is often so prolific that the stand is overstocked and may become stagnated if it is not thinned. (Stagnation is a condition where competition between individual trees for light, water, and nutrients is so intense that growth slows severely or ceases entirely.)

If lodgepole pine is not treated the even-aged stands will become overmature and the mountain pine beetle infestation risk will increase. The large areas of beetle killed trees will become increasingly susceptible to wildfire. If serotinous cones are present the lodgepole pine type could be maintained. Without a seed source meadows or other seral species such as aspen could invade burned over areas.

Mountain Shrub - This vegetation type is dominated by one or more of the following species: current, bitterbrush, rabbitbrush, snowberry, and mountain mahogany. It is located in combination with other shrub types and some of the drier forest types. The primary value of the type is for wildlife habitat. It has particular importance when available for use as big game winter range.

Pinyon/Juniper - This vegetation type is a semi-arid woodland composed of pinyon pine and juniper. It is a widespread type occurring below the elevation limit of Gambel oak and generally occupies lower elevations on the Forest.

The pinyon-juniper type occurs on the drier sites on the Forest and therefore is one of the least productive types. Vegetation is characterized by small size and low growth rates.

It provides forage for wildlife and livestock, adds scenic variety to the landscape, and furnishes products such as firewood, posts, and Christmas trees. It is important cover on big game winter range. Most of the type is estimated to be in the intermediate and late structural stages which reflects the lack of recent natural disturbance.

If left untreated the pinyon-juniper type will replace itself. If it replaces itself naturally the type will retain its current structural imbalance.

Riparian - Riparian vegetation occurs in areas with high water tables. Plants frequently common in this ecosystem include willows, alder, cottonwood and sedges. These areas are typically located adjacent to streams and around springs, lakes or bogs. While small in total area, they represent delicate, very important habitat for wildlife and serve as sediment traps to help purify overland water runoff. Desirable forage production is high, and under proper management these areas are an important part of grazing allotments. The riparian type also provides visual diversity and timber management potential along most forest streams. Riparian is important for recreation such as campgrounds and fishing. Riparian is one of the more productive sites on the forest. It also has the most uneven age structure.

Sagebrush - This vegetation type occupies relatively dry sites on the Forest. It is important for big game winter range. It also provides a scenic desert-like landscape and significant forage for livestock. Most of the type is in intermediate and late structural stages. Management techniques used in this type are prescribed burning and mechanical or chemical treatment.

Sagebrush is an invader species that may eventually take over other sites. If left untreated the sagebrush type will perpetuate itself and expand.

Engelmann Spruce/Subalpine Fir - Engelmann spruce and subalpine fir, occupies 14 percent of the Forest. This type occurs at higher elevations and represents the climax plant community on the majority of the sites it occupies. This type usually occupies moist sites. Spruce can grow to over 300 years and fir to 250 years. They generally occur in single age stands but occasionally occur in 2, 3, or multi-story stands. Its dense forest growth and layered appearance provides outstanding scenic views. It is also valued for wildlife habitat, watershed protection and production, and wood products.

There is currently a poor distribution of age classes or structural stages. This poor distribution is caused by low levels of management activity and by fire control. Fifty-six percent of the type is overmature. As the spruce and fir type matures, the trees become susceptible to insect and disease infestations. Subalpine fir is infected first, followed by spruce. A better balance of structural stages is needed to enhance forest health and vigor.

There was a massive spruce bark beetle epidemic during the period 1939 to 1952. It affected the old growth spruce and fir stands on the Forest at that time. Many of the dead trees are still standing.

The spruce/fir type reproduces by seed. It will reproduce itself naturally if not treated. The reproduction will retain the same age class distribution as currently exists. If a natural disturbance occurs, such as a major fire, the site will probably revert to aspen or lodgepole pine.

Ponderosa pine - This vegetation type occupies 14 percent of the Forest. Ponderosa pine generally grows in pure stands, but can be associated with aspen, Douglas-fir, pinyon and juniper and oakbrush. Ponderosa pine reproduces by seed. Natural regeneration requires the combination of a good seed crop, ample moisture the spring following seed fall to assure germination and seedling survival, and favorable seedbed conditions. These three conditions coincide rather infrequently.

Historically, low-intensity wildfires burned through ponderosa pine stands at frequent intervals. These fires had little effect on established trees. Thick bark makes ponderosa pine fire resistant. However, these fires prevented the buildup of heavy duff accumulations and kept competing vegetation in check, thus maintaining seedbed conditions favorable to ponderosa pine. Fire suppression over the past several decades has resulted in a buildup of organic litter, making seedbed conditions less favorable for ponderosa pine. Currently the type is mature to overmature, open grown and poorly stocked. There are some uneven aged stands. These are the result of past cutting activity.

Ponderosa pine is important for timber production, livestock grazing, and wildlife habitat.

Ponderosa pine is considered a climax species on many of the sites on which it occurs, particularly near the center of its elevational range. Major disturbances, such as high-intensity fires, heavy logging, or widespread mortality from insect or disease infestations may cause ponderosa pine sites to revert to more seral stages such as aspen, oakbrush or grass. The mountain pine beetle is currently at epidemic levels in some localized areas, but the rate of spread appears to generally be decreasing.

Precipitation

Precipitation varies from about 10 inches per year in the "rain shadow" in the Upper Arkansas Valley, to 30 inches in some higher mountain areas. Average precipitation in the lower mountains is

from 12 to 20 inches and 10 to 17 inches on the plains. Precipitation in these two areas often comes as sudden torrential thunder showers Summer thunder showers are also common throughout the mountains, however much of the precipitation comes from snowfall. Growing seasons vary from 170 days on the eastern plains to about 82 days in the higher mountain elevations.

PAST AND CURRENT MANAGEMENT AND SUPPLY POTENTIAL

The capacity of the Pike and San Isabel National Forests to provide outputs, goods and services is directly related to management of the resource elements described in the following section. These resource elements are the same ones used in developing the National Assessment and Renewable Resources Program (RPA).

Table II-1 compares the estimated resource production and use levels that would be provided by implementation of the Forest Plan with current management, Regional objectives, demand trends, and supply potentials where appropriate. The following defines the levels portrayed in the table.

Current Management

The level of outputs and uses that could be attained under the guidance of goals, objectives and land use allocations established in existing plans.

Regional Objectives

That portion of resource uses and outputs from the 1980 Resource Planning Act (RPA) Program that have been assigned to the Pike and San Isabel National Forests by the Rocky Mountain Regional Guide.

Demand Trends

Level of outputs, uses, and services expected to be needed or desired in the future.

Supply Potential - Maximum Resource Outputs

The estimated maximum possible level of a given output that could be supplied while maintaining long-term land productivity.

Forest Plan Objectives

The estimated levels of resource uses and outputs to be provided over time by implementation of the Forest Plan.

TABLE II-1

Current Outputs, Projected Demand, Supply Potentials (Average Annual Units)

Activity	Category	Unit of Measure	Present Level 1983	TIME PERIODS 1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RECREATION									
Developed Recreation Use Capacity (except downhill skiing)	Current Management	Thousand RVDs 1/	989	989	1010	1610	1730	2923	2170
	Regional Objectives			1935	2025	2338	2346	2656	2846
	Demand Trends			989	1510	2013	2163	2338	2713
	Supply Potential								
	Maximum Resource Outputs			3530	3730	4026	4326	4676	5426
	Forest Plan Objectives			989	1510	2013	2163	2338	2713
Downhill Skiing Use Capacity	Current Management	Thousand RVDs	147	147	219	474	904	1100	1150
	Regional Objectives			----------No Objective Assigned----------					
	Demand Trends			147	219	481	904	1305	1754
	Supply Potential								
	Maximum Resource Outputs			270	330	474	997	1100	1150
	Forest Plan Objectives			147	219	474	904	1100	1150
Dispersed Recreation Use Capacity (except wilderness)	Current Management	Thousand RVDs	3200	3200	3200	3800	4500	5000	5600
	Regional Objectives			3523	4151	4151	5515	6031	6163
	Demand Trends			3181	3620	3990	4661	5350	6130
	Supply Potential								
	Maximum Resource Outputs			8070	8500	9187	8895	9050	9033
	Forest Plan Objectives			3400	3600	4000	4700	5400	6100
Wilderness Use Capacity	Current Management	Thousand RVDs	242	288	387	486	558	617	617
	Regional Objectives			----------No Objective Assigned----------					
	Demand Trends			286	357	461	609	755	899
	Supply Potential								
	Maximum Resource Outputs			685	685	685	685	685	685
	Forest Plan Objectives			320	430	540	620	685	685
WILDLIFE									
Winter Range Habitat Capability for Elk and Deer	Current Management (Capacity)	Thousand Animals	15	15	15	16	16	16	17
	Regional Objectives			----------No Objective Assigned----------					
	Demand Trends			28	30	35	39	43	48
	Supply Potential								
	Maximum Resource Outputs			15	17	19	21	25	28
	Forest Plan Objectives			15	16	17	19	20	22

TABLE II-1 (Continued)

Current Outputs, Projected Demand, Supply Potentials (Average Annual Units)

Activity	Category	Unit of Measure	Present Level 1983	TIME PERIODS 1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RANGE									
Permitted Grazing Use National Forest	Current Management	Thousand AUMs 2/	40	43	43	43	45	49	50
	Regional Objectives			40	41	43	45	45	45
	Demand Trends			43	45	48	52	56	60
	Supply Potential								
	Maximum Resource Outputs			70	70	82	85	82	74
	Forest Plan Objectives			42	42	46	50	52	55
Permitted Grazing Use National Grass-lands	Current Management	Thousand AUMs	160	165	165	172	177	180	185
	Regional Objectives			161	164	172	178	180	180
	Demand Trends			----------100% of Allowable Use----------					
	Supply Potential								
	Maximum Resource Outputs			170	170	177	181	187	193
	Forest Plan Objectives			170	170	174	178	181	185
TIMBER									
Allowable Sale Quantity	Current Management 3/	Million Board Feet	23	23	29	43	43	43	43
	Regional Objectives			13	15	16	17	17	17
	Demand Trends			30	37	42	42	46	50
	Supply Potential								
	Maximum Resource Outputs			116	116	145	181	136	102
	Forest Plan Objectives			26	26	36	39	42	42
		Million Cubic Feet		8	8	11	12	13	13
WATER									
Water Yield	Current Management	Thousand Acre-Feet	1277	1277	1277	1278	1278	1278	1289
	Regional Objectives			1265	1265	1270	1275	1280	1285
	Demand Trends			----------100% of Water Yields----------					
	Supply Potential								
	Maximum Resource Outputs			1282	1282	1282	1281	1280	1280
	Forest Plan Objectives			1277	1277	1278	1278	1278	1278

1/ Recreation Visitor Day = 12 hours of recreation for one person or one hour of recreation for 12 persons or any combination thereof
2/ Animal Unit Month = the amount of forage consumed by one mature cow or its equivalent in a one-month period
3/ Timber yield in the current timber management plan in the standard and special areas The most probable outputs for the Current Management alternative were used in the EIS analysis These are 29 MMBF in the first 10 years, 43 MMBF in the second 10 years, and 43 MMBF in each of the last three 10-year periods The long-term sustained yield (LTSY) in the Timber Management Plan is 44 MMBF per year The LTSY in this Forest Plan is 57 5 MMBF

RESOURCE ELEMENTS

The following discussion presents the management situation as it relates to various resource elements. Although resource elements are discussed individually, management of the Forest occurs on an integrated resource basis. Management activities affect a variety of resources, and decisions are made only after considering the entire set of ramifications involved. Similarly, single management activities are actually designed to serve a variety of resource objectives. For example, treating lodgepole pine stands with small clearcuts to increase water yield can improve wildlife habitat and provide a source of wood for various purposes. Water developments are designed to serve the needs of certain wildlife species as well as domestic livestock. Roads are located to efficiently transport logs from the timber sale area to the mill, but these same roads are also designed to provide access for hunting, firewood gathering, and recreation.

Other inter-relationships are more separated chronologically. For example, treating trees to improve successional stages of vegetation can provide an immediate benefit of wood fiber and can improve wildlife habitat diversity and visual quality over the long term. This increases recreation opportunities, such as photographing, hiking and sightseeing over a period of time and may be entirely the result of a single management activity.

Resources discussed below are really part of a very complex system with numerous interactions. They are described individually only to emphasize important aspects of the current situation in an organized framework. These elements must be conceptually combined to understand the overall current situation on the Forest as well as how the Forest Plan relates to it.

Vegetation

Vegetation contributes to the character of the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands. The thousands of individual plant species which occur on the Forest may be classified into less than a dozen major vegetation types. Each type lends a unique character to the landscape. Management of the Forest is inevitably linked to vegetation management because vegetation influences every other resource element.

Relatively low levels of vegetation treatment activities, and fire control efforts have permitted mature vegetation to become widespread on the Forest. The process of natural succession leads toward the establishment of mature vegetation. This condition is characterized by low vigor, high levels of mortality due to insects and disease, and greater risk of wildfire because

of increased ground fuel build-up. A more balanced distribution of ages and sizes (structural stages) improves visual and vegetation diversity, improves vegetation vigor and growth, reduces the risk of insect and disease epidemics, and reduces the potential for wildfire. Additional discussion of the character of the Forests' vegetation is included in Chapter III of the EIS.

Wildlife Habitat Diversity

Current Use and Management

Vegetation diversity has a primary influence on wildlife habitat quality, since most wildlife species require a variety of plants and plant communities for feeding, for security, and for breeding purposes. The majority of the Pike and San Isabel National Forests has good to excellent inherent diversity of its vegetation; however, most forested areas are mature to over-mature and are in need of a better balance of age-classes.

Aspen is a key habitat for many wildlife species. The maintenance, expansion, and renewal of aspen stands is important for habitat diversity. Generally, the aspen is overmature and in need of renewal as a result of limited treatment.

Alpine and rockland non-forested habitats are generally in good condition. Only a few activities, primarily dispersed recreation, affect their wildlife habitat values. The mountain shrub and grassland habitats are in fair to good condition, with a few areas of livestock-big game competition.

Riparian habitat is especially important for wildlife and fish. There are problems in some areas with excessive domestic livestock grazing and off-road vehicle use.

The need for increased habitat diversity will continue in the future. As pressure on the Forest grows from loss of private habitat lands and from increased hunting and fishing, vegetation treatment will be called upon to provide more habitat opportunities for game species. More fisheries and fish habitat improvement projects will also be needed.

Demand Trends

General assumptions relative to demand trends for wildlife habitat diversity management are.

- The Forest Service will continue to provide adequate diversity to maintain viable populations of wildlife and fish species presently occurring on the planning area.

- Wildlife habitat diversity is an important indicator of wildlife species diversity and population levels.

- Management indicator species will be used to determine the levels of wildlife habitat diversity necessary to maintain viable wildlife populations.

- As road building, timber harvest, fuelwood cutting and recreational use increases, there will be a direct effect on elk and other species which are intolerant of disturbance.

Recreation

Current Use and Management

The Forest receives very heavy pressure for outdoor recreation uses. In 1983, recreation use totaled over 3,830,000 visitor days. The identification of public issues and management concerns highlighted the role that outdoor recreation plays in the Forest management situation. Rapidly expanding population centers along the Colorado Front Range, and particularly in the Denver metropolitan area, promise rapidly increasing use of the Forests recreation resources.

The Forest has a developed site capacity of about 17,230 persons at one time (PAOT), made up of about 10,040 PAOT in campgrounds, 2,095 PAOT in picnic grounds and 5,095 PAOT in other sites such as visitor centers, overlooks, or trailheads. Ski areas provide an additional capacity of 11,850 persons at one time. Demand for developed sites exceeds the supply on peak use days in most areas, and summer-long in some of the most popular areas. However, the existing supply is adequate to meet demand through 1990 if it is assumed that demand can be distributed throughout the Forest as a whole.

Downhill skiing demand is increasing rapidly as well. Potential capacities at the six existing areas on the Forest, (Ski Cooper, Monarch, Pikes Peak, Geneva Basin, Cuchara Valley Resort, and Conquistador) can provide adequate capacity to meet expected demand through the year 2000.

