United States
Department of
Agriculture

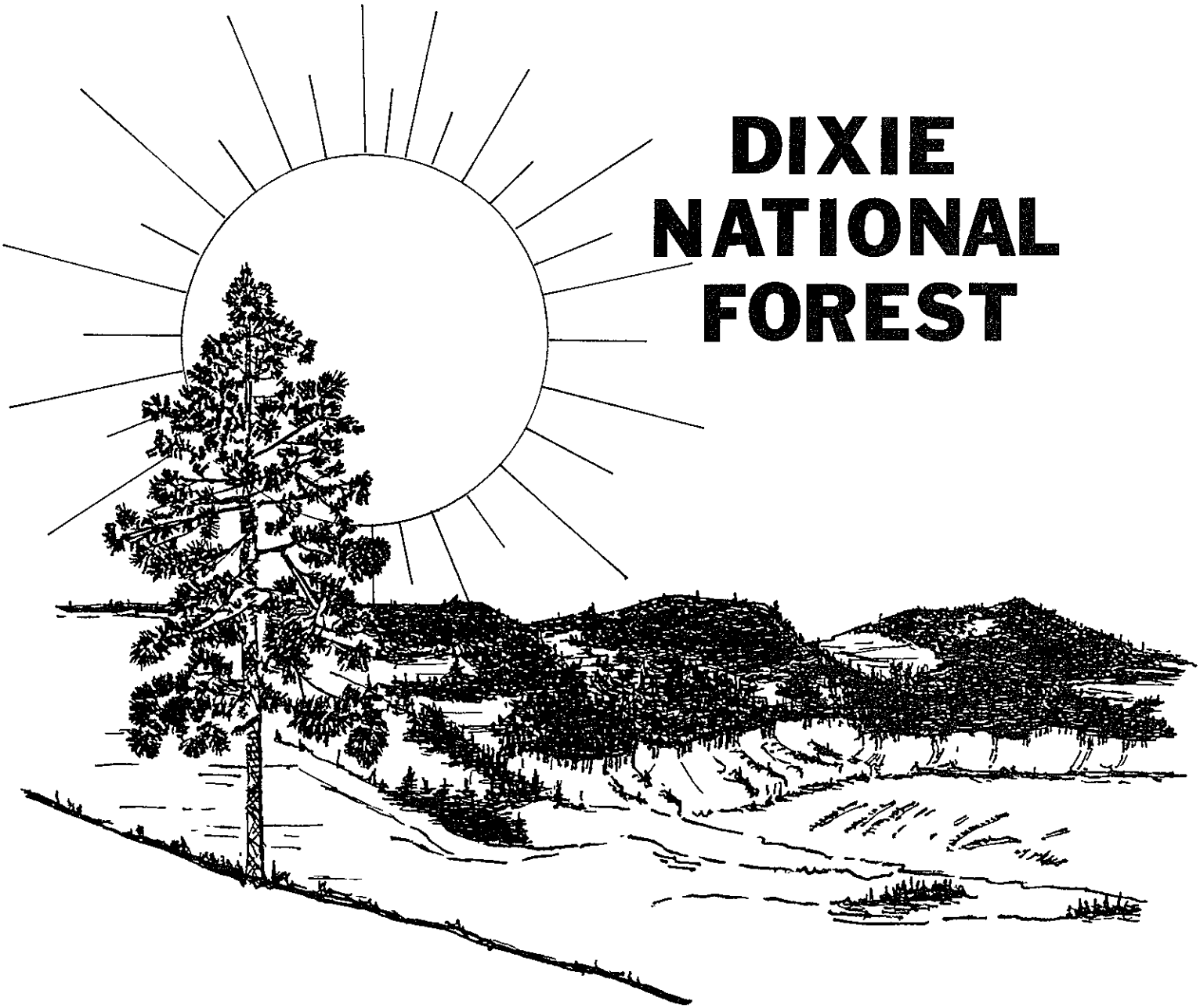
Forest
Service

Dixie
National
Forest

# Land and Resource Management Plan

for the

# DIXIE NATIONAL FOREST



# PREFACE

This Land and Resource Management Plan has been developed for the Dixie National Forest. Details pertaining to the development of this Plan can be provided by:

Forest Supervisor
Dixie National Forest
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Cedar City, Utah 84720

## A. APPLICABLE LAWS AND REGULATIONS

The principle acts providing direction in developing this Land and Resource Management Plan are:

1. Multiple Use and Sustained Yield Act of 1960

2. National Environmental Policy Act (NEPA) of 1969

3. Forest Rangeland Resources Planning Act (RPA) of 1974

4. National Forest Management Act (NFMA) of 1976

RPA requires the Forest Service to conduct an assessment or inventory of the Nation's renewable resources and develop a program for the use of the resources. The assessment includes a determination of the capability of all National Forest lands to provide various goods and services. It also includes an estimation of future demands for those goods and services.

## B. PUBLIC REVIEW AND APPEAL

If any particular portion of this Plan is determined invalid in relation to a specific person or circumstance, the remainder of the Plan shall remain valid. Also, the specific portion shall remain valid as far as its' application to people or in other circumstances.

The right to request an administrative appeal of the Regional decision to approve a Forest Plan is contained in 36 CFR 219.10 (d), which describes the appeal process. The appeal is limited to the issues raised during the planning process. Intermediate decisions made during the planning process prior to the approval or disapproval decisions are not reviewable. The procedure is described in 36 CFR 211.18.

Comments should be sent to the Forest Supervisor of the Dixie National Forest.

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# CHAPTER I
# FOREST PLAN INTRODUCTION

## A. PURPOSE OF THE FOREST PLAN

The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Dixie National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

The Forest Plan embodies the provisions of the NFMA, Regulations, and other guiding documents. The prescriptions and standards and guidelines are a statement of the Plan's management direction; however, the project outputs, services, and rates of implementation are dependent on the annual budgeting process.

## B. RELATIONSHIP OF THE FOREST PLAN TO OTHER DOCUMENTS

Development of the Forest Plan takes place within the framework of Forest Service Regional and National planning. The relationship among the different planning levels is shown as follows:

Congressional Acts

National level
Forest Service planning through the
Renewable Resource Assessment and Program (RPA)

Regional planning level through the
Regional Guide for the Intermountain Region

Forest level planning through the
Dixie National Forest
Land & Resource Management Plan

The RPA Program sets the National direction and output levels for the National Forest system lands. It is based on suitability and comparability information from each Forest Service Region.

Each Forest Service Region distributes its share of national production targets to each of its Forests. The share each National Forest receives is based on detailed information gathered at the Forest level.

The Land Resource Management Plan validates or provides a basis for changing production levels assigned by the Region. Activities and projects are planned and implemented by the Forest to carry out the direction developed in the Forest Plan. Information from all the National Forests in the region was used in developing the Intermountain Regional Guide.

The Forest Plan is the selected alternative and is based on the various considerations which have been addressed in the Environmental Impact Statement (EIS). The planning process and the analysis procedure used in developing this Plan, as well as the other alternatives that were considered, are described or referenced in the EIS. Activities and projects will be planned and implemented to carry out the direction in this plan. The local project environmental analysis will use the data and evaluations in the Plan and EIS as its basis.