Dispersed use includes a wide range of activities, and in 1983 accounted for 2,425,000 visitor days (63 percent of total use). The most popular activity is driving for pleasure, followed by hiking and camping in undeveloped sites. Fishing is quite popular and is often tied to other activities. Off-road vehicle travel is one of the most important public issues and management concerns on the Forest and reflects the conflicts that develop between nonmotorized and motorized recreation use activities. The rapidly increasing population along Colorado's Front Range results in increasing demands for dispersed use opportunities in all activities. There is adequate capacity to meet demands for

dispersed recreation opportunities. However, concentrations of use in the most popular areas can be expected to cause problems or conflicts requiring increased management effort to distribute the use or prevent resource damage.

Forest planning for recreation opportunities uses the Recreation Opportunity Spectrum (ROS) as described in the ROS Users Guide (USFS, 1981). ROS provides a framework for defining the types of outdoor recreation opportunities available on the Forest. A description of ROS is found in Appendix B of the FEIS. The relationship of the Forests' present ROS class composition and use is shown in Table II-2.

TABLE II-2 Recreation Opportunity Spectrum Class Composition and Use

Class	Percent of Forest	Percent Use on Forest
Urban (U)	1	1
Rural (R)	1	8
Roaded Natural (RN)	53	75
Semiprimitive Motorized (SMP)	20	5
Semiprimitive Nonmotorized (SPN)	22	9
Primitive (P)	3	1

Approximately 84 percent of the recreation use on the Pike and San Isabel National Forests occurs within the Roaded Natural, Rural, and Urban ROS classes. Almost 100 percent of all developed recreation sites, including ski areas, occur within these classes and account for the resultant intensive use.

The remaining 16 percent of recreation use occurs within the primitive and semiprimitive ROS classes. Table II-3 illustrates the relationship between existing ROS and type of use.

TABLE II-3 Percent Use by ROS Class and Type of Use

Type of Use	ROS Class P	SPN	SPM	RN	R	U	Total
Developed	-	-	1%	23%	6%	-	30%
Dispersed (excluding Wilderness)	-	4%	5%	52%	2%	1%	64%
Wilderness	1%	5%	-	-	-	-	6%

Historically, recreation use on the Pike and San Isabel National Forests fluctuates dramatically. The addition of recreation complexes at Turquoise and Twin Lakes; the sensitivity of use to weather conditions (e.g., lack of snow decreases winter use or heavy snowfalls shorten summer use seasons); the addition of Wilderness, and other factors make historic use trends and future use projections difficult to derive. Therefore, use projections for developed (excluding ski areas) and dispersed recreation are based on local, State, and national population projections related to Forest user origin.

Forest-wide supply and use of developed and dispersed r creation is displayed in Table II-4

TABLE II-4 Forest-wide Supply and Use Data 1/ - Existing Situation

Supply	Number of Sites/Areas	Number Acres (Net)	Percent of Forest Acres	Theorectical Capacity (Annual RVD's) 2/
PIKE AND SAN ISABEL NATIONAL FORESTS (Includes National Grasslands)	282	2,751,736	100%	13,453,750
Ski Areas	6	2,800 3/	0.1%	900,750
Public and Private Developed Sites (Other than Ski Areas)	276	3,900	0.1%	2,285,000
Dispersed Areas (Other than Wilderness)	NA	2,380,773	82.8%	9,187,000
Wilderness	5	257,420	9.4%	685,000
Wilderness Study Areas & Further Planning Area	5	206,843	7.6%	396,000

Use	Annual RVD's 4/	Percent Total Use	Average Annual RVD's Per Acre
PIKE AND SAN ISABEL NATIONAL FORESTS (All Sites and Areas)	3,829,700	100%	-
Ski Areas 5/	161,500	4%	57.7
Public and Private Developed Sites (Other than Ski Areas)	1,000,900	26%	256.6
Dispersed Use (Other than Wilderness)	2,347,300	61%	1.06
Wilderness 6/	241,500	7%	1.17
Wilderness Study Areas & Further Planning Areas	78,500	2%	.38

1/ From RIM
2/ Annual RVD capacity may vary considerably from year to year because of weather conditions. Operating capacity for each category is considered to be 40% of theoretical capacity and 30% at ski areas. See narratives.
3/ Permitted Acres (rounded to nearest 100 acres).
4/ Recreation use on the Pike and San Isabel National Forests can vary up or down by as much as 10% because of weather conditions. Reported use represents an adjusted average of most recent years.
5/ Average year based on Colorado Ski Country and RIM.
6/ Reflects information on Wilderness resources administered by the Pike and San Isabel National Forests only.

Dispersed Recreation (Other than Wilderness)

Current Use and Management. Approximately 64 percent of all recreation use of the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands is attributed to dispersed recreation activities outside of Wilderness. Motorized touring (on and off roads) is the leading dispersed recreation activity on the Forest. The high prominence of this activity can be attributed to the highly scenic visual resources on the Forest associated with travel routes. Camping and hiking are the next most prominent activities, followed by fishing, hunting, viewing scenery, and other activities.

Around 80 percent of all use occurring outside of developed sites and Wildernesses occurs on or near roads. The area being used by these recreationist represents approximately 35 percent of the total Forest. The remaining 20 percent of the dispersed use outside of wilderness is occurring on approximately 35 percent of the Forest.

Off-road vehicle (ORV) use does not represent a major percentage of total recreation use on the Pike and San Isabel National Forests. Because of the rugged terrain and availability of challenging primitive roads, most users of motorbikes and 4x4's limit use to designated routes. Motorbikes are the major "off-road" vehicle users on the Forest. Total ORV use on the Forest is approximately 325,000 RVD, or about eight percent of the total use on the Forest. Operational dispersed recreation capacity is limited bacause of inadequate parking at trailheads for summer and winter users. The Forest does not have funds to plow snow at these facilities and cooperative efforts with the State, counties, and others are needed to provide winter access.

Much of the Forests' primitive and semiprimitive nonmotorized recreation use occurs within Wilderness and Wilderness Study Areas. This occurs because these areas possess outstanding recreational, scenic, and geological attributes, including most of the lakes and most of the highest (over 14,000 foot) mountain peaks.

A major factor influencing the use of Forest resources for dispersed recreation are the Travel Management Plans. Motorized recreation use on the Forest is currently managed according to the 1980 and 1981 Pike and San Isabel National Forests Travel Maps Presently, 25 percent of the Forest is open to unrestricted motorized use, 19 percent is closed (wilderness, ski areas, wildlife, and other closures), and 56 percent of the Forest is open with restrictions on motorized use. Information on miles of roads and trails on the Forest is found in the Facilities section, this chapter.

Several trails on the Pike and San Isabel National Forests have been identified for special recognition. The Barr and Devil's Head Trails are part of the National Recreation Trail System. About 170 miles of the Colorado Trail, (Denver to Durango) crosses the Forest. The Continental Divide National Scenic Trail (CDNST) corridor, identified in the Regional Guide (USFS, Region 2), has primary and alternative routes in the South Platte, South Park, Leadville and Salida Districts. The Rampart motorcycle trail system, southwest of Denver, has over 100 miles of trails especially designed and administered for motorcycle use.

Demand Trends Based on current dispersed recreation use estimates, user origin, and projections for local, State and national populations, dispersed recreation use trends are projected to increase by approximately 49 percent to over 3,620 MRVD's by 1990. Long-range projected use estimates are for 3,990 MRVD's by 2000, and 6,130 MRVD's by 2030

Dispersed recreation use estimates on State, private, and other agency administered lands are not readily available. Big game hunting, snowmobiling, boating (rafting), and fishing are the predominate activities.

According to the 1981 Colorado State Comprehensive Outdoor Recreation Plan, the public land recreation resource base in southeastern Colorado (Regions 3, 4, 6, 7 and 13) is as follows: USDA Forest Service, 73 percent; Bureau of Land Management, 18 percent; other federal, state, city/county and private, 9 percent Only 9 percent of the recreational water resource base is being provided by the National Forests, with 71 percent provided by state agencies. The Plan recommends better coordination between federal, state, and local governments and the private sector to achieve better continuity in the provision of open space and developed recreation opportunities. High priorities are hiking, camping, picnicking, fishing and 4x4 use, and development of areas capable of accommodating intensive use.

Current dispersed recreation capacity on the Pike and San Isabel National Forests was estimated using procedures based in FSH 1909.12 and the ROS User Guide. People-at-One-Time (PAOT) capacity for undeveloped nonwilderness areas in each ROS class was determined and applied in the following formula:

$$\text{Annual RVD Capacity} = \frac{\text{PAOT} \times \text{MS} \times \text{PU} \times \text{LOS}}{12}$$

where:

PAOT = People at one time capable of occupying acres in a given ROS class.

MS = Managed Season - 200 days was used.

PU = Pattern of Use - an adjustment factor for accessibility and weekend vs. weekday use (.1 in Primitive to .4 for Roaded Natural)

LOS = Length of Stay - assumed average of eight hours was used.

12 = The constant for 12 hours/RVD.

Following these computations, a maximum capacity of 22,950 MRVD's annually was reached. Assuming 40 percent of the acres are usable (based on slopes, soil, and vegetation), the current practical maximum capacity for dispersed recreation (excluding wilderness) is 9,187 MRVD's annually. Supply will decrease slightly during the period 1986-1990 because some lands are expected to be classified as wilderness during that period and the use will be reported as wilderness use Supply will increase slightly throughout the subsequent decades because of planned road improvements which will result in converting some lands to the more intensively used ROS classes

AVERAGE ANNUAL
DISPERSED RECREATION USE 1/
(MRVD)

	1983	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand Trend	2425	3181	3620	3990	4661	5350	6130
Supply Potential	-	9187	8800	8888	8977	9067	9156

1/ Includes fishing and hunting but excludes wilderness.

Developed Recreation (Other than Ski Areas)

Current Use and Management. The Pike and San Isabel National Forests currently manages 192 developed sites, including campgrounds, picnic grounds, boat ramps, and observation sites. Downhill skiing developments are discussed separately in the following section. Most sites typically open in late May to early June and remain open through hunting season which ends in November. The annual theoretical capacity for these sites is approximately 3,182 MRVD's for campgrounds and 1,330 MRVD's at other developed sites, totaling 4,512 MRVD's annual theoretical capacity as managed by the Forests. Current practical capacity (40 percent of theoretical capacity) is 1,805 MRVD's for Forest Service operated facilities. 1/

There are currently 72 fee sites (family and group campgrounds) being managed by the Forests during the heavy use season. The fee sites have an annual theoretical capacity of 2,700 MRVD's during the fee season and are the only developed sites being managed at the full service level. Collections from these sites in 1983 were nearly $270,000.

Eighty three developed recreation sites on the Forests are being utilized or operated by private individuals or organizations under special use permits. These sites include organization camps, group recreation residence sites, and isolated recreation residence sites. These sites provide an annual theoretical capacity of 1,200 MRVD's and an estimated practical capacity of 480 MRVD's. In a typical year, over one million MRVD's in public developed recreation (this excludes ski area use) is reported on the Pike and San Isabel National Forests. About 30 percent of this use is attributed to use at sites owned or administered by private owners or other agencies. The developed recreation use (excluding ski areas) on the Forests by ROS class is as follows: rural, 12 percent; roaded natural, 85 percent, and semiprimitive motorized, 3 percent.

DEVELOPED SITES 1984
Forest Service Operated

	Campground		Picnic		Other		Total	
District	Sites	PAOT 1/	Sites	PAOT	Sites	PAOT	Sites	PAOT
Leadville	13	2455	4	285	18	1352	35	4092
Salida	13	1365	2	195	10	585	25	2145
San Carlos	12	1265	4	440	7	670	23	2375
Pikes Peak	13	1470	3	440	13	833	29	2743
South Park	21	1585	8	385	5	660	34	2630
South Platte	25	1900	10	285	9	915	44	3100
Comanche	0	0	1	35	1	80	2	115
Cimarron	0	0	1	30	0	0	1	30
Total	97	10040	33	2095	63	5095	193	17230

1/ PAOT is the persons-at-one-time capacity which is equal to 5 persons per family unit for camp and picnic grounds. Other sites vary.

Demand Trends. Demand trends for developed recreation are based on projected population growth.

AVERAGE ANNUAL
DEVELOPED RECREATION USE
(MRVD)

	1983	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand Trend all Types of sites	989	989	1510	2013	2163	2338	2713
Demand Trend for Camping & picnicking sites	595	595	631	848	1140	1532	2059

Winter Sports (Ski Areas)

Current Use and Management

There are six winter sports sites on the Pike and San Isabel National Forests. They are Ski Cooper, Monarch, Pikes Peak, Conquistador, Cuchara Valley Resort, and Geneva Basin. In 1983/84 they provided about 146,700 visitor days use. All sites are operating basically as day use areas rather than destination resort type areas.

TABLE II-5
WINTER SPORTS AREAS

Areas	(SAOT) 1/ Capacity	2/ Visits	3/ RVD	Maximum Theoretical Capacity 4/ RVD
Ski Cooper	2500	46,132	23,066	187,500
Monarch	3000	140,327	70,163	237,000
Pikes Peak	1250	4,948	2,474	93,750
Geneva Basin	1200	24,287	12,143	90,000
Cuchara Valley Resort	1300	33,500	16,750	97,500
Conquistador	2600	44,196	22,098	195,000
Total	11,850	293,390	146,695	900,750

1/ Capacity in Skiers at One Time (SAOT)

2/ Visits are from 1983-84 lift ticket sales

3/ A recreation visitor day (RVD) equals one visitor for 12 hours. The average length of stay at the ski areas is considered to be 6 hours or 0.5 RVD.

4/ Theoretical capacity presumes a maximum SAOT at 7 days per week and a 150 day season, except that a 160 day season was used for Monarch.

Currently, Monarch, Cuchara Valley Resort and Conquistador are open seven days a week on a regular basis. The other three are open for shorter weeks.

Downhill Demand Trends

Downhill skiing demand has been rapidly increasing. For example, skiing use has increased from 27,200 RVD's in 1967 to 146,700 RVD's in 1984.

Supply and demand projections are presented in the following table:

AVERAGE ANNUAL
DOWNHILL SKIING USE
(MRVD)

	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand						
Trend	147	219	481	904	1305	1754
Supply						
Potential	270	330	474	997	1100	1150

Cultural Resources

Current Uses and Management

Cultural resources on the Forest are considered valuable and need to be identified, protected and managed. Eight sites have been recognized for their historical significance and have been included on the National Register of Historic Places. They are the Little John Cabin and Mine Complex, North Fork Historic District, Pikes Peak, Vicksburg Mining Camp, Winfield Mining Camp and Cemetery, St. Elmo, Interlaken Historic District and Twin Lakes Historic District. Pikes Peak is further designated as a National Historic Landmark. Twin Lakes Historic District and Interlaken Historic District are National Register sites located on lands transferred to the Forest Service in December, 1983 by the Bureau of Reclamation. Additional sites are expected to be added to the National Register as evaluations are completed and nominations are submitted.

Demand Trends

Demand for the preservation of cultural resources is expressed in laws and regulations requiring their identification and protection. Mineral exploration, the development of energy-related minerals, road and trail construction, timber sales,

developed recreation construction, and transmission line construction will increase, creating a greater demand for the cultural surveys required for these projects. Evaluation of sites by consultants or academic institutions is likely to increase and eventually to complete the inventory of all sites on the Forest. The thrust of future cultural resource management will be to complete an inventory of the Forests.

Visual Resources

Current Uses and Management

Visual resources are important for enjoyment and appreciation of the forest by visitors and residents in and around the area. Inventoried visual quality objectives (IVQO) indicate levels of visual quality of current condition and capacity. Comparing the existing visual condition with the IVQO, 86 percent of the landscapes meet or exceed the IVQO recommended for the particular land unit. On the Grasslands, 99 percent of the landscapes meet or exceed the IVQO. The Forest has an excellent capability for high quality visual resource opportunities. The mountains of Colorado, including those on the Forest, have an international reputation for outstanding scenery. The great open expanses of land on the Grasslands, broken occasionally by buttes and wooded stream bottoms, are a unique scenic resource.

Trends in visual quality indicate a steady decline over the years. Eight-six percent of the landscape has been altered by man; twenty-three percent of this to an extent noticeable to the average visitor It is estimated that about 6,600 acres (0.3%) have been altered beyond acceptable standards.

Visual impacts in the general Forest areas result from introducing structures into the landscape, disturbing the soils, or altering vegetation patterns. Structures can usually be located and designed to blend with their surroundings. Soils can be contoured and revegetated, and vegetation can be managed to achieve a positive visual effect. Vegetation treatments which increase ecological diversity usually enhance scenic beauty as long as the treatments initiate natural growth patterns and shapes in the surrounding landscape.

In wilderness and in much of the alpine area only ecological changes normally take place. Visual changes normally take place very slowly, except in the case of wildfire or insect epidemics, which have the potential to alter the scenic quality of large areas of land in a short period of time.

Current insect infestations could result in severe long-term visual alteration of large areas of National Forest land if left unchecked. The best method to protect the scenic resource and

to maintain a healthy and esthetic forest is to manage the trees. Dead and diseased trees could be removed and management practices which result in diversity of ages and species to promote tree vigor and lessen susceptibility to disease could be used. One of the more efficient and economical methods to maintain a healthy forest is to manage the Forest by timber harvest. By applying visual resource management principles, methods can be used by which the positive visual attributes of a managed Forest can be enjoyed while minimizing the more negative visual aspects of vegetation treatment activities.

Insect attacks, tree disease, and wildfire are a part of the natural evolution of forests. However, the risk of a disastrous event can be greatly reduced in a managed forest situation by providing a wide variety of vegetation sizes, age classes and species composition. A highly diverse ecological mixture of vegetation types also results in a more scenic forest.

Demand Trends

Demand by Forest visitors for scenic quality and local concern about impacts on present and future scenic quality are high. Recreation use on the Forest in 1983 was the second highest in the Rocky Mountain Region and fifteenth among all National Forests. This use places great importance on visual quality. Driving for pleasure and enjoying the scenery account for over one-fourth of the recreation use of the Forests. Maintenance of a high quality visual resource will increase in importance as recreation use grows and as more people move to the mountains for the aesthetic setting.

Special Recreation Areas

Special recreation areas include Scenic Areas and National Natural Landmarks. Windy Ridge Bristlecone Pine Scenic Area and the Spanish Peaks and Lost Creek National Natural Landmarks are managed for their unique characteristics.

Windy Ridge Bristlecone Pine Scenic Area. This area includes 150 acres featuring a wind swept ridge with old growth bristlecone pine over 1,000 years old. The area has unique biological values as well as outstanding scenery. The area is located about eight miles northwest of Fairplay, Colorado.

National Natural Landmarks

Two National Natural Landmarks are recorded on the Forest. The National Natural Landmarks program is established to recognize sites which illustrate the ecological and geological character of the United States and to enhance the educational and scientific values of the sites.

The Spanish Peaks are twin peaks rising to 12,683 and 13,626 feet in elevation uplifted by the intrusion of volcanic stocks into

sedimentary formations. The resulting vertical cracks filled with lava and now show as a unique system of dikes radiating outward from the peaks like spokes of a wheel. The dikes form spectacular free standing walls 1 to more than 100 feet thick and up to more than 100 feet high extending as much as 14 miles in length.

The Lost Creek National Natural Landmark is located 40 miles northwest of Colorado Springs in the rugged Tarryall Mountain Range. The area features bold outcrops carved into the Precambrian Pikes Peak granite by the forces of erosion. Massive dome shapes, spires and boulders characterize the area. Lost Creek picks its way through the area disappearing and reappearing numerous times before emerging as Goose Creek. The Landmark is within the Lost Creek Wilderness.

The Continental Divide National Scenic Trail - National Recreation Trails

Section 3(c)(1) of the National Trails System Act (October 2, 1968) provided for a study of the route for a Continental Divide Trail. The study was to determine the feasibility and desirability of designating a Continental Divide trail as a National Scenic or National Historic Trail. The route followed a three thousand, one hundred mile course extending from near the Mexican border in southwestern New Mexico northward generally along the Continental Divide to the Canadian border in Glacier National Park, Montana.

In 1978, the National Parks and Recreation Act established the Continental Divide National Scenic Trail (CDNST) as a part of the National Scenic Trails System. The Act established a 50 mile corridor approximating the Continental Divide. The corridor entered the Pike National Forest in the vicinity of Guanella Pass following the Continental Divide, crossing Forest boundaries with the Arapaho, White River, Gunnison and Rio Grande National Forests. The corridor exits the San Isabel National Forest near Windy Peak.

In concert with the purpose and guidelines established by the CDNST Advisory Council, the corridor on the Pike and San Isabel National Forests has been refined to an existing trail (tread), two to three feet in width for a portion of its length. Some parts of the tread location have yet to be determined along the Continental Divide. Preliminary surveys indicate that approximately fifty miles of trail construction is needed to complete the trail on the Pike and San Isabel National Forests. The final trail location (tread) will be established in compliance with CDNST Advisory Council guidelines.

The Continental Divide National Scenic Trail Corridor is displayed on the Forest Plan map.

Two trails in the planning area are designated National Recreation Trails. They are Devil's Head Trail and Barr Trail. Devil's Head Trail, located on the South Platte District of the Pike National Forest, is approximately 1-1/3 miles in length and ascends to the summit of Devil's Head Mountain. Devil's Head Mountain is a prominent rocky point along the Rampart Range at an elevation of 9,748 feet surmounted by a Forest Service Fire Lookout Station. Several thousand people make the climb each year.

Barr Trail, constructed in 1921, climbs from Manitou Springs to the summit of Pikes Peak, an elevation from 6,720 feet at the base to 14,100 feet at the top. The 12 mile hike is a popular activity for several thousand visitors each year. The trail traverses through life zones from foothill shrubs in the Montane zone through the spruce/fir zone and into the alpine zone at the summit.

Colorado Natural Areas

Three areas have been identified by the State and recommended for protection under the Colorado Natural Areas Program. The Colorado Natural Areas program is a State program administered by the Colorado Department of Natural Resources to identify elements and sites for the Colorado Natural Heritage Inventory.

Lesser Prairie Chicken Area. This area on the Comanche National Grassland represents the "best population" of lesser prairie chicken, Tympanuchus pallidicinctus, a state threatened species. The area is in T.34S, T.35S., R.44W. in Baca County. The area is recognized and provided for in the Forest Plan.

Braya humilis Site. This site represents one of a few known locations of this small alpine plant Braya humilis ssp. ventosa. Further study and assessment is required prior to a recommendation for protection under the Colorado Natural Areas program.

Hoosier Ridge Area. This area is identified as special habitat for rare plant species Eutrema penlandii and Saussurea weberi, both currently under investigation for federal listing by the U.S. Fish and Wildlife Service. Further study and assessment is required prior to a recommendation for protection under the Colorado Natural Areas program.

Wilderness

The Colorado Wilderness Bill (P.L. 96-560) of December 22, 1980, designated several wilderness and Wilderness Study Areas on the Pike and San Isabel National Forests.

There are five designated wilderness areas partly or entirely on the Forest.

Wilderness	Total Area	Pike & San Isabel NF
Collegiate Peaks	159,900	81,450*
Holy Cross	126,000	9,020*
Lost Creek	106,000	106,000
Mount Evans	75,000**	34,950
Mount Massive	26,000	26,000
	Total	257,420

*The management alternatives for the San Isabel National Forest portion of the Collegiate Peaks and Holy Cross Wildernesses are displayed in the Environmental Impact Statement and Forest Plan for the White River National Forest.

**Management alternatives are displayed in the Arapaho and Roosevelt National Forest's Land and Resource Management Plan.

Current use of the five designated wildernesses is estimated at approximately one visitor day per acre per year. The areas have not been designated wilderness long enough to provide established use levels. Use has generally been unrestricted except to conform with wilderness laws. Use levels are expected to increase significantly in coming years. Demand is projected to exceed supply by mid planning period. In certain favorite destination locations, demand is already exceeding apparent capacity.

TABLE II-6
AVERAGE ANNUAL
WILDERNESS USE
(MRVD)

	1983	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand Trend	242	286	357	461	609	755	899
Supply Potential	-	685	685	685	685	685	685

There are four Congressionally designated Wilderness Study Areas (WSA) and one Further Planning Area on the Forest. They are:

WILDERNESS STUDY AREA	Acres	FURTHER PLANNING AREA	Acres
Buffalo Peaks	56,950	Lost Creek	20,723
Greenhorn Mountain	22,300		
Spanish Peaks	19,570		
Sangre de Cristo**	87,300 (San Isabel)		
	130,700 (Rio Grande)		
Total	316,820		

** The Sangre de Cristo WSA contains 218,000 acres.

Determination as to the areas' suitability or unsuitability for inclusion into the Wilderness Preservation System are made in this planning effort. These recommendations are that 187,169 acres of the Sangre de Cristo WSA (61,657 acres on the San Isabel and 125,512 acres on the Rio Grande National Forest), 36,060 acres of the Buffalo Peaks WSA, and 22,300 acres of the Greenhorn Mountain WSA be recommended for designations as wilderness. Management of all Wilderness Study Areas will be to preserve the wilderness characteristics until Congress has made a final decision. After Congressional action, Wilderness Study Areas not designated as wilderness will be managed in accordance with the management direction contained in this Forest Plan. Management of the Lost Creek Further Planning Area will be in accordance with management direction contained in this Forest Plan. These management requirements are displayed in Chapter III of this document.

National Wild and Scenic Rivers

The segment of the South Platte river from Elevenmile Canyon Reservoir to Cheesman Reservoir has been determined eligible for a suitability evaluation for designation as a Wild and Scenic River. Pending the suitability study and recommendation, the study area will be protected to preserve its characteristics which make it eligible. The study area is about 23 miles long and extends 1/4 mile on each side of the river segment. Badger Creek, a tributary of the Arkansas River east of Salida, and the Cimarron River on the Cimarron National Grasslands were also inventoried, but did not meet the eligibility criteria. These three stream segments were identified in the National River Inventory by the Heritage Conservation and Recreation Service, as directed by President Carter in 1979.

Fish and Wildlife

Current Uses and Management. The planning area has a variety of wildlife due to the wide range of habitats ranging from the prairie to the high peaks. The greatest opportunity to increase wildlife populations is to improve habitat conditions on the planning area. This can be accomplished most efficiently through commercial timber sales and with coordination with management of other resources. Inventories of forested land indicates a distribution of stand age classes across the Forest with the mature, older aged class predominating. Wildlife supply potentials are significantly improved by increased diversity through a better stand age class distribution, both in time and area.

In addition to improved habitat diversity, improved habitat is needed to provide for desired populations of deer, bighorn sheep and elk. Fish and riparian habitat quality are currently below potential. Increased identification and protection of special habitats and potential threatened and endangered species

habitats is also needed. Improved distribution of habitat components such as snags for cavity nesters, available water, and dead and down material is also necessary. Current trends indicate a small but steady decline in habitat quality and resulting fish and wildlife populations.

Demand Trends

Rapidly increasing demand for hunting, fishing and non-consumptive wildlife uses, such as nature study and wildlife photography, exist on the Forest. In the Rocky Mountain Region, hunting and fishing recreation has increased 22 percent in the past five years. By the year 2030, recreational demand for fishing in the Region is expected to increase by 101%, big game hunting by 68%, nature study by 55% and small game hunting by 41%. Relatively easy access to the Forest from Front Range population centers results in particularly high demand for recreational opportunities associated with wildlife and fish. The estimated quantity of recreation-visitor-days associated with wildlife and fish are displayed in the dispersed recreation demand and supply figures.

General assumptions regarding wildlife and fish habitat management on the Pike and San Isabel National Forests are:

- Consumptive and non-consumptive demand for wildlife currently exceeds supply.

- Overall demand for wildlife will increase even faster in the future than it has in the recent past.

- Non-consumptive wildlife users will increase faster than consumptive uses as hunting and trapping become more restricted.

- Demand for fishing currently exceeds supply.

- Fishing use will increase even faster in the future than it has in the recent past.

- Much of the wildlife and fish resource demand above the current supply can be provided through habitat improvement practices on the Forest.

- Wildlife and fish habitat improvement projects will become increasingly important, especially in areas of high human use on the planning area.

Threatened and Endangered Species

Significant habitat for three threatened and endangered species occurs on the planning area; peregrine falcon, greenback cut-throat trout and lesser prairie chicken. Falcon habitats are

being monitored and sites have been identified for possible transplants. The greenback cutthroat trout occurs in both natural and reintroduced populations, and additional reintroductions and habitat improvement projects are being implemented. Prairie Chicken habitat is being inventoried and habitat improvement opportunities are identified. Habitat quality is protected for all three species, as well as for the threatened and endangered species which may peripherally use the planning area, or which may use it in the future. Threatened or endangered species whose occurrence on the planning area is peripheral or uncertain include: bald eagle, black-footed ferret, river otter, lynx, wolverine, prairie falcon (Cimarron N.G.), and least tern.

Demand Trends

Assumptions concerning management of threatened and endangered species are:

- Public demand for special treatment for endangered plant and animal species and their habitat will continue

- Demands for other National Forest and Grassland resource outputs will often be in conflict with threatened and endangered species habitat requirements.

- The Forest Service will continue to fulfill responsibilities outlined under the Endangered Species Act.

Range

Current Use and Management

Current permitted grazing use on the Pike and San Isabel National Forests is approximately 10,400 head of cattle, 84 head of horses, and 5,000 sheep grazed for about 40,000 animal unit months (AUM's). By the year 2030, demand is expected to be about 60,000 AUM's. On the Comanche and Cimarron National Grasslands, about 23,000 head of cattle graze for about 160,000 AUM's. Demand is expected to include all available forage. General trends indicate a decline in private land available in the National Forest area for grazing and increased demand for grazing use from Forest lands.

There are eight vacant allotments (5 Sheep and 3 Cattle) on the Forests that are suitable for restocking. There has not been a demand for sheep allotments. Sheep numbers have been decreasing since the mid-1950s and there are currently only four bands of sheep under permit on the Forests.

On the National Grasslands, the private agricultural and rangeland base is more stable. However, the soils are more suscep-

tible to wind erosion. When the grazing capacity on private land is low, increased demand is made on the Grasslands. Increased costs in feeding cattle also adds to the increased demand for public rangeland.

Increased forage production on the Forests may be realized through tree stand management to provide more understory vegetation. In addition, more intensive range management practices with a greater investment in improvements on both the Forests and Grasslands also may contribute to increasing available forage.

Levels of use are shown in the following table:

TABLE II-7
APPROXIMATE CURRENT GRAZING USE
(FY 78-83 Average)

Permitted Livestock	Number	AUM
Pike & San Isabel National Forests		
Cattle	10,150	38,518
Horses	222	266
Sheep	4,510	2,723
Comanche & Cimarron National Grasslands		
Cattle	26,057	160,423
Horses	18	169
Total		
Cattle	36,207	198,941
Horses	240	435
Sheep	4,510	2,723

There are 68 allotments on the National Forests and 224 allotments on the National Grasslands (see Appendix H, FEIS), 8 of the National Forest allotments are vacant but are available for grazing by livestock.

Many National Forest areas were severely overgrazed in the past resulting in erosion and reduced productivity. Livestock numbers were reduced and rehabilitation projects such as reseeding, terracing, check dams and tree planting were accomplished.

Some problem areas still exist, usually as a result of improper livestock distribution. Efforts are underway, or are planned, to resolve these problems through development of new water sources, fencing, improved grazing management systems and in a few cases, reduced stocking.

Decreases in base ranch properties because of subdevelopment for residential sites or sale of water rights on privately owned irrigated meadow lands adjacent to and within the Pike and San Isabel National Forests has decreased the amount of livestock on non-federal lands. On the National Grasslands grazing use fluctuates more dramatically because of annual weather conditions.

Production capability was determined through the development of yield tables based on current forage production, estimation of forage produced on range that could be grazed if range improvements such as water developments are installed, estimated increased forage production as a result of non-structural range improvements (reseeding, pitting, brush control, etc.), and estimated increased production as a result of intensive grazing management systems.

Colorado State University (Fort Collins, Colorado) has on-going studies on the Comanche National Grasslands (Southeast Colorado Research Center) which are looking at livestock production capabilities under various range management systems.

Suitable range is land accessible to livestock and capable of producing forage on a sustained yield basis. The table below shows suitable acres in the planning area.

SUITABLE RANGE

Pike & San Isabel National Forests	
Rangeland	140,416 acres
Timbered rangeland (aspen, ponderosa pine, spruce/fir and non-commercial timber types)	354,954 acres
Total	495,370 acres
Comanche & Cimarron National Grasslands	
Rangeland total	526,564 acres
Planning Area total	1,021,934 acres

Areas not available for grazing include watershed withdrawals, administrative areas and developed sites including recreation sites.