## C. PLAN STRUCTURE

This plan provides the direction for managing the Dixie National Forest. It contains the overall directions and activities which will be required to achieve the desired state of the Forest. Management area maps indicate where the activities will occur.

The Forest Plan is organized into five chapters:

| | |
|---|---|
| Chapter I. | Forest Plan Introduction |
| Chapter II. | Analysis of the Management Situation Summary |
| Chapter III. | Plan Responses to Issues, Concerns, and Opportunities |
| Chapter IV. | Forest Management Direction |
| Chapter V. | Implementation of the Forest Plan |

Details concerning the various subsections and pages are found in the Table of Contents.

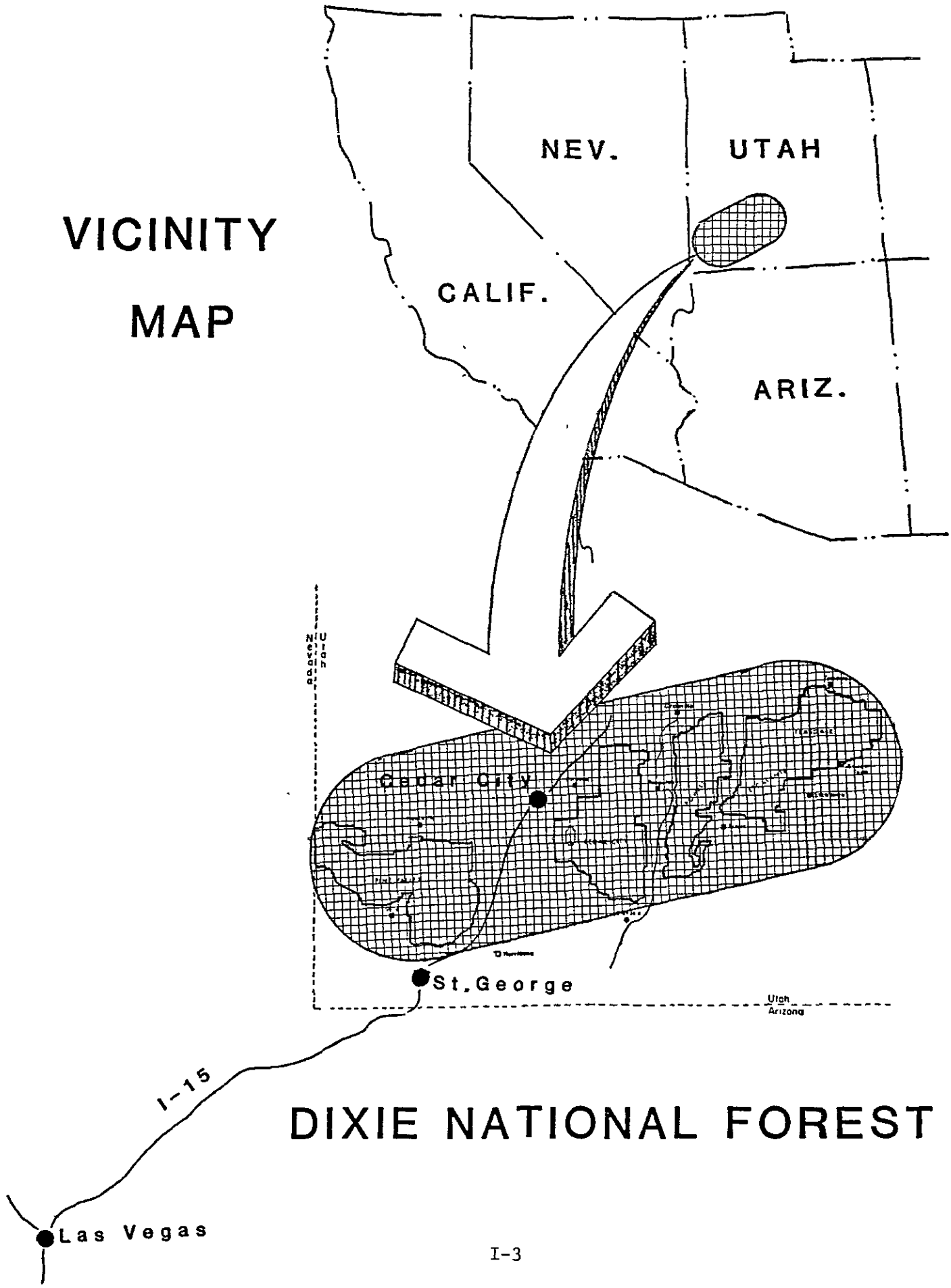
The chapter titled "Forest Management Direction" deals with the multiple use goals and objectives. It also lists the management practices and standards and guidelines for management of specific areas. The "Implementation of the Forest Plan" chapter deals with the means to implement the plan and evaluate and monitor the effects of management practices. All glossary and appendix references can be found in the separate Appendix document. Glossary words are highlighted by an asterisk throughout the Plan.

Maps displaying the various resources and associated management activities can be found in the accompanying map packet. By studying the maps concurrently with the Forest Plan, the reader can better understand the proposed action.

## D. FOREST DESCRIPTION

The Dixie National Forest is located in southwestern Utah and is in Washington, Iron, Garfield, Kane, Wayne, and Piute counties (see vicinity map). The Forest covers 1,967,187 acres. Included within the Forest boundaries are 1,883,734 acres of National Forest Land, 78,899 acres of privately owned land, and 4,554 acres of State of Utah Land.

# VICINITY MAP




DIXIE NATIONAL FOREST

# CHAPTER II
# ANALYSIS OF THE MANAGEMENT SITUATION SUMMARY

## A. INTRODUCTION

This chapter describes the present condition of the Forest. The chapter describes the physical and biological setting, the economic and the social setting, the summary of the demand trends for the Forest resources and the ability of the Forest to supply the demand, and the expected future condition of the Forest.

## B. PHYSICAL AND BIOLOGICAL SETTING

The Forest occupies almost two million acres and stretches for about 170 miles across southern Utah. The largest National Forest in Utah, it straddles the divide between the Great Basin and the Colorado River.

Elevations vary from 2,800 feet near St. George, Utah, to 11,322 feet at Blue Bell Knoll on the Boulder Mountain. High altitude forests in gently rolling hills characterize the Markagunt, Paunsaugunt, and Aquarius Plateaus. Boulder Mountain, one of the largest high elevation plateaus in the United States, is dotted with hundreds of small lakes 10 to 11,000 feet above sea level.

The Forest has many climatic extremes. Precipitation ranges from 10 inches in the lower elevations to more than 40 inches per year near Brian Head Peak. At the higher elevations, most of the yearly precipitation falls as snow. Thunderstorms are common over the Forest, during July and August and produce heavy rains. In most areas, August is the wettest month of the year.

Temperature extremes can also be impressive, with summer temperatures exceeding 100° F near St. George and winter lows exceeding - 30° F on the plateau tops.

The vegetation of the Forest grades from sparse, desert-type plants at the lower elevations to stands of low growing pinyon pine and juniper trees dominating the mid-elevations. At the higher elevations, aspen and conifer trees such as pine, spruce and fir predominate.