Appendix H displays the current status of grazing allotments on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands.

Demand Trends

Demand for grazing on the National Forests is expected to increase from current levels of about 40,000 AUM's to about 60,000 AUM's by the year 2030. Production capability is expected to exceed demand on the National Forests. Some forage production occurs in isolated small areas that are not economically feasible to graze with livestock. In other areas forage is allocated between wildlife and livestock.

Demand for grazing on the National Grasslands is expected to exceed their production capability. Increased production because of initiation of intensive grazing management systems and installation of structural and nonstructural range improvements will occur. Permitted use is expected to increase from current levels to about 185,000 AUM's by the year 2030.

Increased livestock use is possible in many areas when additional range improvements, especially water sources, are installed and improved grazing management systems such as rest-rotation, deferred rotation and high intensity-short duration are initiated.

On the National Forests forage production can be increased by decreasing tree crown cover. This forage production will be reduced or lost as the crown cover increases or tree stands are reestablished. This is called transitory range. Through proper scheduling, needed amounts of transitory range can be made available. Mature aspen stands are also important forage production areas. Many aspen stands are being replaced by conifers in the understory. Conifer stands produce much less forage. By harvesting mature aspen stands and/or removing the invading conifers, higher forage production is maintained as well as providing a healthy aspen component in the Forest.

The greatest potential for increasing forage production is by decreasing tree stand density in the ponderosa pine vegetation type. Large areas of dense tree cover of this type exist on the Forests and these lands are producing little or no forage. Forage increases for both domestic livestock and big game animals can be attained by reducing tree stocking levels.

Table II-8
AVERAGE ANNUAL
PERMITTED GRAZING USE NATIONAL FOREST
(MAUM)

	Current Level	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand Trend	40	42	44	48	52	56	60
Supply Potential	65	67	70	83	85	82	74

Table II-9
AVERAGE ANNUAL
PERMITTED GRAZING USE NATIONAL GRASSLAND
(MAUM)

	Current Level	1981-1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
Demand	160	170	175	182	187	192	205
Production Capability	160	165	170	177	181	187	193

Timber

Timber management on the Pike and San Isabel National Forests has not been a cost-effective program considering only the direct costs and revenues of selling timber. However, when all associated resource benefits are considered, a timber management program may become a realistic and cost-effective management tool. Other resource objectives provide the impetus for a coordinated timber management program and in so doing improve the effectiveness of their own programs. Without a timber management program, many resource management programs would cost a great deal more or could not be accomplished at all. In a sense, wood products are both an objective and a by-product of multiple use management.

The Forest has approximately 1,432,600 acres of tentatively suitable forest land. Of this total, 131,000 acres are reserved in classified wilderness and 121,000 acres are deferred in Wilderness Study Areas. Of the remaining area, about 115,000 acres are physically or administratively unsuitable for timber management and 241,000 acres are on slopes greater than 40 percent. Overall, about 824,000 acres are suitable, and available for logging with conventional tractor-skidder logging equipment commonly used in the area. This figure represents suitable land (1,065,200 acres) minus slopes too steep for conventional harvest methods (241,000 acres). Although high lead or other logging equipment capable of operating on slopes over 40 percent is available, these systems have not proven economical or practical locally.

Demand Trends

As a result of the Forests' proximity to the Front Range population centers, demand for wood fiber is greatest within a 75 mile radius of Denver, Colorado Springs and Pueblo.

Continuation of recent trends would indicate a steady increase in fuelwood demand. A growing commerical fuelwood industry is already in place.

The demand for sawtimber is based on existing mill capacity dependent of the Forest for supply A small increase in demand is expected from sawmills on the fringe of the traditional market area.

Water

Current Use and Management

The Pike and San Isabel National Forests encompass most of the headwaters of the Arkansas River (1,100,000+ acres) and portions of the headwaters to the South Platte River (1,100,000+ acres). All of the Comanche and Cimarron National Grasslands (500,000+ acres) are in the Arkansas River Watershed.

The Pike and San Isabel National Forests produce an average annual water yield of 1,262,000 acre feet. The Cimarron and Comanche National Grasslands produce an additional 15,800 acre feet of water annually. Total mean annual water production for the Forest is estimated to be about 1.28 million acre feet.

Water is a valuable resource produced on the Forest. The demand for water originating from National Forest System lands is increasing rapidly as the Front Range population centers and industrial sectors grow.

The annual water yields from the Forests can be increased depending on the extent and location of vegetation treatments and snow management activities. A maximum increase of 4,849 acre feet per year is possible through vegetative treatments.

The greatest opportunity for increasing water yields is by creating small openings in the subalpine forest. Research has shown that snow accumulation patterns are optimum when openings are five to eight tree heights in diameter, are protected from the wind and are interspersed so they are five to eight tree heights apart. This results in about 40 percent of a timber stand in small openings with 60 percent of the stand remaining to shelter the openings.

Other opportunities for increasing water yield are through construction of snow fences. High elevation sites which have large upwind areas exposed to the wind are the most efficient places to utilize snow fences. Many of the high elevation areas on the Pike and San Isabel National Forests are not conducive to large snow fencing projects due to steep upwind slopes which limit the extent of the contribution areas Snow fences will be used on a smaller scale such as supplementing stock ponds.

Numerous water collection, transmission and distribution systems exist within the Forest boundaries. Requests for future water developments will be handled through the Forest Service special use authorization process.

The Pike and San Isabel is currently in the process of applying for state water rights for all of its water uses for campgrounds, picnic grounds, summer homes and stock water developments. The Forest has also made instream flow claims for favorable conditions of water flow under the Reservation Principle.

On July 3, 1978 the U.S. Supreme Court (United States vs. New Mexico, 438 U.S. 696 - more commonly known as the Mimbres Decision) held that the National Forests, reserved from the public domain under the authority of the Organic Act of 1897, were reserved to "...insure favorable conditions of water flow and to furnish a continuous supply of timber..."

In-stream flows needed to insure favorable conditions of water flow, a reservation purpose upheld by the Court, will be claimed under the Reservation Principle The reason for this is that insuring those favorable conditions requires the maintenance of sufficient flows to prevent the accumulation of sediment and debris that would cause unfavorable conditions. These flows are also important to insure the availability of water for fire-fighting, and the maintenance of riparian vegetation which acts as a firebreak and provides protection to stream banks. This unfavorable condition would develop when a stream energy (that is, the availability to transport its sediment load) is reduced by diversion to a point where gradient, channel form, and scouring depositional patterns are adversely affected.

Conflicts over instream flows, and water needed for recreation, esthetics, wildlife preservation and livestock purposes will more than likely be resolved through judicial proceedings in State and Federal Courts.

The majority of water on the Forest meets or exceeds state water quality standards. The few streams that do not meet state standards are polluted from acid mine drainage from old mines no longer in use. A couple of streams are polluted by naturally occuring outcrops of highly mineralized rock. Sayers Gulch near Leadville, Mosquito Creek near Fairplay, and Handcart and Bruno Gulches near Grant are the streams most affected by acid drainage or highly mineralized geology.

Except for sediment, water quality is generally not adversely affected by Forest management activities. Initial analysis indicates that nine watersheds might exceed threshold sediment levels. The Forest standards and guidelines state that threshold sediment levels will not be increased by activities A threshold sediment level is the maximum amount of sediment a

stream can carry without adversely affecting the existing channel stability. Many of the unacceptable sediment levels are due to highly erodible soils in combination with high road densities within a watershed. Restoration measures such as road closures and rehabilitation are necessary in order to bring the sediment back to acceptable levels.

All activities occurring on the Forest must be mitigated if necessary in order to meet state water quality standards as well as threshold sediment levels.

Section 404 of the Clean Water Amendments ("Federal Water Pollution Control Act Amendments of 1972") Act, October 18, 1972 (P.L. 92-500) regulates the discharge of dredged or fill material in the Nation's waterways, lakes and wetlands. These activities must be authorized under the Nation-wide permit or individual permits issued by the Department of the Army.

Demand Trends

The growing population and agricultural industries located along the Front Range place heavy demands on available water supplies. All streams in the Forest are over-appropriated; that is, there are more water rights than water available to fulfill them. The demand for water is expected to continue to increase with the increasing population along the Front Range. This demand will be greater than the 1.28 million acre feet per year that is produced on the Forest.

Minerals

Mineral exploration, production, and development are expected to increase in the future. Recent activity is especially evident in oil and gas lease applications. The northwestern part of the Forest lies within the "Mineral Belt" of Colorado. Areas around Como, Alma, Fairplay, Climax, Leadville, Buena Vista, and St. Elmo have in the past been very active in production of mineral materials. Some mines such as Climax Molybdenum continue to be significant ore producers. Management of surface resources to provide for mining is increasingly complex as more demands are placed on all resources.

Oil and gas production has been significant on the Cimarron National Grasslands. The Comanche National Grassland has a number of leases and one active oil field with producing wells. Lease applications have recently been made for extensive areas at the southern end of the San Isabel National Forest. Geothermal energy potential has been identified in the Salida, Poncha Springs and Buena Vista areas. Appendix H, Mineral Potential Report for the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands contains additional discussion of minerals information.

Locatable Minerals

Locatable minerals are those valuable deposits subject to exploration and development under the U.S. General Mining Law of 1872 and its amendments. Commonly, locatables are referred to as "hardrock" minerals. Examples include, but are not limited to, deposits of iron, gold, silver, lead, zinc, copper, and molybdenum. Citizens, and those who have declared their intent to become citizens have the statutory right to explore for, claim, and mine mineral deposits in Federally-owned lands subject to the U.S. Mining Laws, including those of the National Forest System. Through a memorandum of understanding with the Bureau of Land Management (BLM), U.S. Department of the Interior, the Forest Service administers most aspects of operation of U.S. Mining Laws on National Forest System lands. In addition, under the regulations in 36 CFR 228, the Forest Service approves exploration and mining operating plans and administers those operations to insure protection and reclamation of affected surface resources.

Current Use and Management

Historically, mining activities have often dominated the employment sectors in several of the human resource units since settlement occurred in Colorado. The Leadville, Salida, and South Park Ranger Districts are located within the Colorado Mineral Belt. This area is a narrow but irregular shaped zone trending southwest from Boulder through Leadville to Durango. Most of Colorado's mining districts lie within this belt. The mineralized belt has produced significant amounts of metallic and nonmetallic minerals since the 1860's.

Current mining activities can be found throughout the Forests. Development and production activities include the several base and precious metals operations in the Alma-Como area, and the Climax and Henderson Miners. Exploration activity is centered in the Sawatch, Mosquito, and Sangre de Cristo Mountains, and the South Park area.

The following includes some known mineral occurrences in the planning area:

MINERAL OCCURRENCES

MINERAL	OCCURRENCES
Placer Gold	Leadville, Buena Vista-Twin Lakes, Fairplay-Alma, Como, Upper Tarryall Creek
Iron Ore	Calumet Mine - Chaffee County
Manganese	Leadville area
Molybdenum	Climax Mine, Clear Creek, Webster Pass
Tungsten	Climax Mine, Tarryall Creek, Cleora
Beryllium	Badger Flats, Lake George area, St Peters Dome, Mt. Antero
Thorium	Climax Mine, St. Peters Dome
Uranium	Kenosha Pass, Thirty-nine Mile Mountain, East Sangre de Cristos, Marshall Pass, Southwest Wet Mountains, Arkansas Hills, Kim Area on Comanche National Grassland
Copper	Carrizo District Comanche National Grassland
Sodium	Comanche National Grasslands Cimarron National Grasslands
Potassium	Vicinity of Antero Junction Vicinity of Mosquito Lake (near border of Rio Grande National Forest)
Gemstones (amethyst, tourmaline, smoky quartz, amazonite, topaz, aquamarine, and turquoise)	South Park, Leadville, Pikes Peak, Salida, San Carlos, Lake George

Demand Trends

Development of locatable minerals will play an important role in the management of the Forest as mineral products are provided to meet the future needs of the Region and the Nation.

Exploration and development for hardrock minerals is expected to increase in the future. As market prices increase, more activity is likely to occur particularly for base and precious metals.

Leasable Minerals

Federally-owned leasable minerals include fossil fuels (coal, oil, gas, oil shale, etc.), geothermal resources, potassium, sodium, carbon dioxide, phosphates, and sulphur in New Mexico and Louisiana. These minerals are subject to exploration and development under leases, permits or licenses granted by the Secretary of the Interior. The controlling statutes currently are the Mineral Lands Leasing Act of 1920 and amendments, the Mineral Leasing Act for Acquired Lands of 1947, and the Geothermal Steam Act of 1970, whichever applies to the particular resource. The Secretary of the Interior's authority is administered by the Bureau of Land Management. When National Forest System lands are involved, the BLM requests the Forest Service's recommendation for minerals, other than coal, subject to the 1920 Act, or the Forest Service's consent decisions for minerals subject to the 1947 and 1970 Acts and for all coal deposits. Forest Service recommendations for and consent to the BLM for leasing, permitting or licensing except for coal include appropriate stipulations to be included in the issued license, permit or lease for the management of surface resources. The Secretary of the Interior, through the Office of Surface Mining (OSM) for coal and through the BLM for other minerals has the authority under provisions of the Surface Mining Control and Reclamation Act of 1977 to administer operations on National Forest System lands leased, licensed or permitted under his authority.

Prior to approval of operating plans, the Forest Service participates with BLM or OSM in the formulation of the site-specific terms and conditions of operating plans so that the plans provide appropriate mitigation measures to insure that adverse impacts on surface resources will not exceed applicable environmental protection standards. Plans must be designed to minimize the impacts of operations on other uses and surface resources, and to provide for prompt reclamation or restoration of affected lands upon abandonment of operations.

Current Use and Management

Oil and gas, as well as other leasable products, have been produced extensively in the Cimarron and Comanche National Grasslands. Exploration for oil and gas has occurred in several areas of the Forest.

All National Forest System lands are available for mineral exploration and development, unless specifically precluded by Acts of Congress or other forms of formal withdrawal. Appropriate terms, conditions, or stipulations are already a part of, or can be added to, nearly any permit or lease to provide adequate protection for surface resources of National Forest System lands.

Oil and gas production activities currently do not occur on the Pike and San Isabel National Forests. However, there are producing wells on the Grasslands. The potential for hydrocarbon accumulation exists in sedimentary rocks along the flanks of the Sangre de Cristo and Mosquito Ranges, and the Spanish Peaks. Currently, there are two producing and five "shut-in" gas fields in the Carrizo District of the Comanche National Grasslands. Oil and gas are being produced from 23 oil and gas fields within the Cimarron National Grassland boundary.

The Cimarron National Grassland overlies one of the world's largest known accumulations of natural gas. This field, the Hugoton Known Geologic Structure covers in excess of four million acres in Kansas and has been producing both oil and gas since 1923. In 1981, Morton County, Kansas, oil production exceeded 1.7 million barrels and gas production surpassed 49 billion cubic feet. A known carbon dioxide area exists in the central portion of the Springfield District.

A potential deposit of potassium exists near Porphyry Peak southwest of Salida. Known occurrences of potassium within the planning area are in the vicinity of Antero Junction and Mosquito Lake. Occurrences of sodium have been found on the Cimarron and Comanche National Grasslands. Alunite is a secondary mineral formed principally from the actions of acid sulfate solutions forming replacement or disseminated-type deposite. Helium and natural gas liquids are produced at several facilities. The Cottonwood Creek, Chalk Creek and Poncha Springs geothermal area have good potential for electrical production.

About ninety (90) percent of the ownership for oil and gas on both the Cimarron and Comanche National Grasslands exists in reservations and outstanding rights, or non-federal ownership.

During the land acquisition programs of the Department of Agriculture's Resettlement Administration in the 1930's, a significant number of properties were acquired by the United States subject to a reservation of mineral interests for a specific number of years. In most cases the vendor also reserved rights to use the surface in conjunction with development, production, and marketing of the reserved minerals. Terms for these reservations vary from 40 years to 100 years with the most common term being 50 years. Many of these properties are now producing oil and gas under private leases. Starting in 1985, about 35 percent of the non-federal ownership will revert back to the U.S. Government and continue into the mid and late 1990's. There will be a significant increase in revenue credited to the National Forest account as a result of the reversions.

The Forest has two coal reserve areas, South Park Field and the Raton-Mesa Region. The South Park Field touches the Forest north of Jefferson and is not active. The Raton-Mesa Region, a known recoverable coal resource leasing area, consists of the Walsenburg and Trinidad fields.

Demand Trends

Criteria has been established for case by case use in recommending availability for oil, gas and geothermal leasing with and without surface occupancy for all National Forest System lands in the planning effort. Mineral development will play an increasing role in the management of the Forest as energy and other resources are provided to meet the future needs of the Region and the Nation.

Exploration and development for oil and gas is expected to increase in the future. Inflationary cost factors have kept most activities at a low level. A positive change in the economy could increase the mineral activities throughout mineral resource potential areas for leasable minerals. If activities increase, the Forest is likely to notice effects as a result of necessary support facilities, such as roads, pipeline, and electric transmission lines.

Salable Minerals

Salable mineral materials, or common varieties, are generally low value deposits of sand, clay and stone that are used for building materials and road surfacing. Disposal of these materials from the National Forest System is totally at the discretion of and by the Forest Service. Requirements controlling salable mineral material operations are similar to those for leasable minerals.

Refractory and clay shale deposits exist along the Front Range. Sand and gravel is available in all counties. The main sources are alluvium and terrace gravels along the South Platte and Arkansas Rivers and their tributaries.

Current Use and Management

There are numerous sources for salable products on privately owned lands in or near the planning area which places little demand on Forest common variety products. Limestone and dolomite are used considerably for building and construction purposes. Pikes Peak District possesses a valuable source of high quality limestone desired for construction and decorative purposes. The market for such products has been good.

Demand Trends

An increase in common variety minerals for on Forest uses may occur as road construction development increases on the Forest. The demand for Forest resources for off Forest uses is not expected to be significant except for districts along the Front Range where considerable construction is occurring.

Mineral Potential

A mineral potential evaluation was conducted to determine the possible existence of locatable and leasable mineral deposits in the Forest and Grassland areas. Mineral potentials were determined for metallic and nonmetallic minerals and energy fuels. A set of general criteria was established which included known favorable geology and structure, known mineral occurrences and reserves (if data available), and field activity related to mineral exploration, development and production. The "potential levels," determined as high, medium, and low, are based on today's knowledge and prices and may change at any time, depending on the mineral economy, technological advances, or further exploration.

High mineral potential includes favorable geology and structure, known economically valuable mineral occurrences and reserves (if data available), and field activity. Medium mineral potential includes favorable geology and structure, known mineral occurrences with insufficient evidence of present economic value, or sub-economic deposits, and occasional activity. Low potential includes geology considered unfavorable at this time, no known mineral occurrences, explored or prospected sites determined non-economic, and little or no present activity. The low potential level does not infer the lack of mineral deposits, but rather insufficient knowledge at this time.

The following eight mineral element levels "rate" the potential occurrence of mineral-related activities during the life of the management plan:

- Locatable/leasable minerals - producing sites/known reserves
- Locable minerals - high/medium potential
- Leasable minerals - high/medium potential
- Locatable/leasable minerals - low potential
- Leasable minerals - no potential
- Leasable minerals - unknown potential
- Reservations and Outstanding Rights - all levels of potential
- Mineral Withdrawals
- Salable minerals - known areas.

(See Appendix H for detailed description of mineral element levels.)

Mineral potential maps were developed by gathering data from individuals and references, including historical production records. The mineral potential maps are a part of the planning records and are available for review in the Pike and San Isabel National Forests Supervisor's Office, Pueblo, Colorado.

Additional information on mineral occurrences, production, and geologic environment is found in the Mineral Potential Report for the Pike and San Isabel National Forests in the Appendix H.

SUPPORT ELEMENTS

Lands

A number of activities in lands administration are carried out on the Forest.

There are a variety of special land uses for various improvements and activities on Forest land, including summer homes, pipelines, powerlines, roads, fences, dams, and electronic sites. As populations increase and competition for private land use increases, more demands are put on forest lands for these special uses. The trend is expected to continue. Major utility corridors are identified on the Forest Plan map.

Privately-owned land is widely scattered throughout the Forest. Within the Pike and San Isabel National Forests' boundaries, there are over 307,000 acres of private lands. Unmarked property boundaries present a potential trespass problem for both private and Forest lands. Exterior boundaries are not established for the Grasslands, and private lands are intermingled with the National Forest System lands throughout the area.

Land adjustments may be made by acquisition, disposal, exchange or transfer to another agency. The 1872 mining law allows acquisition of Federal lands and interests in land for extraction of minerals. Forest Service acquisition of land may occur

as provided in several laws to meet specific resource needs such as key recreation tracts, and essential wildlife and threatened or endangered species habitat. Land exchanges may be made for resource needs and management efficiency where it is in the public interest. Rights-of-way will be acquired to meet resource management and access needs.

There are withdrawals and special land classifications for various purposes throughout the Forest. Many withdrawals overlap. Areas classified as withdrawn from entry under the general mining laws cover 98,862 acres. Watershed withdrawals or cooperative agreements include 49,263 acres.

Soils

Current Uses and Management

Soils are highly variable in terms of the degree or amount of development within the Forest. Most of the soils on the Forest developed from parent materials of granite, schist, sandstone, shale, limestone, conglomerates and glacial deposits. Inherent fertility of these soils range from good to poor. In certain areas soils at or near the angle of repose, with heavy clay subsoil, exhibit high potential for slippage or mass movement with or without any surface disturbance. Some areas are more susceptible to mass movement than others.

Specific information about soils in different locations of the planning area are as follows:

Front Range. Soils vary considerably in texture, depth, and productivity. They are moderate to high in erodibility and low to moderate in fertility. The potential for slope failure and soil erosion is high where the landform is characterized by short, sharply breaking steep slopes and where the soil is low in amounts of organic matter.

Wet Mountain Range. Soils are generally deep to moderately deep. Fertility varies from low to high but is classed as moderate overall.

Sangre de Cristo Range. Soils are generally shallow with moderate erodibility and fertility.

Thirty nine Mile Mountain. Soils are deep to shallow, moderate to low in erodibility and high to moderate in fertility.

Upper Arkansas River. The formation of soils were influenced considerably by glacial action. The area includes high mountain peaks and steep to moderately sloped valley which dissect the area. Consequently, depths, fertility, and erodibility vary considerably.

Comanche National Grassland. There are three predominant soil types on the Carrizo unit. There are tighter soils consisting of clay-loam with shallow to deep hardpan; sandy soils ranging from sand to sandy clay-loam; and the deep loams and clay loams in the basalt and sandstone breaks. Timpas soils are silty clay-loam with a transition toward sandy clay-loam to the west. Soil production is limited by soil moisture. There is a high potential for erosion when there is not a protective vegetation cover.

Cimarron National Grassland. There are hard lands and sandy lands on the Cimarron. The hard lands contain heavy textured clay soils which are shallow to medium in depth. Most have limitations requiring careful management. The sandy lands consist of level to gently rolling topography The deep, sandy soils are favorable to cultivation under normal precipitation patterns. These soils are highly susceptible to wind erosion during periods of drought.

Demand Trends

The demand on the soil resource is a continuing concern to both the Forest Service and the public. This concern focuses primarily on the potential for accelerated erosion, decreases in soil productivity and increases in stream and lake sedimentation. There are approximately 84 miles of road construction planned for in the first 10 year period. Over 1,300 acres of productive soils (producing vegetation) will be removed from the productive soil base and placed in a nonproductive category as a result of this activity. Some of these acres will return to production, however, other soils will be permanently removed from vegetation production. Activities such as flooding from water impoundments, building construction and wildfire can reduce or temporarily remove soils from production. Approximately 193 miles of trail construction or reconstruction are planned in the first 10 year period. This will also remove these soils from the productive base.

Approximately 10,000 acres of timber management activities will occur annually. This places additional demands on the soil resource. Potential for changes in soil productivity exist whenever soil is disturbed. Mitigation measures contained in the Plan (Chapter III) reduce or prevent the adverse impacts to soils from timber harvest, road and trail construction and other activities.

Natural forces (wind, water, gravity) cause soils to erode. Natural soil erosion levels can be as much as two to four tons per acre per year in forested and grassland areas. Mass soil movement (large blocks of soil, rock and vegetation sliding downhill) can occur from natural forces such as earth tremors, excessive soil moisture, weak soil structure and rock contact layers. Mass soil movement can also be triggered or accelerated

by Forest management activities. Examples of these include: 1) removing mechanical support (road cut); 2) adding weight to a slope (increasing water infiltration); and 3) softening lake shores (flooding from impoundments).

Continuing concerns of the public and the Forest Service about accelerated soil erosion rates and changes in soil productivity will require increased management emphasis on maintaining and improving soil productivity and mitigating or preventing anticipated adverse impacts.

The role of the soil management program is to identify and develop methods and procedures to conserve and/or enhance this fixed supply of soil. This will be accomplished by inventorying soil properties and characteristics, monitoring the soil conditions for detection of harmful soil management activities and practices, and providing information and guidance to develop and install appropriate mitigation measures as needed.

The soil resource does not directly produce outputs when outputs are defined as goods, services, and products which are purchased, consumed or used directly by people. However, soil is a critical component in the production of timber, range and forage; as well as general forest vegetation. The soil is one factor in determining whether vegetation production will increase, remain constant, or decrease over time. Soils are considered as a support element for the resources which produce outputs.

In general, management practices or ground disturbance initiated by forest management activities cause greater accelerated soil erosion than natural geological soil erosion. The level at which accelerated soil erosion may occur during the 50 year planning horizon is directly related to the management emphasis of that particular area.

Soils inventory data has been collected for approximately 800,000 acres of the Forests and Grasslands. Approximately 1,725,000 acres remain to be soil inventoried. The remainder of the soil inventory is scheduled for completion by 1989. Continuing public concern will require that increased management emphasis be placed on maintaining or enhancing long term soil productivity and reducing soil erosion.

FACILITIES

A wide variety of facilities are present in the Forest. Facilities include buildings and structures needed for resource management, administration and public use. Fences, dams, stock-water developments and wildlife structural improvements are included. Roads, trails and associated improvements are part of the facilities. Recreation facilities are included in developed recreation. Many facilities are owned and operated under special use permits for various purposes throughout the Forest.

Structures

The Forest has 64 owned and 9 leased buildings for administration and management of the Forest and Grasslands. The buildings include 13 public service or office buildings, 21 dwellings or bunkhouses and 39 storage, service, utility or other buildings. Energy consumption is approximately 90,000 KWH electricity, 20,000 CCF of natural gas and 11,000 gallons of LP gas per year for offices, storage and service buildings. Condition of buildings varies with age and use, though all are in serviceable condition.

Dams

Because of the Forests' location relative to the Front Range cities of Denver, Colorado Springs and Pueblo, several water storage reservoirs have been constructed on or adjacent to the Forests. Other dams have been constructed for irrigation purposes as well as for recreation uses. Both of the major drainage systems (Arkansas River and South Platte River) have had dams constructed on them. Two dams have been proposed for construction; Two Forks Dam on the South Platte River and another (unnamed) dam on the Tarryall Creek near Lake George, Colorado.

The Forest has an inventory of 39 dams or which 5 are high hazard. The high hazard dams are owned and operated by other govermental agencies.

Electronic Sites

Communication facilities are authorized by special use permits. There are 30 locations that have been developed as commercial electronic sites. These sites have been identified on the Forest Plan Map. With satellite communications being rapidly developed and implemented, a dependence on surface sites will be declining.

Bridges

On the Forest Development Road system, there are 59 bridges. Of these bridges, 15 are owned and maintained by the respective counties An accurate inventory of major trail bridges is not

kept. There is some need for bridge construction and replacement, however, a specific action plan will not be formulated until adequate funding is available.

Transportation

Major federal and state highways provide convenient access from population centers through the main Forest and Grassland units. County and Forest System roads further provide an extensive network to give access to most areas of the Forest. Forest System roads consist of the following:

Table II-10
Miles of Road

	Primitive	Graded	Gravel	Paved
Pike NF	1046	528	137	44
San Isabel NF	581	284	131	41
Comanche NG	115	261	240	0
Cimarron NG	0	169	33	0
Total	1742	1252	541	85

Many of the Forest System roads are also on County road systems and are maintained by those counties to serve local public needs. Where the Forest Service has primary maintenance responsibility, roads are maintained to meet resource management needs and to provide public safety. Future transportation needs reflect dramatic population increases in Colorado's Front Range. County and State systems will absorb most of the impact whereas expansion of the Forest System will be to meet resource management needs.

TRAVEL MANAGEMENT

Current Use and Management

Use of the roads rather than the roads themselves cause most of the impacts on other resource uses and activities. Road management direction in the various alternatives concentrates on managing the use of existing and future roads. It includes obliteration, total or seasonal closures, and controlled use for specific purposes. This will minimize impacts on wildlife and dispersed nonmotorized recreation users. It will also assist in controlling rising maintenance costs.

Under current management, a variety of road and trail closure techniques are employed to serve several resource protection needs. Seasonal or year-round closures are used to prohibit on or offroad use on large areas of the Forest. For the most part, these closures are implemented to protect the soil, water, and wildlife resources.

Local roads that have been built to serve a short-term need, but which will be needed again in the future, are commonly closed by gates to restrict vehicular traffic. This minimizes maintenance needs and helps protect other resources.

Temporary timber sale roads are customarily physically obliterated and some primitive roads which are not on the transportation system are scarified and seeded.

Signing primitive roads and tracks as being closed to motorized use is done frequently, but is not particularly effective because of limited enforcement ability and vandalism of the signs.

Demand Trends

The demand for use of Forest roads is significant. Currently congestion occurs primarily on public roads rather than Forest Service roads, and most often at the beginning and end of weekends. Four-wheel-drive interests want more opportunities for off-road and primitive-road use. The owners of private inholdings want access to their property. Sightseers want more roads with better driving surfaces. Although there is demand for numerous and varied road opportunities, many nonmotorized recreationists want fewer roads In the immediate future, demand for roads is expected to increase.

Trails

Current Use and Management

There are 1200 miles of trails on the Pike and San Isabel National Forest Trails System. There are none on the Grasslands. The trails vary from lightly maintained for a primitive experience level to highly developed for large volumes of people and specialized uses. Trails of particular interest are the Rainbow Trail extending almost 100 miles from the southern Sangre de Cristo range to the Continental Divide south of Marshall Pass, and the Main Range Trail extending over 170 miles from Tennessee Pass paralleling the Continental Divide south to Cottonwood Creek west of Buena Vista. Also included are two National Recreation Trails, Barr Trail and Devil's Head Trail. Segments of the Continental Divide National Scenic Trail will be included when final location is determined.

The Rampart motorcycle trail system southwest of Denver has over 100 miles of trails especially designed and administered for motorcycle use. Trails where motorized use is not permitted are usually indicated by a sign on the trail and noted on the Pike and San Isabel National Forests Travel Management Map.

Demand Trends

Projected demand for trails is expected to increase along with the demand for dispersed recreation opportunity. The demand for

trails closer to the population center is expected to exceed that for more remote trails.

Utility Corridors

There are numerous utility companies that furnish electricity, gas, telephone communications and water throughout the planning area. Approximately 440 miles of utility corridors are currently located on the National Forest and Grasslands in the planning area. These are: 269 miles for electricity, 65 miles for natural gas, 35 miles for telephone communications, and 72 miles for water transmission. Major corridors are shown on the Forest Plan and alternative maps. The demand for additional energy and water may result in increased use of existing corridors or the provision for new ones.

A joint utility corridor study is being conducted by the Forest Service and the Bureau of Land Management. Utility companies and state representatives have been asked to participate in the study in developing standards and guidelines for corridor selection. The standards and guidelines for corridor selection and designation are required by the National Forest Management Act and the Federal Land Policy and Management Act. The purpose of the study is to avoid a proliferation of corridors across Federal lands and to combine compatible uses where possible.

Forest Protection

Forest protection includes fire prevention and control, integrated pest management, and law enforcement. Because of mutual concerns, protection needs are closely coordinated with other Federal, State and local authorities. The Forest has the highest occurrence of fires in the Region. The average number is 140 per year, of which 52 percent are man-caused.