## C. ECONOMIC AND SOCIAL SETTING

### 1. Zone of Influence

The Dixie National Forest Primary Zone of Influence consists of the communities and counties in southcentral and southwestern Utah within and adjacent to the Forest that are influenced by Forest policies and decisions. It is comprised of six counties: Washington, Iron, Kane, Garfield, Piute, and Wayne. The State of Utah organizes counties into multi-county planning districts. The Primary Zone of Influence is located in two of these districts:

- The Five County Association of Governments (FCAOG), which includes Washington, Iron, Kane Garfield, and Beaver Counties.
- The Six County Commissioners Organization (SCCO), which includes Piute, Wayne, Juab, Millard, Sanpete, and Sevier Counties.

Washington and Iron Counties contain the only urban areas in the influence zone and are populating more rapidly than the others. Kane, Garfield, Piute, and Wayne counties are primarily rural and population growth remains low. The Forest is important to people residing locally for recreation, grazing, mining, fire wood gathering, and timber harvesting. The principal timber harvesting activities take place in Kane, Garfield and Wayne Counties.

Economic Indicators, Past Trends, and Baseline Projections for Primary Zone of Influence

| | | | | | | Baseline Projections | | |
|---|---|---|---|---|---|---|---|---|
| | 1960 | 1970 | 1977 | 1980 | 1983 | 1985 | 1990 | 1995 |
| Pop. (M pers.) | 30,474 | 34,474 | 45,877 | 54,351 | 61,050 | 67,810 | 76,924 | 83,403 |
| Income (MM$) | | 82.2 | 210.1 | 343.1 | 434.8 | | | |
| Employment (M pers.) | | | | | | | | |
| Agricul. | | 1973 | 1802 | 1792 | | | | |
| Lumber | | 253 | 291 | 252 | | | | |
| Retail | | 2156 | 3326 | 3449 | | | | |

## D. RESOURCE ELEMENTS

The supply and demand conditions of the resource element are described under each resource section that follows. Those conditions are summarized in the following table.

TABLE II-1
CURRENT OUTPUTS, PROJECTED DEMAND, SUPPLY POTENTIAL

| Activity-Category | Units | Current Level | 1990 | 2000 | 2010 | 2020 | 2030 |
|---|---|---|---|---|---|---|---|
| Developed Rec. Use | MRVD | | | | | | |
| Capacity-Public | | 1793 | 1793 | 1806 | 1880 | 1897 | 1919 |
| Demand Trends | | 339 | 382 | 534 | 870 | 1417 | 2858 |
| Regional Objective | | 630 | 640 | 650 | 785 | 925 | 1050 |
| Current Program | | 787 | 787 | 787 | 787 | 787 | 787 |
| Developed Rec. Use | MRVD | | | | | | |
| Capacity-Private | | 859 | 859 | 1155 | 1155 | 1155 | 1155 |
| Demand Trends | | 259 | 426 | 1717 | 11892 | 168217 | 629138 |
| Regional Objective | | | | | | | |
| Current Program | | 859 | 859 | 859 | 859 | 859 | 859 |
| Dispersed Rec. Use | MRVD | | | | | | |
| Capacity | | 5668 | 5668 | 5668 | 5668 | 5668 | 5668 |
| Demand Trends | | 811 | 843 | 1130 | 1841 | 2954 | 4012 |
| Regional Objective | | 630 | 665 | 766 | 766 | 823 | 880 |
| Current Program | | 811 | 815 | 1085 | 1727 | 2685 | 3643 |
| Wilderness Use Capacity | MRVD | | | | | | |
| Demand Trends | | 8.0 | 8.0 | 10.3 | 17.6 | 28.7 | 46.8 |
| Regional Objective | | 26.5 | 26.5 | 26.5 | 26.5 | 26.5 | 26.5 |
| Current Program | | 8.0 | 8.0 | 11.0 | 17.0 | 27.0 | 36.0 |

| Activity-Category | Units | Current Level | 1990 | 2000 | 2010 | 2020 | 2030 |
|---|---|---|---|---|---|---|---|
| Wildlife Habitat (M Acres) | Acres | | | | | | |
| Improvement | | | | | | | |
| Demand Trends | | 5.3 | 5.8 | 6.5 | 6.5 | 6.8 | 6.8 |
| Regional Objective M Acre Equiv) | | 43.0 | 38.0 | 33.0 | 28.0 | 24.0 | 19.0 |
| Current Program (M Acres) | | 4.5 | 5.8 | 6.1 | 6.4 | 6.6 | 6.7 |
| Permitted Livestock Use | MAUM | | | | | | |
| Demand Trends | | There would be a demand for all AUMs made available. | | | | | |
| Max Production Potential | | 115 | 119 | 124 | 130 | 137 | 143 |
| Regional Objective | | 115 | 119 | 121 | 121 | 122 | 123 |
| Current Program | | 115 | 115 | 115 | 115 | 115 | 115 |
| Timber Sales Offered | MMBF | | | | | | |
| Demand Trends | | 55 | 55 | 55 | 55 | 55 | 55 |
| Max Production Potential | | | 30 | 30 | 33 | 30 | 30 |
| Regional Objective RPA-85 | | | 51 | 38 | 31 | 21 | 16 |
| Current Program | | 20 | 26 | 25 | 25 | 25 | 25 |
| Water Yield (increase over natural flow) | MAC.Ft. | | | | | | |
| Demand Trends | | Exceeds supply potential. | | | | | |
| Regional Objective | | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| Current Program | | 2.9 | 4.3 | 8.3 | 8.1 | 6.7 | 6.0 |

1. Recreation

The Dixie National Forest has unique recreation opportunities. The Forest is adjacent to or surrounds three National Parks and one National Monument. The parks and monument draw people into the area from throughout the United States and from other countries. Once in the area, the people often visit many areas on the Forest and use the campgrounds for bedroom areas.

Major population centers within one hour driving time of the Forest are Cedar City, St. George, Panguitch, Enterprise, Hurricane, and Escalante. The population of these communities and others within the hour driving time is approximately 100,000 people. Many parts of the Forest are used by people from larger communities, such as Las Vegas and southern California. Private land adjacent to and within the Forest boundary has been developed and serves as summer home property for many people from these larger community centers.

The Recreational Opportunities across the Forest are highly diversified. The primitive recreation areas provide opportunities for camping, hunting, viewing scenery, and horse back riding. Semi-Primitive non-motorized recreation areas provide similar opportunities as primitive plus opportunities for small boats and cold water fishing. Motorized Recreation areas have opportunities for camping, picnicking, resort lodging, recreation residence, sledding, skiing, hunting, gathering forest products, viewing interpretive exhibits, hiking, viewing scenery, driving for pleasure, snowmobiling, biking, horse back riding, canoeing, sailing, swimming, water skiing and fishing.

Developed Recreation - Public. Cedar City and Pine Valley Ranger Districts, which are located adjacent to Interstate Highway 15, are the two most heavily used areas on the Forest. More than half of the use on these two districts comes from Nevada and California. Only 15 percent is from Utah.