Some increase in the number of man-caused fires can be expected as development and visitor use increase, although this will not drastically affect the wildfire situation. Over the next 40 to 100 years, due to aging and decay of forested areas, fuel hazards will likely increase and could result in larger, more destructive fires. This is particularly true in areas of the Forest which receive little vegetation treatment.

The overall fire management objective is to provide a cost-effective program which responds to land and resource management goals and objectives. This includes fire protection and use. Other fire management objectives for the entire Forest are to protect air quality through management of wild and prescribed fires and to use prescribed fire to reduce fuel hazards and accomplish other resource management objectives.

The Forest's timber management program has not been at a sufficient level in the past few years to apply the stocking control and harvesting of mature timber necessary to maintain

healthy, vigorous stands. As a result of this lack of silvicultural treatment many areas on the Forest are susceptible to epidemic insect populations. Currently the greatest concern in pest control has been the mountain pine beetle and spruce budworm. The mountain pine beetle predominantly occurs in older age classes of ponderosa pine stands. An increased timber management program will help relieve some of the insect problem. Cooperation with the State Forester in integrated pest control programs has recently been successful in this area of forest protection.

The Forests' objective with an Integrated Pest Management (IPM) Program is to ensure optimal pest management with respect to environmental concerns, biological effectiveness, and economic efficiency while achieving resource management objectives. The intention is to rely on an IPM policy which will reduce the reliance on chemical methods, and manage resources in a manner that is not conducive to the development and perpetuation of pest problems. Pesticides will be used under prescribed conditions to protect resource values when their use is prudent and control of potential adverse effects can be minimized.

Significant pests on the Forest include insects (mountain pine beetle, spruce bark beetle, western spruce budworm, western tent caterpillar, grasshopper); diseases (dwarf-mistletoe, rust, root rot, aspen canker and wood decay); noxious weeds (Canada thistle, toadflax, whitetop, bindweed, knapweed, leafy spurge); rodents (mice, gophers, porcupines, prairie dogs); and undesirable shrubs (sand sagebrush, big sagebrush, broom snakeweed). At present, pest management in forest stands is to meet long-range objectives through prevention measures using vegetation treatment practices, particularly planting, harvesting and utilization practices. Biological, chemical, mechanical means, and prescribed fire are considered where conditions are epidemic. Only western tent caterpillar, western spruce budworm, mountain pine beetle, and noxious weeds are considered to be increasing in population at a rate that would be a threat to resources and uses.

Forest diseases which cause losses include a variety of stem cankers, rusts and root rots. Acting in a much more subtle fashion over time, disease loss significantly exceeds losses caused by insects. Rot and decay are particularly significant in overmature aspen stands.

A continual problem has been dwarf-mistletoe infections in ponderosa pine and lodgepole pine stands. Recent surveys showed that 43 percent of the lodgepole pine type (1979 survey) and 20 percent of the ponderosa pine type (1981-1982 survey) are currently infected with dwarf-mistletoe. Dwarf-mistletoe causes growth reduction, lower timber quality, reduced seed production, increased mortality and an increased susceptibility to attack by

insects or other diseases. Controlling dwarf-mistletoe infections is commonly accomplished with silvicultural practices, since biological or chemical control is not possible.

Noxious weeds are controlled by chemical means, usually in cooperation with county programs. The current level of control is below that required to meet needs identified in noxious weed inventories.

Air Quality - Air quality over the Pike and San Isabel National Forests is good with respect to all air pollutants. The largest source of air pollution from Forest activities is smoke from both wildfires and prescribed burns, and dust from unpaved roads.

The Clean Air Act and its 1977 amendments give the States most of the responsibility for managing air quality within their boundaries. The framework for air quality management is the State's implementation plan.

The Forest Service role in air quality management is coordination of National Forest activities with State and Federal air quality control efforts. This is accomplished by properly managing the air pollution created by Forest Service activities such as prescribed fire, construction and use of roads, and the operation of various facilities. It also includes review of ski area permit applications for potential air quality impacts from fireplace smoke and automobile exhaust. The Forest Service has a primary responsibility for protecting the Forest from adverse impacts created by external sources of air pollution, such as industrial plants and automobiles, by coordinating with the Environmental Protection Agency and the State of Colorado.

The Forest Service complies with the agricultural burning application and permit requirements of the Air Pollution Control Division, Colorado Department of Health.

The Federal Clean Air Act of 1977 (CAA) requires the Federal Land Manager to take an "affirmative responsibility" to protect Air Quality Related Values (AQRV's) within Class I areas and to determine whether proposed new sources of pollution will have an adverse impact on such values. AQRV's are generally accepted to be flora, fauna, soil, water, visibility, cultural and climate.

Law Enforcement - The current organization consists of a Law Enforcement Coordinator (Administrative Officer), a Zone Special Agent serving this Forest but stationed on the Rio Grande National Forest, three Level IV law enforcement officers, and Levels II and III law enforcement officers.

Emphasis to date in law enforcement has been in developed recreation and travel management. Over half of the law enforcement work is associated with developed recreation, such as non-payment of campground fees. Recreation is a major use on the Pike and San Isabel National Forests.

This use continues to increase and as more people use the Forests, more problems will develop.

Cooperative law enforcement agreements are financed with Chaffee, Fremont, Custer, Huerfano, Las Animas, Pueblo, Douglas, El Paso, Teller, Park and Jefferson Counties. These agreements call for patrols in heavy use recreation areas.

Major law enforcement problems occur in:

- Recreation facilities and management
- Travel management
- Land occupancy
- Vandalism to government property
- Personal and commercial firewood

STATE AND PRIVATE FORESTRY

Current Use and Management

National Forest System land can be used as a base to implement, develop, and demonstrate sound, practical, and economically efficient management practices. These practices may then be used on lands of other ownerships. This use will also help support the natural resource management goals of other resource agencies, both state and federal.

Technical staff expertise on the Forest is available on an ad hoc basis to provide review and suggestions to other agencies. This includes serving as members of interagency coordinating groups, involvement as a private citizen in professional societies and local advisory or civic organizations

Specific resource management activities which provide opportunities to further State and Private Forestry related goals are:

- Rural fire protection on rural lands;
- Prescribed fire use;
- Integrated pest management;
- Oil, gas, and uranium prospecting and development;
- Coordinating resource management plan development;
- Tree planting and genetic improvement;
- Tree stand improvement;
- Forest products market development;
- Developed recreation management;
- Wildlife habitat management;
- Range management techniques including structural and nonstructural improvements;
- Youth development; and
- Watershed restoration.

Demand Trends

Furthering the achievement of State and Private objectives requires maintaining an active working relationship with a wide variety of federal and state agencies, industrial and environmental organizations, and individuals. State forestry agencies are the primary delivery system for cooperative forestry programs. National Forest System management attempts to complement those efforts wherever feasible.

THE NEED TO ESTABLISH OR CHANGE MANAGEMENT DIRECTION

Included in the analysis of the management situation is a determination of the need to change current management direction on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands. This was accomplished by assessing the current situation, determining productive potentials, and reviewing public issues and management concerns. The following determinations were made:

Vegetation is a dominant feature of the landscape and its management is, to a large degree, the subject of the Forest Plan. Low levels of vegetation management in the past combined with an active program of wildfire suppression have resulted in a situation where most of the Forest is covered with mature vegetation. This situation is not likely to change dramatically in the future as large acreages of the Forest are classified wilderness or remain inaccessible. In these areas the pattern of natural succession will continue.

To better address most of the issues and concerns, the Plan has been developed to more aggressively manage the vegetation where physical barriers permit and favorable economic conditions exist. It is the direction of this Plan to use the management activities of prescribed fire, fencing, seeding, timber sales, and thinning to enhance and protect a wide range of resource values that involve visual quality, recreation, and wildlife habitats.

Management activities that are properly located and timed will significantly reduce the risk of vegetation losses caused by insect, disease, or wildfire.

Attractiveness of the natural mountain environment depends largely on vigorous, healthy vegetation. Most of the communities close to the Forest are dependent, at least to a degree, on vegetation as a source of products or natural beauty. Radical changes in vegetation patterns caused by insects, disease, fire, or other activities are unattractive and probably would result in fewer visitors and the loss of property values. The most effective way to improve the attractiveness of the Forest is through sound resource management. By-products of these activities also satisfy the needs of consumers.

Range

A change in range management is needed to provide for increased demand, especially on the National Grasslands. This is necessary to prevent overuse due to poor distribution of livestock and to improve riparian conditions where deterioration is a result of livestock grazing.

Additional forage for livestock and wildlife can be produced on Forest lands by reducing tree crown cover creating more understory vegetation and through intensive management practices for grazing. These include deferred rotation and installation of structural and nonstructural range improvements.

Grassland forage can be increased through intensive management practices for grazing and installation of structural and nonstructural range improvements.

Timber

A change in timber management is needed to replace the role of natural forest succession. Forest cover types need insect and disease control, fire hazard reduction, wildlife habitat diversity improvement, and perpetuation of healthy and visually pleasing forest conditions. Emphasis needs to be placed on providing wood for growing firewood demand. Timber production needs to be concentrated on highly productive sites.

Water

There is a need for all of the water that can be produced from the Forest. Current management has provided little increase in water yields. Forest Plan objectives should provide for increased tree stand management activity, including increased cutting in spruce/fir stands above 8,000 feet elevation, within watersheds having the greatest water yield increase potential. In addition, other management practices such as structural improvements designed to increase water yields should be considered. Storage and transmission facilities associated with water yield increases can be compatible with Forest Direction if adequately mitigated. Mitigation measures provided in management direction provide protection to keep soil and erosion loss well within acceptable levels. Maintenance of municipal watershed quality is of prime importance. Vegetation treatments and other Forest activities should be designed and managed to assure stable stream channels and streambanks.

Wilderness and Wild and Scenic Rivers

Wilderness management is relatively new on this Forest The existing wilderness was designated in December 1980. The Forest Plan should provide for managing the wilderness resource in accordance with direction in the Wilderness Act. In addition,

coordination of wilderness management with adjacent National Forest units to provide for consistent wilderness management in the Rocky Mountain Region is needed.

A Wild and Scenic River suitability study will be completed to determine if the South Platte River segment between Elevenmile Reservoir and Cheesman Reservoir should be recommended for addition to the National Wild and Scenic Rivers System. Management of the corridor will retain the appropriate characteristics of the area until the study is completed, a legislative proposal is made to Congress, and Congress acts on the recommendation.

Fish and Wildlife

More wildlife and fish habitats should be improved, and existing high quality habitats should be better protected. Habitat treatments should be directed toward the specific needs of those wildlife and fish species in high demand for recreational purposes, those particularly valuable for healthy forest or grassland conditions (such as woodpeckers), for threatened and endangered species and to maintain viable populations.

Vegetation treatments should also be designed to provide for better long-term habitat diversity in terms of vegetative composition, forest structural stage distribution, and interspersion of different habitats. In forested areas more grass-forb, seedling-sapling, and old growth structural stages are needed. Much more aspen should be regenerated, particularly by cutting in conifer stands where there is still a significant aspen residual in the understory.

Habitat management should be better coordinated with transportation system management and recreation management to minimize disturbance of wildlife.

Minerals

Mineral production continues to be an important feature in the economics of the Social and Human Resource Units of the Forest. Increased exploration, development and production of mineral resources from the Forest are expected. Many people are concerned that potential sources of needed minerals are becoming increasingly inaccessible because of withdrawals and other resource restraints, while at the same time recognizing the potential resource damage which might occur. Operating plans will include stipulations to minimize and mitigate adverse effects to the extent possible. In areas where oil and gas leasing activities will occur, appropriate stipulations will be prescribed on a site specific basis. Individual project level operating plans for mineral activities on the Forest will require that the management area direction for the area be followed.

Lands

Landownership adjustments in the Forest land base are those necessary to meet specific resource management needs. A moderate level of land acquisition is planned. Rights-of-way are acquired where access is necessary to carry out resource management objectives or provide public access for specific purposes Administrative jurisdiction from the Bureau of Reclamation of lands at Twin Lakes on the Leadville District, has been transferred to the Forest upon completion of construction activities in that area on the Fryingpan Arkansas project. Land uses compatible with management area direction will be allowed.

Utility Corridors

Utility corridors and installations have a significant impact on the Forest. The public has been increasingly concerned with existing and proposed facilities. Utility corridors and their management should be identified in the Plan. The Plan should also identify acceptable areas for future corridor location.

Forest Protection

Protection in the form of fire prevention and control, integrated pest management, trespass prevention and law enforcement is an essential part of resource management. Fire prevention and control will continue to protect Forest and adjacent land resource values. Increased emphasis should be made in the application of fire as a management tool. The use of fire in vegetation treatment to improve wildlife habitat, improve rangelands, or to reduce fuels for fire control should be planned. Protection activities are closely coordinated with State, local and other Federal agencies and benefit local communities, while accomplishing Forest management goals Pest management objectives are achieved while demonstrating sound forest management practices and providing wood fiber products.

Developed Recreation

Developed recreation use capacity should be managed to continue to meet public needs. Development should be at a scale, location, and level that will complement developments on private lands.

Current management direction concerning the Twin Lakes Special Recreation Management Unit as contained in the Interim Land Management Plan for the Upper Arkansas Planning Unit needs to be changed in significant part. The Management Unit presently includes all Forest Service administered lands within one-half mile of Twin Lakes Reservoir, Lake Creek westward from the Reservoir to include Parry Peak Campground, and the Mt. Elbert Forebay.

The principal need for change centers on the fact that the current management direction provides that the Unit should be developed for a designed capacity of 5,500 PAOT. This amount of capacity is equivalent to one-third of the total existing public sector developed sites capacity of the Pike and San Isabel National Forest, including the Comanche and Cimarron National Grasslands. This comparison alone provides a strong indication that the capacity prescribed by the Interim Land Management Plan is very excessive. Moreover, the need to significantly reduce the prescribed intensity of development is evident for the following reasons.

(1) Portions of the Management Unit have been subsequently identified as areas of essential elk winter range

(2) Significant changes have occurred since the preparation of Twin Lakes recreation development master plan. Twin Lakes was not enlarged to the extent contemplated. Plans for providing recreational developments at the Mt. Elbert Forebay were cancelled because of large fluctuations in the water level and because of potential interference with BOR operations. Nearby lands were designated to be part of the Collegiate Peaks Wilderness.

(3) The prescribed high level of development appears out of proportion with the size and other physical characteristics of Twin Lakes.

(4) The scale and type of development contemplated in the Twin Lakes master plan would significantly change the physical and social recreational settings and experience levels within the Unit and also within adjacent land areas. Within the Unit, settings would shift from rural to urban.

The facts and effects discussed above were apparently not recognized or addressed during the course of previous planning.

Ski area expansion proposals should be considered for the existing permitted sites, (Cooper Hill, Monarch, Geneva Basin, Pikes Peak, Cuchara Valley Resort, and Conquistador) to meet the expected future demand for downhill skiing. Suitable Priority 2 areas should be managed to maintain their characteristics for future development until final decisions regarding development are made.

Dispersed Recreation

Dispersed recreation management should provide for moderate increases in dispersed recreation use capacity to meet the expected future demand. Current Recreation Opportunity Spectrum classes will generally be maintained. Management should ease conflicts between motorized and nonmotorized use by providing

semiprimitive nonmotorized recreation areas and trails separate from motorized areas and trails Monitoring use, capacity levels, and effects will indicate needed future management changes.

Trail and trailhead construction should be at a moderate level. The location of the portion of the Continental Divide National Scenic Trail that passes through the Forest is recommended in this planning effort.

Special Recreation and Other Land Classifications

Special recreation land classifications should be maintained; except for Lost Creek and Abyss Lake Scenic Areas which have been declassified as scenic areas since they are now within designated wilderness; the Fremont Experimental Forest which has been disestablished and returned to undesignated National Forest status and control returned to the National Forest System.

Special Interest Areas

Special Interest Areas are areas of National Forest System lands where unusual scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics require protection to permit continued public use and enjoyment. A number of these sites are currently being studied for possible classification as Special Interest Areas to provide protection for rare plants and endangered wildlife species habitat. Among these are a number of identified locations where the rare plant Braya humilis var. ventosa occurs.

In accordance with the Memorandum of Understanding between the Forest Service and the Colorado Natural Areas Program, these sites on National Forest System lands can be identified, evaluated, registered and designated by the Colorado Natural Areas Council. This identifies the site as a scientifically qualified State natural area.

Designation (formal protection) of a site can only occur with Forest Service permission, and upon signing of Articles of Designation by the Regional Forester and the Executive Director of the Department of Natural Resources, State of Colorado.

Research Natural Areas

Hurricane Canyon and Saddle Mountain Research Natural Areas are the only designated Research Natural Areas on the Forest.

The Forest Plan Map shows two additional Management Area Prescription 10A (provides for Research Natural Areas) areas. These are the proposed Cimarron Research Natural Area (K-70 Sandsage - Bluestem Prairie) and the proposed Campo Research Natural Area (Comanche National Grassland - K-65 Grama - Buffalo Grass). These designations and studies should continue.

Cultural Resources

Cultural resource management should continue to identify and protect sites which are included or are eligible for inclusion in the National Register of Historic Places Selected sites should be interpreted where appropriate. Surveys should continue at an orderly rate to identify cultural resources prior to project work.

Facilities

Facilities are a support item directly related to the level of activity which they serve. Roads are provided for timber harvest, silvicultural treatment, and other specific resource management needs. About 498 miles of arterial and collector roads and 1,986 miles of local roads are needed to meet Forest Plan objectives over the 50-year planning period. Local roads not needed for continued resource management activities should be closed. Twenty miles of trail per year should be constructed or reconstructed.

Significant additions or changes are not planned in building needs. Major utility corridors are not changed from those currently existing. Expanded service to communities will follow those existing corridors.

Human and Community Development

Human and community development includes various manpower programs such as the Youth Conservation Corps (YCC) and Senior Citizen Service Employment Program (SCSEP). These programs are affected by budgetary appropriations; however, the Forest will support and participate in those programs, when possible, to benefit Forest resources and local community stability.

Special Land Classifications

Special land classifications and withdrawals will not specifically change under the Plan. Withdrawals should be reviewed early in the first time period and periodically thereafter to determine if they are still appropriate.

Soils

Soils are affected by the degree of resource treatment applied. Vegetation management, primarily timber harvest, directly affects soils as does grazing, heavy recreation use and off-road vehicle travel. Road construction and maintenance may significantly affect soil loss and erosion. In all cases, mitigation measures specified in management direction are designed to keep soil loss within acceptable limits. Where possible, resource treatment should be coordinated with other

Federal and State agencies and landowners to accomplish needed improvement on watershed areas where unacceptable erosion is occurring.

Visual Resources

Visual resources Forest-wide will generally not be adversely affected. Visual quality should be improved in highly visible areas and scenic travel corridors, while being maintained or slightly reduced in areas that are seldom viewed. The overall effect however will be that about 1,400,000 acres will shift from a retention classification to a partial retention or modification category. Mitigation measures in the forest direction section of this Plan will offset this shift to provide a favorable visual condition.

THE FUTURE

This section describes how the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands are expected to change with the implementation of the Forest Plan. The first part, describes the physical and biological future by planning questions. The second part describes the social and economic future of the Proposed Action.

The key feature of the Forest Plan is its multiple use mix of goods and services and outputs. No resource output is emphasized to the extent that standards for other resources are violated. An integrated mix of resource outputs is provided rather than a mix that maximizes some outputs to the exclusion of others.

Consideration of the social resource is given equal importance. By applying socially responsible management principles, the Forest Plan addresses the existing public issues and management concerns and allows for identifying and addressing new issues as they emerge, as well as for maintaining or enhancing local community stability.

The Forest Plan emphasizes management opportunities for water, fish and wildlife, recreation and other amenity values. Management for other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values. The Forest Plan enhances environmental quality, promotes economic stability, and provides an increased but moderate output in market resources such as timber and range. In some instances, as in wood fiber and forage, outputs in market resources are increased to achieve the objectives for amenity values. Increased water yield, as well as improved wildlife habitat, is achieved through vegetation management and increased utilization of wood products.

Management requirements in the Plan provide direction for achieving resource outputs while maintaining a balanced program in response to public issues and management concerns. The Plan provides for maintaining or enhancing local community stability by considering the relationship of the Forest to the social and human resource units.

Implementation of the Forest Plan includes coordination with and understanding of the policies, programs and objectives of other Federal agencies and State and local governments. Such coordination will ensure a mutual understanding, if not a compatibility, with other on-going programs.

PHYSICAL AND BIOLOGICAL FUTURE

This section describes expected future physical and biological conditions in relation to each of the planning questions. This section also addresses the disposition of public issues and management concerns identified in the scoping process and during the review of the Draft EIS.

Planning Question I: What should be emphasized in the management and utilization of the range resource and how much forage should be allocated to livestock use on the Pike and San Isabel National Forests and Grasslands?

Most public issues and management concerns related to grazing deal with conflicts between grazing and other activities and the need to determine and intensify livestock management on the Forest.

Range management in the Plan shows a gradual increase in capacity and use on the National Grasslands with significantly more area coming under intensive grazing practices. Investments in both structural and nonstructural improvements are relatively high in the first decade to achieve the increases in potential forage production. On the National Forest areas, grazing use will increase as a result of vegetation management which will increase forage under tree stands. Also there will be increased capacities through added intensive management practices. Gradual increases in livestock grazing will be allowed, although careful monitoring will be necessary to insure that overgrazing does not take place. Wildlife habitat will also be improved. Increased grazing use will improve stability of ranching in the affected communities.

Planning Question II: How can the Pike and San Isabel National Forests supply the variety of timber products desired by the public while insuring that timber harvest activities enhance other resource values?

Public issues and management concerns related to this planning question address the growing and harvesting of trees for commercial wood products and the benefits or conflicts with other resource values and uses of forested lands.

Conflicts between timber and other resources are addressed by the Forest Plan in that sales are designed specifically to benefit range, wildlife, or water resources. Visual resource management considerations will be an important part of sale design and layout. Roads constructed for timber access will be designed considering the needs for activities such as recreation, firewood gathering, and Christman tree cutting.

On lands unsuitable for timber management, vegetation treatment will be used to satisfy other purposes and objectives although merchantable timber volume may become available as a result.

The Analysis of the Management Situation (Planning Action 4) shows that current timber production levels are below the capability of the Forest to produce and below expected demand, particularly for fuelwood.

Timber production will be significantly increased. Past cutting practices have been to treat the more accessible ponderosa pine as opposed to lodgepole pine, aspen, spruce and fir. With low harvest levels many areas of lodgepole pine and spruce and fir are becoming increasingly susceptible to large scale attack by insects and disease because of old age and overly dense stocking conditions. More emphasis will be placed on management of Douglas-fir, lodgepole pine, spruce/fir and aspen. Cutting practices will, in turn, increase water yield and improve wildlife habitat conditions. Treatment of mature pine stands will provide an improved age class distribution reducing insect and disease impacts. Local dependent industries would be benefitted by increased availability of timber. Increased supplies of fuelwood will be made available to benefit local users and commercial suppliers. In addition to increased water yields and improved wildlife habitat, grazing capacity would be increased by added forage provided by decreased stand densities in suitable stands

Existing recreation opportunities will be maintained by appropriate travel management, planned access, and road maintenance activities following vegetation treatment.

Planning Question III: How should the Pike and San Isabel National Forests be managed to respond to increasing demands for water yield, storage, transmission uses, high quality water, and protection of the soil resource?

Public issues and management concerns related to water express the need to provide a continued or increased quantity of high-

quality water for present and future needs. Concern was also expressed regarding the potential impacts on the environment of future water development projects.

Water yields will be increased where timber harvest is accomplished in spruce-fir or lodgepole pine stands in heavy snow deposition areas above 8,000 feet elevation. Appropriate mitigation will maintain water quality in resource utilization activities. Other management practices designed to increase water yield will include structural improvements and vegetation treatment on noncommercial forest lands.

Water meeting water quality goals will also increase slightly as those watersheds presently below water quality standards are allowed to recover through natural successional processes. Wetland and riparian ecosystems will be maintained, or enhanced in some areas, as a result of protection measures called for in the Forest Plan.

Water storage, transmission, diversion and use proposals will continue to be studied and acted upon by the Forest. Timely public participation in the analysis and evaluations conducted for these projects will continue on a case-by-case basis.

Planning Question IV: How should wilderness on the Pike and San Isabel National Forests be managed to maintain a high quality wilderness recreation experience under the National Wilderness Preservation System?

The major public issues and management concerns related to wilderness management center around conflicts between both existing and potential uses of lands that are or may become designated wilderness areas.

Wilderness management continues on the 257,420 acres designated as wilderness in the Colorado Wilderness Act of 1980. An additional 120,000 acres of Congressionally designated Wilderness Study Areas have been determined suitable for addition to the National Wilderness Preservation System and are managed for wilderness values. The Congressionally designated study areas or portions thereof which are not suitable for wilderness designation will be managed to protect their wilderness characteristics until such time as Congress acts. Management requirements in the Forest Plan provide the necessary management direction to maintain a high quality wilderness resource.

Planning Question IVa: Should additions to the National Wilderness Preservation System and Wild and Scenic Rivers System be recommended for certain designated areas on the Forest?

Major public issues relative to establishment of additional wilderness centered around a perceived need for more wilderness and perceived effects relating to increased risk of serious insect and disease infestations, suppression of wildfire, future access and opportunity for mineral exploration and development. Issues regarding recommendations for Wild and Scenic River classification related to both the particular river segments studied and whether or not the Forest Service would find these river segments suitable for inclusion in the National Wild and Scenic River System.

This question addresses the suitability of Wilderness Study Areas for inclusion in the National Wilderness Preservation System. The Colorado Wilderness Act (1980) identified Buffalo Peaks, Greenhorn Mountain, Sangre de Cristo and Spanish Peaks as Wilderness Study Areas. The Act also retained Lost Creek's Further Planning Area designation.

In the Plan 245,529 acres of these Wilderness Study Areas are recommended as suitable for inclusion in the National Wilderness Preservation System. The area designated wilderness on the Forest will increase if the suitable land is added to the National Wilderness Preservation System.

Three Streams inventoried as possible additions to the National Wild and Scenic Rivers System were evaluated to determine their eligibility. The streams were segments of the South Platte River, the Cimarron River, and a tributary to the Arkansas River, Badger Creek. Only the South Platte River segment, Elevenmile Canyon Reservoir to Cheesman Reservoir, was found elegible. A suitability study on this section of the South Platte River will be completed at a later date. If determined suitable, a recommendation and legislative proposal will be made to Congress to designate this section of the South Platte River as a Wild and Scenic River.

Planning Question V: What can be done to maintain or improve wildlife and fish populations by management of their habitat and how can riparian (wetlands) area management be emphasized on the Pike and San Isabel National Forests?

Public issues and management concerns expressed strong interest in protection and improvement of wildlife and fish habitat.

Habitat quality will be protected through application of general direction, standards and guidelines given in Chapter III of the Forest Plan. Wildlife habitats will be improved primarily through vegetative treatments in both forested and non-forested areas to meet habitat capability objectives. The need to increase the proportion and improve the interspersion of early forest seral stages to meet such objectives will be done by tree cutting. Prescribed fire will be used to improve forage quality and plant composition, and to reduce excessive slash material in some timber sale areas. Other habitat improvements, such as

water developments, modified livestock grazing systems, seeding, tree and shrub planting, and fencing will be used to improve habitat quality.

Thermal and hiding cover for big-game species and habitat for many nongame species will be provided by maintaining, restoring, and/or improving forest cover around natural and created openings and along riparian areas. The improved habitat resulting from vegetative treatment will be managed to provide habitat effectiveness through seasonal or year-round closure, selection of appropriate locations for new roads, and closures of areas to dispersed recreation when needed. Management activities that could adversely influence important wildlife habitat effectiveness will continue to be coordinated with the Colorado Division of Wildlife and Kansas Forestry, Fish and Game Commission.

Riparian and aquatic habitats receive special management consideration that will result in the maintenance or restoration of tall forest cover along perennial streams and lakes. Stream channel stability will be maintained or restored. Structural and nonstructural treatments, such as log dams, gully plugs, will be used in these areas to increase fish and wildlife habitat capability.

Protection and improvement of threatened and endangered species habitat will receive primary management emphasis wherever identified species are present. Such management will continue to be coordinated with the USDI Fish and Wildlife Service, Colorado Division of Wildlife and Kansas Forestry, Fish and Game Commission. Cooperative efforts include transplanting greenback cutthroat trout in suitable waters, protecting lesser prairie chicken breeding and nesting sites, and protecting peregrine falcon nest sites for reintroduction.

Planning Question VI: How should the Forest provide accessibility to National Forest System lands for mineral activities and at the same time minimize the adverse impacts of mining activities on other resources?

Most mineral related issues and concerns express the need for controlling adverse surface resource impacts while at the same time being responsive to the Nation's need for minerals. Oil, gas, and geothermal leasing, exploration, development, and related geophysical investigations within wilderness and Wilderness Study Areas were identified as activities adversely affecting the environment and wilderness character.

Since midnight December 31, 1983, wildernesses were withdrawn from mineral entry and location under the 1872 mining laws and leasing under the 1920 Mineral Leasing Act, except where valid mineral rights exist prior to January 1, 1984.

Any lands added to the Wilderness System will be withdrawn from mineral entry and leasing, subject to valid existing rights established prior to January 1, 1984. Development of mining claims and mineral leases with valid existing rights established prior to January 1, 1984, will be conducted in compliance with Forest Service regulations designed to protect the wilderness resource.

On the entire Pike and San Isabel National Forests, the Forest Service would recommend that the Bureau of Land Management issue oil, gas and geothermal leases on approximately 2,370,900 acres if any lease applications are received. Approximately 2,351,300 acres could be leased permitting a range of exploration, development, and production activities as determined by site specific analysis; 19,600 acres could be leased with a no surface occupancy stipulation. Oil and gas deposits within the no surface occupancy areas could be recovered through directional drilling or other techniques which will not disturb surface resource values.

No leasing is recommended in Wilderness Study Areas until such time as Congress acts on the disposition of those areas, designates them as wilderness or releases them to multiple-use management If they are released for multiple-use management, leasing recommendations that apply on non-classified NFS lands will apply.

Planning Question VIIa: How can resource management programs and administration be improved through land exchange, land and rights-of-way acquisition, land line location and other functions?

Major public issues and management concerns related to land exchange, rights-of-way and land line location express a desire for more access to National Forest System lands, identify conflicts where trespass occurs and indicate that natural resource values are threatened by development on some private lands within the Forest boundaries.

The Forest has a widely varied landownership pattern Some Forest areas are heavily intermingled with private land. Access to public lands in some cases is blocked by private ownership. Coordination with State programs in forest insect and disease control, fire protection and wildlife management helps to minimize conflicts. Where specific needs are identified, land adjustments will be made by exchange, acquisition or by transfer with other Federal agencies.

The Pike and San Isabel National Forests will respond to the need for land adjustments by:

1. Revising the Forest Land Adjustment Plan and developing a priority system to identify those cases having the greatest public benefit.

2. Close coordination with local governments.

3. Encouraging increased proponent participation in the furnishing of data for complete analysis of proposals and additional information or support as needed (e.g., archaeological reports, surveys) for case completion.

Planning Question VIIb: How should the need for utility lines, electronic sites, and other transmission facilities be integrated into the administration of the National Forest and can the Plan accommodate the needs of future development?

This planning question addresses Forest land used for rights-of-way for major transmission lines. The primary concern is impacts on resources created by these utility rights-of-way.

The impacts will be reduced by concentrating the transmission rights-of-way in corridors. Chapter III, Forest Direction, includes measures to mitigate potential soil, water, and visual impacts resulting from the construction and reconstruction of transmission corridor facilities. Expanding compatible uses in existing corridors is emphasized over new corridor development. Growth will require additional transmission capacity and transmission lines may cross National Forest System land.

The Rocky Mountain Regional Guide establishes standards and guidelines to be used by the Forest in activities related to utility corridors. Chapter III, Forest Direction and Management Area Prescription ID, provides for utility corridors on 5,761 acres. Management emphasis is for major oil and gas pipelines, major water transmission and slurry pipelines, electrical transmission lines, and transcontinental telephone lines. Management activities within these linear corridors will be compatible with the management goals of the management areas through which they pass.

Livestock grazing will be permitted within the corridor. Recreation use will be directed away from the corridor.