Recreation use has increased steadily over the past 11 years. Some areas, such as along the Boulder-Grover Road, are expected to experience a greater increase in use. The Boulder-Grover Road recreation increase is due to reconstruction of this road. This road will tie Bryce Canyon and Zion to Capitol Reef and other National Parks in southeastern Utah. The use on Cedar City and St. George Districts is expected to continue increasing, due to continued development of summer homes on adjacent private land and the desire of people in large metropolitan areas to escape the crowds and heat. Some sites on these districts are used up to 50 percent of their capacity. This exceeds the recommended use by 10 percent.

The number of major developed facilities, by ranger districts, is shown in Table No. II-2. Most use of developed facilities is during the summer months and fall hunting season. Some facilities along State Highway 12 to Bryce Canyon are used late into the fall and winter and early in the spring by visitors to Bryce Canyon.

TABLE II-2
NUMBER OF FACILITIES FOR DEVELOPED RECREATIONAL USE

| RANGER DISTRICT | CAMPGROUND | PICNIC | OVERLOOK & OTHER |
|---|---|---|---|
| D-1 Pine Valley | 7 (1) | 3 (3) | 3 |
| D-2 Cedar City | 10 (1) | 1 | 6 |
| D-3 Panguitch | 2 | | 1 |
| D-4 Escalante | 3 | 1 | |
| D-5 Teasdale | 4 | | |
| TOTAL | 26 | 5 | 10 |

(Numbers in parentheses are group facilities.)

Most of the facilities were constructed during the time when tents were the major form of camping on the Forest. Since that time, the trailer and motor home have evolved, and there has been resource damage due to the incompatibility of facilities and equipment being used with the available developed sites.

Some of the major campgrounds, roads, and spurs were reshaped with road reconstruction to accommodate modern vehicles. Facilities such as tables, grills and pads associated with them need repair to meet the standards of roads and spurs. Across the Forest, vegetation has been badly trampled in developed sites. Compaction, loss of topsoil, development of trails, exposure of tree roots, and stream bank breakdown are all impacts that are degrading the appearance of picnic areas and campgrounds on the Forest.

In recent years, construction and rehabilitation of recreational facilities have declined because of reduced Forest Service budgets and human resource programs. The current outlook for the next several years is for no new construction of recreational facilities. Current funding allows little more than minimal operation and maintenance.

The capacity of developed sites is measured in people at one time (PAOT). That's an estimate of the number of persons who can comfortably use a site at one time. Family camping and picnic sites are estimated to have a capacity of five persons per unit. The current capability of the Forest is shown in Table II-3.

TABLE II-3
PEOPLE AT ONE TIME CAPACITY OF DEVELOPED SITES

| DISTRICT | CAMPGROUND | PICNIC | TOTAL |
|---|---|---|---|
| D-1 Pine Valley | 1,005 (355) | 390 (390) | 1,395 |
| D-2 Cedar City | 2,790 (200) | 20 | 2,810 |
| D-3 Powell | 680 | | 680 |
| D-4 Escalante | 450 | 30 | 480 |
| D-5 Teasdale | 530 | | 530 |
| TOTAL | 5,455 (555) | 440 (390) | 5,895 |

(Numbers in parentheses are group facilities.)

Developed recreation sites on the Forest contain old growth overstory with little understory vegetation. The overstory vegetation is susceptible to disease and insects due to its age. One area on the Cedar City District has recently lost most of its overstory aspen due to disease. Although the vegetation is coming back, there is a need to develop vegetative management plans for developed sites, to manage the vegetation to provide shade, and to increase the aesthetic appeal of the areas.

Other opportunities to improve developed recreation for the public include:

- Facilities that better resist vandalism.
- Limit use of developed sites to capacity.
- Attract visitors during mid-week, low-use periods.
- Rehabilitate substandard sites.
- Close and allow some sites to rest during slack periods.
- Emphasize development of new campgrounds and picnic areas.

More intensive use in the future will result in further overcrowding, additional site deterioration, greater wear on facilities, and increasing social problems such as vandalism. The Forest expects to shift use to less crowded facilities at more remote locations and a small shift from weekend to weekday use. Projected use for developed sites is expected to exceed supply by about year 2010.

The projected use of developed recreation facilities on the Forest is shown in Table II-4. This use is based on projected growth in population of the areas.

TABLE II-4
PROJECTED RECREATION USE BY DECADE

PLANNING PERIOD

| 1981-1985 | 1986-1990 | 1991-2000 | 2001-2010 | 2011-2020 | 2021-2030 |
|---|---|---|---|---|---|
| 339 MRVDs* | 382 MRVDs | 634 MRVDs | 870 MRVDs | 1417 MRVDs | 2858 MRVDs |

Downhill Ski Area. Brian Head is presently one of the fastest growing ski areas in Utah. It has grown from 33,400 skier visitor days in 1973 to 70,600 in 1983. The area is anticipating growth from the present seven to ten lifts during the next few years. Crystal Mountain development is proposing to connect with Brian Head and increase the potential for expansion to 14 lifts.

The ski area is the largest in southern Utah and draws users from Nevada, southern California, and Arizona. Presently, the area is dependent on natural snow condition for the amount of use it receives.

Projected use for downhill skiing on the Forest from now until 2030 is shown in Table II-5. This use will exceed the existing capacity and development by 1997 if the use continues at the present growth and facilities rate. The growth rate is likely to decrease as the slopes become more crowded. The projected growth rate reflects this change at the year 1995 by dropping from 28% to 5% annually.

TABLE II-5
PROJECTED USE IN THE PRIVATE SECTOR

PLANNING PERIOD

| 1981-1985 | 1986-1990 | 1991-2000 | 2001-2010 | 2011-2020 | 2021-2030 |
|---|---|---|---|---|---|
| 259 MRVDs | 426 MRVDs | 1294 MRVDs | 1812 MRVDs | 2952 MRVDs | 4809 MRVDs |

Capacity of the downhill ski area on the Forest and its potential future capacity is shown in Table II-6.

TABLE II-6
PRESENT & PROJECTED CAPABILITIES FOR SKIERS
AT ONE TIME ON DOWNHILL SKI AREAS
1985-2030

| AREA | PRESENT CAPACITY | ADDITIONAL PLANNED WITHIN BOUNDARIES | POTENTIAL ADDITIONAL OUTSIDE BOUNDARIES |
|---|---|---|---|
| Brian Head | 3200 SAOT* | 1324 SAOT | 2390 SAOT |

On most weekends during the peak season the existing ski area nears capacity. Holiday weekends are especially busy. Weekends are more popular because of work schedules, and also because of the distance involved for most of the users, who come from Nevada, California, and Arizona.

Brian Head, like most ski areas in Utah, is located up a narrow canyon. Access is often a problem during winter months when the road is snow packed. The State Department of Transportation is presently looking into possible solutions to the problem.

Developed Recreation - Private. Developed private recreation includes recreation residences, group organization camps, and other recreational opportunities provided by private enterprises under special use permit from the Forest Service. The following table summarizes private recreational activities on this Forest.

TABLE II-7
SPECIAL USE RECREATION SITES AND SITE USE

| SITES | 1980 VISITOR DAYS | 7-YEAR AVERAGE INCREASE PERCENT |
|---|---|---|
| 2 Recreation Residence (43 residences) | 5,600 | N/A |
| 2 Lodge Resorts | 7,400 | N/A |
| 1 Organization Camp | 5,500 | N/A |
| 4 Boat Marina | 6,000 | N/A |

Recreation special uses paid fees of $17,540 in fiscal year 1984. There have been no new permits issued for recreation residences on the Forest since 1959. Originally, they were used only in the summer. Snowmobiles and four-wheel drive vehicles now make year around access possible.

Recreation use in the private sector has not shown an increase other than in skiing. These areas have been operating at this capacity for some time without expansion. On the other hand, private residences have increased greatly on private land within and adjacent to the Forest boundary.

Some organizational camps have deteriorated and need substantial rebuilding to bring them up to satisfactory condition.

Dispersed Recreation. Dispersed recreation is use away from developed sites. Driving for pleasure is the most popular dispersed activity, followed by camping, fishing, gathering forest products, viewing outstanding scenery, hunting, and hiking. With the increase in fuel and heating cost, gathering fuelwood has increased 115% a year over the last three years. Driving for pleasure is expected to become more popular over the whole Forest. However, State Highway 14, and Boulder-Grover Road are being considered scenic highways by the State. The added publicity will increase their use.

Dispersed recreation areas receive intensive use on weekends and holidays, with areas near water being the most popular. Different types of users, such as snowmobilers and cross-country skiers, compete for use of a given recreation area. The most heavily used areas, especially for fuelwood and snow play, are on the Cedar City District. The capacity of the Forest for dispersed recreation is calculated by using the Recreation Opportunity Spectrum (ROS). The number of acres in each ROS class was converted to recreation visitor days (RVD's)*.

TABLE II-8
CURRENT CAPACITY FOR DISPERSED RECREATION
DIXIE NATIONAL FOREST

| ROS CLASS | TOTAL ACRES | WILDERNESS ACRES | AVAILABLE ACRES | RVD/ACRE CONVERSION FACTOR | MRVD CAPACITY |
|---|---|---|---|---|---|
| Primitive | 83,000 | 83,000 | 83,000 | .3 | 25.8 |
| Semi-Primitive Non-Motorized | 831,309 | | 831,309 | .9 | 748.2 |
| Semi-Primitive Motorized | 645,797 | | 645,797 | 2.8 | 1,811.4 |
| Roaded Natural | 237,747 | | 237,747 | 12.4 | 2,948.1 |
| Rural | 10,869 | | 10,869 | 12.4 | 134.8 |
| TOTAL | 1,811,722 | 83,000 | 1,811,722 | | 5,668.3 |

Capacity for dispersed recreation is directly related to ease of access and facilities. The easier the access and the more available the facilities, the more opportunity for dispersed recreation. The Forest estimates for every mile of new road construction (which is not closed after use) 118 acres of land will

change from its classification as Semi-Primitive Motorized (SPM)* or some Semi-Primitive Non-Motorized (SPNM)* to a Roaded Natural (RN)* classification. This will increase the capacity from 1.1 MRVD's to 1:4 MRVD's, depending on the acres of SPNM and/or SPM that will change to RN with the addition of one mile of new road.

The projected use for all types of dispersed recreation was predicted to increase as follows:

| YEAR | 1990 | 2000 | 2010 | 2020 | 2030 |
|---|---|---|---|---|---|
| MRVD'S | 843.1 | 1129.9 | 1841.1 | 2953.9 | 4811.7 |

Demand for dispersed recreation will never exceed the supply unless some unforeseen population explosion takes place during the planning period.

The Forest expects the same patterns of use to continue unless the economy changes. There will be some shift in the amount of use between the communities of Boulder and Teasdale, due to the construction of the new high standard Forest Highway. Other than increased use on the new highway, use will continue to be high around Panguitch Lake, Navajo Lake, Duck Creek, Pine Valley, National Parks, and along major highways.

Timber sales and mineral development will add additional miles to the Forest Road System. Some of these roads will be closed to motorized recreational use, and use on remaining roads will increase.

Heavily used dispersed campsites that continue to receive heavy use from hunters and fishermen will continue to deteriorate. Competition for choice hunter sites will create social conflicts.

Opportunities for improving the dispersed recreation experience and reducing conflicts between user groups include:

- Developing a program for trailhead construction.
- Encouraging use at remote sites.
- Developing a program for all types of dispersed winter recreation.
- Providing adequate sanitation for both summer and winter use.
- Encouraging State and counties to provide parking and sanitation facilities for winter use.
- Develop a program to determine use in dispersed areas.

The following table shows the eight major dispersed recreation activities on the Forest and the average increase in use per year over a three year period.

TABLE II-9
VISITOR DAYS USE FOR SELECTED DISPERSED
RECREATIONAL ACTIVITIES
DIXIE NATIONAL FOREST
1983 AND AVERAGE YEARLY INCREASE 1980-1983

| ACTIVITY | 1983 VISITOR DAYS (MRVD) | AVERAGE YEARLY INCREASE 1980-1983 (PERCENT) |
|---|---|---|
| Driving for Pleasure | 201.8 | 0 |
| Fishing Cold Water | 106.9 | 4 |
| Gathering Forest Products | 84.6 | 5 |
| Viewing Outstanding Scenery | 66.7 | 3 |
| Hunting Big Game | 59.8 | 2 |
| Skiing | 45.2 | 3 |
| Hiking | 52.4 | 3 |
| Horseback Riding | 34.1 | 1 |

Trails. The Forest has approximately 637 miles of trails. The trail inventory lists 175 miles as adequate, 462 miles as inadequate, and 40 miles as planned but not constructed. The majority of the trails were originally constructed for fire access or livestock distribution. Recreation use of these trails has pointed out the need for some relocation. Many of the trails have also been damaged by timber sale operations, and are badly in need of repair. Most trail use has been in the summer, but snowmobiles and cross-country skiers are increasing winter use. Two trails on the Forest have received National recognition and status. Whipple Trail and Cascade Falls trails have both been designated as National Recreation Trails. An accurate figure of use for these two trails has not been determined, but the use on them has increased over the past five years. Whipple Trail is one of the major access routes into the Pine Valley Mountain Wilderness.

Areas closed, restricted, open to ORV use.

Off-Road Vehicle Use. The Forest presently has 181,840 acres closed to all types of motorized vehicle use, 159,845 acres closed to all but snow machines, and/or on existing roads. These closures have been designated to protect an area from resource damage or preserve wildlife habitat. Winter use on the Forest is becoming more popular as equipment becomes more available for use. The Markaguant Plateau near the developed ski area, and Navajo Lake - Duck Creek are popular areas on the Forest. Cabins in these areas are being used on a year around basis.

The development of the three and four wheeled All-Terrain-Vehicles is fast becoming a concern on the Forest. Use of these vehicles will likely increase on trails and general forested areas. Without a plan to regulate use in critical areas, some damage may occur.

Cultural Resource. The lands administered by the Dixie National Forest, due to their general remoteness, have become a repository for much of the undisturbed evidence of the prehistoric and historic habitations in south central Utah. On

the timbered ridges, and within the grass and sage-covered valleys of the Forest, the untold stories of ancient hunters, gatherers and farmers, as well as the tales of our own pioneering ancestors, are silently awaiting an expression. To this end, cultural resource specialists are currently inventorying the thousands of archeological properties within the boundaries of the Dixie National Forest.