Both existing and identified future utility corridors are displayed on the Forest Plan map.

Planning Question VIIIa: What is the role of the Forest in managing insects and diseases?

This includes major public issues and management concerns of how the adverse effects of injurious insects and diseases can be mitigated to protect resource values and productivity

A multitude of insects are either currently in an epidemic situation or have reached epidemic populations within the last twenty years. When these insects reach epidemic proportions many forest values are diminished. Valuable wood fiber is lost. The hazard of wildfire is greatly increased.

The Plan emphasizes those practices most likely to develop vegetative situations more resistant to epidemic insect populations than presently exist. Each pest prefers certain conditions of vegetation.

The Engelmann spruce bark beetle prefers older, overmature, overly dense stands of trees. Actions which gradually replace these stands with younger more vigorous trees are planned.

The mountain pine beetle which attacks ponderosa pine finds tree stands which are overcrowded to be ideal habitat. Overcrowding increases competition between trees and causes the trees to be stressed. The entire tree stand becomes vulnerable to rapid insect population buildup and epidemics are promoted. The Plan would feature operations regularly (every 20 or 30 years) to thin out excess trees.

Spruce budworms are defoliators primarily of Douglas-fir and white fir trees. This pest is currently at epidemic populations. Vegetation management practices to reduce the impact of this insect are still being studied. Some practices show promise. The development of even-aged tree stands helps to reduce the "feeding ladder" whereby larvae drop onto immature trees from the large crowns of mature trees On some areas, it may be possible to promote a better mixture of species in with susceptible Douglas-fir and white fir. Some individual Douglas-fir and white fir appear to escape attack. Seed from these individuals may produce young trees which are also less attractive to spruce budworm.

The mountain pine beetle which attacks lodgepole pine tree stands prefers areas where the preponderance of trees are of large diameter and 80 years of age or older. The plan proposes to replace, over time, the present overmature and overstocked areas, with a mosaic of trees of different ages The result would produce a forest which is more resistant to insect attack, produces better hiding cover, and is more visually attractive.

Tree diseases present an even more complex picture. Tree death and fiber losses are often more insidious because they are not as evident or dramatic as insect epidemics.

The two main disease agents are mistletoe infections and heartrots.

The plan proposes to treat mistletoe infections by removing infected trees and replacing them with noninfected new trees, either naturally or by planting. Tree stands infected with mistletoe will have a high priority for vegetative management.

Heartrot problems intensify as trees reach maturity and beyond. This problem will be addressed with two actions under the proposed plan. Tree stands with a high proportion of heartrot will receive high priority for vegetative management and rotation ages 1/ will be established which recognizes pathologic maturity.

Management requirements contained in Chapter III of this Forest Plan and site-specific locations and design of projects will mitigate the effects of insect and disease damage where management activities occur. Vegetation treatment measures will convert portions of the Forest to more healthy plant communities which in turn will be more resistant to insect and disease infestations.

Planning Question VIIIb. How should the Forest carry out fire protection and management including what suppression methods are appropriate within Wilderness?

The public issues and management concerns recognized the importance of fire management on the Forest. The public is concerned about safety and security of property values where they adjoin Forest land, as well as the threat to Forest resources. The use of fire as a management tool is also recognized.

Reducing the possibility of fire is accomplished through fire management procedures. Currently 1,500 to 2,000 acres per year are managed to reduce hazardous fire fuels. Prescribed or planned fire is sometimes used to eliminate slash and to accomplish other resource management objectives. Fuelwood programs have been initiated and coordinated with the State Forester and Bureau of Land Management which help meet fuel reduction objectives and contribute to local firewood needs.

Fire suppression efforts require immediate action on wildfires in high risk areas and escaped fires. In addition to its own fire specialists, the Forest maintains cooperative fire suppression agreements with 25 other agencies which include counties, other Federal agencies, municipalities and the Colorado State Forest Service. The Forest maintains only one fire lookout within the planning area located on Devil's Head Mountain near Denver. Most fires are detected and reported by Forest users or from aircraft observations.

1/ The number of years required to establish and grow timber crops to a specified maturity for regeneration harvest.

Fire-suppression measures and techniques will be used which achieve the wilderness management objectives with the minimum adverse impact on the wilderness resource. Preference will be given to the methods and equipment which least alter the landscape or disturb the land surfact. Structures and improvements will be located outside the wilderness boundary when at all feasible. Temporary fire camps, helispots, etc., will be obliterated upon termination of use and the site(s) rehabilitated to as natural a state as possible.

Planning Question IXa: What range and quality of developed and dispersed recreation opportunities and activities should the Pike and San Isabel National Forests provide?

This includes major public issues and management concerns of how and where the Forest will provide opportunities for downhill skiing and potential economic benefit to local communities. Another concern is, can adequate facilities be developed to meet demands from the increasing human populations on the Front Range? Additional public issues focused on expanding developed recreation. This would attract more people to the mountains and the Forest Service does not have sufficient funds to administer resultant management problems or maintenance and upkeep.

Because of the overall importance of the recreation resource on the Forest, many facets of the recreation question were expressed in public issues and concerns. Developed recreation opportunity provides the capacity for 17,230 persons at one time. There are 97 campgrounds and 33 picnic grounds. Increased development and operating costs make it difficult to keep pace with demand. An opportunity is recognized for private enterprise to satisfy part of the demand by development on private lands in and adjacent to the Forest. Current developed use excluding skiing is about 1 million visitor days per year. By 2030, the demand is expected to reach 3.0 million visitor days per year. Forest Plan objectives would provide for a capacity of over 2.1 million visitor days per year by 2030. A need to change management direction was recognized in attempting to keep up with the demand for developed recreation capacity.

Twin Lakes and the lands on the north side of Twin Lakes have been identified in the Forest Plan as a management area for emphasizing rural and roaded natural recreation opportunities. The applicable management direction allows a moderately wide range of recreation activities. The direction also allows a level of facilities and support services development that is consistent and compatible with the intended management emphasis. This level has been reached in terms of scope (number and kinds of sites) and intensity (acres committed to sites and capacity). Future management actions will focus on improving the quality and durability of existing sites and facilities. For example, roads should be hard surfaced to reduce dust and annual

maintenance costs. Future management actions will also focus on insuring that all areas disturbed by Fryingpan-Arkansas project construction activities are successfully and attractively stabilized and revegetated.

The Forest has six ski areas· Monarch, Ski Cooper, Pikes Peak, Geneva Basin, Cuchara Valley Resort and Conquistador. The collective current annual skiing use is approximately 147,000 visitor days. Based on certain assumptions concerning expansion and utilization, skiing demand can probably be met at existing sites until the years 2000.

The expansion of existing ski areas and the development of new ski areas on the Forest will be scheduled according to the four-level Priority System disclosed in the Rocky Mountain Regional Guide. Priority 1 sites are expansions of existing ski areas and new sites which are rated good, and that are served by existing ski areas or resort communities.

The Forest will manage two inventoried potential ski area sites to ensure the retention of essential natural characteristics. These two areas, Burning Bear and Quail Mountain, have been classified as Priority 2.

Priority 2 sites will be considered for development only after Priority 1 areas are fully developed or the State of Colorado and affected counties notify the Forest Supervisor of their desire to initiate and underwrite necessary studies. In this case, the Forest Service would coordinate development of the study plan (studies to be performed and/or underwritten by the State of Colorado and affected counties.).

The scheduling of future ski area development will be guided by monitoring actual use, utilization rates, and growth predictions related to local, State and National demographics. An important factor in scheduling future ski area development is an assessment of each ski area's ability and potential for improving its overall operations and skier market through the addition of new facilities.

Another matter involved in scheduling future development is overall regional ski area capacity. According to the Regional Guide for the Rocky Mountain Region, through 1990, it is a Regional goal to provide an increase of no more than 132,000 skiers-at-one-time (SAOT) for a Regional total of 229,370 SAOT.

Proponents will be responsible for funding costs associated with suitability studies as well as those involving the Joint Review Process when the proposal is initiated by someone other than the Forest Service.

Opportunity in dispersed recreation is reflected by the Recreation Opportunity Spectrum (ROS) classes for the Forest.

The ROS defines the opportunity for dispersed recreation use in terms of the physical, managerial and recreation experience setting in various environments. These environments range from primitive settings, without motorized use, to urban settings with extensive developments and heavy use. Current wilderness and nonwilderness capacities provide about 79,000 acres of primitive, 620,000 acres of semiprimitive nonmotorized, 550,000 acres of semiprimitive motorized, 964,000 acres of roaded natural, and 4,000 acres of rural ROS opportunity class lands. Forest Plan objectives will maintain this approximate distribution.

Additional public issues and management concerns focused on motorized use of the Forest and conflicts that developed in the relationship to nonmotorized use. Wilderness classification in recent legislation, along with that recommended in the Forest Plan, provides a greater degree of distinction in nonmotorized areas. Management direction, increased mitigation measures, and monitoring of dispersed recreation use are provided for in the Forest Plan.

Planning Question IXb: How should the cultural resources of the Forest be managed?

The major public issue and management concern is for protection of cultural resources existing on the Forest, both known and those yet unidentified.

Avoidance of site locations until significance can be determined will remain the primary protection tool.

The Forest occupies a significant place in the history and pre-history of southern and southeastern Colorado. Six sites have already been added to the National Register of Historic Places, and a number of others are expected to qualify. sites which are included or eligible for inclusion on the National Register are protected in accordance with appropriate laws and regulations. Sites which have not been evaluated to determine their significance will be protected by avoidance until their status is resolved. An on-the-ground survey will be made to identify cultural resources which might be affected, prior to initiating any management activity that has the potential to adversely impact cultural resources. Appropriate mitigation, protection or avoidance measures will then be prescribed.

Management of cultural resources will continue to be coordinated with State Historic Preservatin Officers.

Planning Question X: What considerations should be made in providing facilities, including transportation systems for off-road vehicles and trails for motorized use to meet public and resource management needs on the Pike and San Isabel National Forests?

A significant portion of the public issues and management concerns related to transportation center around the apparent conflict between those who desire increases and improvements in access to the Forest and those who feel that there is sufficient or even too much access. The transportation system is critically related to the degree to which most other resources can be utilized or enjoyed; therefore, a well designed system is important to integrated resource management on the Forest.

An extensive transportation network provides access to and throughout most areas of the Forest. Construction and reconstruction of roads will be accomplished to meet resource management, public access, and Forest Plan objective needs. Travel management, closely related to dispersed recreation activities was considered in all management area proposals.

Roads will be removed from the transportation system in response to long-range road density objectives prescribed for management areas. They will be obliterated (returned to natural vegetation production) when the facility will no longer be used or planned as a travelway or put-to-bed (stabilized) when use is not planned for an extended period of time. Roads closed to vehicular travel are still available for horseback and for foot travel.

The Forest Plan will provide for a moderate emphasis to be placed on trail reconstruction. This will include trails for livestock and recreation use.

Buildings and structural facilities will be provided to meet management and administration needs.

Planning Question XI: What kinds of human and community development programs or activities will benefit local communities, and provide cooperation with private industry and State and local governments?

This includes major public issues and management concerns of how Forest Planning decisions will affect and be affected by the needs and plans of individuals, communities, industry, and governments influenced by the plan.

Various management activities such as range improvements, water production increases, and timber management activities will tend to benefit local populations and communities through increased resource outputs. Where opportunities exist, the Forest participates in employment programs such as the Youth Conservation Corps, college work study, and the Senior Citizens Service Employment programs. Fuelwood programs emphasizing public access and availability further benefit local communities.

SOCIAL AND ECONOMIC FUTURE

Local dependent industries are benefitted overall under the Forest Plan. Increased wood fiber outputs benefit timber related businesses and commercial fuelwood suppliers. Increased road construction for resource management activities benefits road construction-related businesses. These and similar benefits are usually applicable to small business enterprises. Ranching is benefitted by increased forage availability, especially in those economic impact areas where the cattle industry is a significant part of the local economy. The tourist industry as well, relies significantly on recreation opportunities and the visual attractiveness of the Forest.

Managed vegetation communities will insure the visual attractiveness of the Forest thereby enhancing recreation opportunities including those associated with viewing and driving for pleasure.

Implementation of the Forest Plan will provide a moderate increase in resource outputs without dramatic changes which would have drastic impacts on local economies or industries. A stable output of resource products is expected. In turn, the 25 percent fund return to local governments should be stable and predictable. Overall, the Forest Plan will contribute to community stability and productive harmony within the Human and Social Resource Units.

Employment growth associated with the Forest would be most strongly realized in the tourism sector. This is based on the assumption that the economic and social factors having caused recent increases in tourism will continue to operate. Examples include the availability of relatively inexpensive transportation and increased leisure time. Employment in the agricultural and timber producing sectors is also expected to rise as a result of generally higher levels of timber volume and livestock forage production.

Dollar returns to the U.S. Treasury will increase over the 50-year planning period under the assumption that demand for the various revenue-producing goods and services on the Forest will continue to rise. This reflects the strong emphasis on income-producing resources, specifically timber and livestock forage in the Plan. Under this same assumption, payments to counties will increase in direct proportion to returns to the Treasury, and could result in a doubling of payments some time within the planning period.

RESEARCH NEEDS

The planning process identified areas of research needed to support or improve management of the Pike and San Isabel

National Forests. They are summarized below for consideration for research projects and will be updated during periodic evaluation of Plan implementation. After all Forest Plans are completed in the Rocky Mountain Region, appropriate research proposals will be formulated for research consideration.

Wildlife and Fish

Research is needed to determine what habitat conditions would ensure viable populations of all plant and animal species, diversity in biological communities and how it can affect population levels of various indicator species. Questions that need to be answered include:

- Can diversity be determined effectively for many species using a common area or should each species be studied individually?

- What changes in diversity and what magnitude of change (area and time span) is necessary to significantly affect population sizes of management indicator species?

Studies are needed to better determine the amount and quality of habitat for management indicator species on the National Forests and the National Grasslands. Analyses on the National Forests should be on a Diversity Unit basis.

Studies are needed in several locations on the planning area to identify the factors which currently limit deer, elk, and bighorn sheep populations.

Timber

Research needed to answer questions related to timber management are:

- Development of vegetation classifications for both conifer and aspen forests Classification of conifer forests should identify potential natural communities or habitat types. Classification of aspen forests should identify major community types and their associated potentials.

- A study of the physical and chemical site properties affecting timber productivity and regeneration (especially in ponderosa pine).

  This research should include evaluation of regeneration problems in the ponderosa pine type, and field, laboratory, and greenhouse studies to evaluate the relationship between site characteristics and regeneration.

- Effects of oak brush competition on the growth of ponderosa pine.

- Stand regeneration studies under local conditions to determine the best silvicultural practices to use to ensure adequate natural regeneration

- Development of site index/productivity index tables for local species on local site conditions

Planting stock research to obtain precise data relative to size and shape of containers, root configuration, planting season, number of trees per square foot, age of stock to be planted and lifting data.

Soil and Water

The majority of existing information relating to soil productivity and its capability comes from agricultural research. More information on forest soils is needed to help answer the following:

- How do management activities affect soil productivity?

- How much erosion above natural levels is acceptable for the soils on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands?

- Is soil compaction a problem on the Forest? If so, what is the best way to prevent or mitigate it?

- Is fertilization feasible or desirable for commerical timber species?

- What soil features should the Forest monitor to evaluate changes in soil productivity?

Protection (Includes Prescribed Fire)

A study is needed of local historic fire regimes so that intervals of natural fire and the resulting vegetation succession and soil response trends can be predicted. Stylized fuel models need to be developed to represent local situations and resource fire effects.

Also, a study is needed to improve the risk interpretation for forest pests and weeds on various sites.

Livestock Grazing

Studies are needed to determine short-term and long-range effects on Grasslands ecosystems from high-intensity, short-duration grazing systems (large numbers of livestock for limited time periods).

Studies are needed to assess natural plant succession in native blue grama-buffalo grass plant communities and subsequent effects on forage production on the Comanche National Grasslands (Campo Proposed Research Natural Area).

Studies are needed to assess natural plant succession in native sandsage-bluestem plant communities and subsequent effects on forage production on the Cimarron National Grasslands (Cimarron Proposed Research Natural Area).

Research is needed to develop more efficient, cost effective methods of control of unwanted plants such as yucca, sagebrush and cactus to increase forage productivity of plant communities in livestock forage production areas.