As directed by Executive Order 11593, all inventoried cultural resources are evaluated for eligibility for nomination to the National Register of Historic Places. Through December of 1984, 1,363 archeological sites have been recorded on 140,000 acres of Dixie National Forest system land. The occurrence of another 10,000 to 20,000 sites is projected for the remaining 1,740,140 acres of Forest.

Of the 1,363 archeological sites, three sites have been nominated to the National Register of Historic Places. They are the Mountain Meadows Massacre Site and Pine Valley Chapel and Tithing Office on the Pine Valley Ranger District and the Long Flat Prehistoric Quarry Site on the Cedar City Ranger District. In addition, two sites presently listed on the National Register are adjacent to the boundaries of the Forest. They are Old Irontown near the Pine Valley District and the Anasazi Indian Village State Historical Monument in Boulder, Utah.

In addition to sites formally listed on the National Register, many significant, potentially eligible prehistoric sites are found on the Forest.

Significant and potentially eligible historic sites may be found among the Forest's various administrative facilities especially those from the Civilian Conservation Corps era. Canidates <u>may</u> include the following:

- Vermillion Castle, Bear Valley, and Panguitch Lake guard stations; Cedar City Ranger District.
- Aquarius and Wildcat guard stations; Teasdale Ranger District.
- Dave's Hollow, Podunk and Jones Corral guard stations; Powell Ranger District.
- Clayton and Jubilee guard stations; Escalante Ranger District.
- Browse and Pine Valley guard stations; Pine Valley Ranger District.

According to the guidelines established by the USDA Forest Service (FSM 2361.02-2), 1990 has been established as the target date for the completion of the cultural resources survey and inventory of the Dixie National Forest. This target will not be met, as the complete survey of approximately 1,740,140 acres of Forest would take another 174 years based on a <u>high</u> annual survey average of 10,000 acres.

For the future, cultural resource inventories will continue to be conducted prior to any decision on any understanding which could affect significant cultural values. As the rate of ground-disturbing activities (i.e., timber sales, fences, pipelines, chainings, etc.) increases or decreases, the rate of cultural resource survey and the recording and evaluation of new archeological properties will increase or decrease proportionately. Monitoring activities, which judge the effectiveness of site avoidance by project activity, should continue to be given a high priority.

The enhancement and protection of the Dixie National Forest's cultural resources, which is only minimally related to the degree of project work, should be pursued both formally and informally through the medium of Law enforcement and public education. Incidents of vandalism should be promptly and formally turned over to the Forests or regions law enforcement officer for investigation. Cultural resource specialists should take an active role in the development of an awareness by the public of the fragile and irreplaceable nature of their archeological resources. This can be accomplished by the presentation of slide talks to civic groups, the development of conservation programs for use with public school children, the publishing (i.e., newspapers) of the on-going accounts of area excavations, etc.

The Dixie National Forest has several opportunities to develop educational programs. The Escalante Ranger District enjoys close proximity to an established heritage center - Anasazi Indian Village State Historical Monument. Conceivably, the Dixie's cultural resource specialist could work with the curators at the Anasazi Indian Village to develop audio-visual (slide, video, etc.) programs for presentation to civic groups and school children in the towns where the Dixie National Forest has administrative offices.

The Supervisor's Office of the Forest is located in Cedar City, home of Southern Utah State College. The college, offers a potential reservoir of canidates for cooperative student programs and/or volunteer projects. The cultural resource specialist should view the college as an available resource that could be, if nurtured properly, a mutually beneficial experience for the Forest and the student.

Student-oriented programs, for example, could be developed to aid in the stabilization and interpretation of the Anasazi dwellings in North Canyon on the Escalante Ranger District. Combining forces with interested local citizens, and guided by consultation with agencies such as the USDI National Park Service, small scale projects could witness the stabilization of walls, the protective fencing of sites prone to vandalism and the establishment of interpretive signs.

The Forest's law enforcement program, which is formally charged with the protection of the cultural resources, operates on the premise that every Dixie National Forest employee has enforcement responsibilities. Ideally, the primary responsibility of the employee is to report any activity, initiated by the public or the agency, that is detrimental to cultural resources.

Visual. The scenic beauty of the Forest is one of the major attractions to recreationists. Three National Parks and one National Monument surround or are found within the boundaries of the Forest. These areas are often the attraction that invite people to come. Many stay to see the attractions on the Forest and visit the campgrounds.

An inventory of the visual resource on the Forest has been completed using the visual management system outlined in "National Forest and Landscape Management ---Volume 2".

The inventory showed the following areas in each visual management category:

| | Acres |
|---|---|
| Preservation | 83,000 |
| Retention | 854,000 |
| Partial Retention | 642,000 |
| Modification | 248,000 |
| Maximum Modification | 56,000 |

Special Areas. There are no scenic highways, on the Forest at the present time. Some highways such as Highway 14 between Cedar City and Highway 89 and Boulder-Grover Road, have been discussed. No formal action has been taken.

2. Wilderness

The Utah Wilderness Act of 1984 set aside 83,000 acres on the forest which possess outstanding natural characteristics. The purpose of this plan is to prescribe a method of management which will protect wilderness ecosystems while allowing limited human use. A primary concern is the human impact on popular sites. The act designated three wilderness areas. These are: Pine Valley Mountain (50,000 acres), Ashdown Gorge (7,000 acres), and Box-Death Hollow (26,000 acres).

TABLE II-10
CURRENT CAPACITY FOR WILDERNESS RECREATION
DIXIE NATIONAL FOREST

| AREA | TOTAL | RVD/ACRE CONVERSION FACTOR | MRVD CAPACITY |
|---|---|---|---|
| Pine Valley Mountains | 50,000 | .32 | 16.0 |
| Ashdown Gorge | 7,000 | .32 | 2.2 |
| Box-Death Hollow | 26,000 | .32 | 8.3 |
| TOTAL | 83,000 | | 26.5 |

Trails within the wilderness areas are in need of repair or they are non-existent.

TABLE II-11
PROJECTED DEMAND FOR WILDERNESS
AND BACK COUNTRY RECREATION

| YEAR | MRVD |
|---|---|
| 1986-1990 | 8.0 |
| 1991-2000 | 10.3 |
| 2001-2010 | 17.6 |
| 2011-2020 | 28.7 |
| 2021-2030 | 46.8 |

Based on the above calculations, the supply of wilderness will not meet the demand during the foreseeable future. However, the calculations are based on past use of primitive areas on the forest as projected to the year 2030. A majority of the projected use will likely remain in unroaded back country areas of the forest.

3. Fish and Wildlife

More than 350 species of wildlife and fish inhabit the Dixie National Forest for all or a portion of their life cycle. Consumptive and non consumptive uses of many of these species are an important part of recreation on the Dixie National Forest.

Primitive areas on the Forest as projected to the year 2030 a majority of the projected use will likely remain in unroaded back country areas of the Forest.

TABLE II-12
MANAGEMENT INDICATOR SPECIES
FOR THE
DIXIE NATIONAL FOREST

| SPECIES | VEGETATION TYPE(S) |
|---|---|
| Mule Deer a/ | Grass-forb, sagebrush, mountain brush pinyon-juniper, sapling-mature aspen, sapling mature conifer |
| Rocky Mountain Elk a/ | Grass-forb, sapling-mature aspen, sapling-old growth conifer |
| Wild Turkey | Mountain brush, pole-mature aspen, mature-old growth conifer |
| Goshawk | Riparian tree, mature aspen, mature-old growth conifer |
| Common Flicker | Mature aspen, mature conifer |
| Yellowbreasted Chat | Riparian shrub-tree |

TABLE II-12 CONT'

| SPECIES | VEGETATION TYPE(S) |
|---|---|
| Bonneville Cutthroat Trout | Pristine headwater streams |
| Resident Trout; a/ Rainbow, Brook, Brown, Cutthroat | Streams, rivers, lakes, reservoirs |
| Macroinvertebrates | Streams, river, lakes, reservoirs |

a/ High demand species.

a. Management Indicator Species*

The National Forest Management Act (NFMA) requires Forests to select a group of representative wildlife and fish species. By monitoring their populations and habitat relationships, we can use the effects of Forest Service management activities on all the fish and wildlife of the Forest. On the Dixie, we have selected a group of 12 of these Management Indicator Species (MIS) (Table II-12).

Mule Deer. Mule deer are the most abundant big game species on and adjacent to the Forest. Deer populations have been low in southern Utah for approximately 10 years, but are now recovering strongly. It is estimated that with the current rate of deer population growth, and continuing current programs, the Utah Division of Wildlife Resources (UDWR) population objective of 53,500 deer summering on the Forest can be met by the year 2000. As shown in Table II-12, mule deer can be found in every habitat type on the Forest. Mule deer have value as a management indicator species because the distribution of forage and cover and other habitat factors required to maintain healthy populations of this species will also ensure provision of the habitat requirements for many other species. One of the most important annual social events in the state of Utah is the opening weekend of the deer hunt.

Rocky Mountain Elk. Elk were selected as a Management Indicator species and for many of the same reasons as mule deer were selected because of the amount of public interest (both positive and negative) in them and for many of the same reasons as mule deer were selected. There are three separate major elk herds established on the Forest. There is also some "drift" of elk, on occasion, to other areas of the Forest.

- Boulder Mountain. This herd is currently estimated to contain about 600 animals. The herd was established in 1977-78 with a 2-year transplant program of 159 elk. The Forest Service and the UDWR are presently preparing an Elk Herd Management Plan for Boulder Mountain and the Forest Service has come up with a tentative population objective of 1,000 elk for Boulder Mountain.

- Mount Dutton. This herd was established with transplants in the 1930's. The herd currently contains approximately 600 animals. There are some distribution problems with this herd, in that there is a moderate amount of habitat available on the west side of Mount Dutton that the elk are only

partially using, while some areas on the east side of the mountain are some times overused. The Forest Service estimate is that a 700 head elk herd will be maximum for this unit.

- Panguitch Lake. This herd became established through immigration from other herds. It currently has around 100 animals. The Forest Service estimate is that a herd of 300 head might be able to be established on this unit.

- Cedar Mountain. A relatively small area (about 8 percent) of this herd unit is on the National Forest. Although this small herd has been established for about 20 years, evidence of elk use on the Forest is very limited. Few, if any, elk from this unit have ever been harvested on the Forest.

- Pine Valley Mountains. Elk and elk sign are occasionally observed on the east slopes of the Pine Valley Mountains. They probably drift there from the Cedar Mountain herd.

- Paunsaugant. A small herd of elk are occasionally observed on the Paunsaugant area. They probably drift there from the Mt. Dutton herd.

These figures indicate that there are approximately 1,400 elk using the Forest at the present time. The tentative UDWR population objective; taken from the Region 4 Wildlife and Fish Assessment Data Base (August 1981) is 2,900 elk by 1990. Firm population objectives will be developed in the near future (1985 or early 1986) when the three Elk Herd Unit Management Plans are completed. The UDWR population goal may be met by increases in elk populations on adjacent state, private and BLM lands, however, the Forest has no control over this.

*Denote terms found in the glossary.

Wild Turkey. Turkey have been transplanted on all Districts, with good populations existing until about 1973. Since that time, populations have declined, apparently being limited by periodic severe winters. The UDWR feels that in order to maintain a viable population, periodic transplants may be necessary. The most recent transplant was of 80 birds to the Pine Valley Mountains in February, 1983. The Forest's current turkey population is estimated at 230 birds. The UDWR population objective for the Forest is 500 birds. Turkeys were selected as an MIS because of their requirement for relatively undisturbed habitat containing old growth ponderosa pine. Even though the population is currently quite small, there is considerable public interest in the species.

Goshawk. Goshawks will serve as a Management Indicator for old growth conifer and aspen. They typically nest in large diameter trees in dense conifer stands or in stands of tall (40-60') aspen. UDWR does not have a population objective for this species. Data concerning population trends for goshawks on the Dixie is lacking, but review of past and current management activities in relation to goshawk habitat requirements indicates a stable population.

Common Flicker. The common flicker is a primary cavity nester and will act as a Management Indicator of adequate habitat for other cavity nesting and snag using wildlife. The UDWR has no population objective for this species. As with the goshawk, it is estimated that the population trend for flickers is stable.

TABLE II-13
CURRENT, MINIMUM VIABLE AND MAXIMUM POTENTIAL POPULATION
AND ACREAGE ESTIMATES FOR MIS
DIXIE NATIONAL FOREST

| Species | Indicator Habitat | Minimum Viable Population | Acres required for Minimum Viable Pop. | Existing Population | Acres Existing Habitat | Maximum Potential Population | Acres Potential Habitat | Habitat at 2030 |
|---|---|---|---|---|---|---|---|---|
| Mule Deer | All | 2,000 | 120,000 | 31,500 | 1,883,770 | 56,000 | 1,883,770 | 1,883,770 |
| Rocky Mountain Elk | Aspen, Mixed couifer | 360 | 230,676 | 1,200-1,300 | 800,960 | 3,000 | 1,019,346 | 910,000 |
| Wild Turkey | Aspen, Ponderosa Pine | 150 | 256,000 | 230 | 640,000 | 500 * | 973,000 | 640,000 |
| Goshawk | Mature timber | 40 pairs | 192,000 | 68 pairs | 326,400 | 93 pairs | 446,400 | 326,400 |
| Common Flicker | Standing Dead | 9,325 pairs | 373,000 | 11,900 pairs | 476,000 | 23,310 pairs | 932,400 | 668,000 |
| Yellowbreasted Chat | Riparian | 726 pairs | 5,900 | 1,210 pairs | 9,800 | 1,815 pairs | 14,666 | 9,800 |
| Bonneville Cutthroat trout | Streams | 4,000 fish | 7 | 4,000 fish | 7 | 2.5 MM fish | 2,500 | |
| Resident Trout | Lakes, Reservoirs above 10,000 Feet | 8 lbs. per ac. | 3,100 | 20 lbs per ac 1/ | 31,000 | 20 lbs/ac. | 5,000 | |
| | Lakes below 10,000 Feet | 40 lbs per ac. | | 100 lbs per ac 1/ | | 100 lbs/ac. | | |
| | Reservoirs below 10,000 Ft. | 20 lbs per ac. | | 50 lbs per ac 1/ | | 50 lbs/ac. | | |
| | Streams in sedimentary materials | 32 lbs per ac | 255 | 80 lbs per ac | 250 | | 400 | |
| | Streams in Volcanic Materials | 24 lbs per ac. | | 60 lbs per ac | | 120 lbs/ac | | |
| | Streams in granitic Materials | 16 lbs per ac. | | 40 lbs per ac | | 80 lbs/ac | | |
| Macroinvertebrates | Streams | BCI = 70 | | | | BCI = 100 | | |

1/ Except lakes with known winter kill problems.

* DWR population goal. There is habitat for higher populations.

Yellowbreasted Chat. Chats prefer brushy riparian ecosystem. They will serve as a Management Indicator Species for riparian areas. The UDWR has no population objective for this species. The small amount of data available indicates a stable population trend (over the short term) for this species.

Aquatic Habitat Indicators. Because of the variety of aquatic habitats on the Forest, a combination of Indicator Species will be used. The native Bonneville cutthroat trout will be the MIS in those streams which contain native or transplanted populations. Rainbow, brown, brook, or cutthroat trout will be used in most streams and lakes on the Forest. The most common species in a particular water body will be the MIS in that area. If fish population data is not available for a particular water body, the macroinvertebrate biotic condition index (BCI)* will be used to assess fish habitat capability.

The Current, Minimum Viable* and Maximum Potential Population* levels of the various MIS have been estimated and are displayed in Table II-13. Minimum viable populations are estimated assuming adequate distribution of the animals so that reproduction can occur.

b. Diversity*

The Dixie National Forest is an inherently diverse area. Elevations range from 2,800 to above 11,000 feet. The Forest borders the Mohave Desert on the west (near St. George). Less than 25 miles away, at the top of the Pine Valley Mountains, you enter a subalpine coniferous forest. Similar habitat diversity occurs throughout the Forest. Much diversity is provided by the various vegetation types occurring on the Forest, and the successional stages of these types. Table II-14 displays the approximate acres within the vegetation types, and is further broken down by the existing and estimated optimum percent of each type within each successional stage. This table shows that several of the vegetation types on the Forest are dominated by advanced successional stages. Manipulation of these types to more closely approach the estimated optimum (Table II-14) mix of successional stages could increase production while improving diversity.

Manipulation to improve diversity and enhance wildlife habitat must be planned and conducted very carefully to maintain maximum habitat effectiveness. High densities of open roads do more to negatively impact wildlife habitat effectiveness than anything else. Research indicates that road densities of one mile per square mile of habitat reduce habitat effectiveness for elk to 74% and for deer to 93%, while two miles of open road per square mile reduce elk habitat effectiveness to 60% and deer habitat effectiveness to 84%. Four miles of road decrease elk habitat effectiveness to 40% and deer habitat effectiveness to 50%. The negative effects of roading on most other wildlife are similar to those discussed for deer and elk, except they are not so well documented.

c. Vegetation Types

The dominant vegetation types on the Forest are discussed in terms of quantity and quality as they relate to specific habitats for the MIS. Total acres in each type and approximate percent in each successional stage is shown in Table II-14.

Aspen. This type is potentially one of the most productive for forage on the Forest. Of 183 species of Forest dwelling birds and mammals, 164 of them (89.6%) use the aspen type. Much of the aspen on the Forest is in a mature to decadent condition with little regeneration evident. A significant amount of aspen is also being lost to conifer invasion. Small clearcuts, burning, and/or herbicide treatment would improve the aspen age distribution and improve wildlife habitat within the type. Management indicator species making heavy use of aspen are: mule deer, elk, wild turkey, goshawk, and common Flicker.

Mountain Brush. Increased diversity in this productive type could be achieved through various methods of vegetative manipulation. Although community composition would not change significantly, a mosiac of different aged stands would result in improved vertical and horizontal diversity and forage production. Management indicators for this type are: mule deer and wild turkey.

Spruce-fir. This vegetation type is dominated by contiguous areas of mature uneven aged stands characterized by a sparse understory. Diversity could be improved by coordinating wildlife needs with timber harvest to create well distributed, irregular shaped openings and some open stands with brushy understory vegetation. The MIS most closely associated with this type are elk and goshawk.

Mixed Conifer. Opportunity exists to increase diversity in this type because of high productivity and the abundant tree and understory species present. The type is currently composed of a high proportion of older age classes with little regeneration. Treatment to benefit wildlife would be similar to that applied in the spruce-fir. Management indicators most closely associated with this vegetation type are elk and goshawk.

Pinyon-Juniper. Approximately 50,000 acres of this type has been manipulated by chaining and seeding over the last 20-25 years. These chainings provide diversity and much needed forage, especially in the spring for big-game species. Only a few thousand acres of pinyon-juniper remain where chaining would be feasible, although manipulation by burning could be done on several thousand more acres. Mule deer make more use of this type than any other MIS.

Sagebrush. Chaining, burning, and spraying projects have been conducted on several thousand acres of sagebrush range on the Forest. The situation here is similar to the pinyon-juniper treatment providing diversity and forage for big-game animals. Mule deer make more use of this type than any MIS.

Ponderosa Pine. The pine type is our most productive timber growing area. Wildlife habitat diversity could be improved by harvesting timber using methods sensitive to the requirements of wildlife. Wild turkeys are more closely associated with this type (especially old growth) than any other MIS.

Strict guidelines for the protection of turkey habitat will be required in this type (see IV).

Riparian Areas. These may occur as a relatively narrow (by definition; 200 feet wide) strip along streams or as small patches around seeps or springs or along the shoreline of lakes or ponds. Riparian areas in good condition are

naturally diverse; artificial manipulation is not likely to improve upon good condition riparian or wet meadow areas. Many of the riparian areas on the Forest are not, however, in good condition. Manipulation in the form of replanting with native growth (willows, carex, etc.) and protection from livestock would help many of the poor condition areas recover. These areas attract many species of wildlife. Wildlife species diversity in good condition riparian areas is probably greater than in any other habitat. The yellow-breasted chat is the Forest's management indicator for the riparian type. This large wood warbler prefers riparian ecosystems with relatively dense tangles of willows or other shrubby species.

TABLE II-14
DIXIE NATIONAL FOREST SUMMARY OF PERCENT OF LAND AREA
IN EACH SUCCESSIONAL STAGE OF EACH MAJOR VEGETATIVE TYPE

| Vegetation Type | Range Type | Acres | Successional Stages 1/ Existing Early | Existing Mid | Existing Mature | Existing Old Growth | Desirable 2/ Early | Desirable 2/ Mid | Desirable 2/ Mature | Desirable 2/ Old Growth |
|---|---|---|---|---|---|---|---|---|---|---|
| Grass-Forb | 1,2d, 2w,3 | 157.851 | 25 | 45 | 30 | 0 | 10 | 45 | 45 | 0 |
| Sagebrush | 4 | 221,662 | 10 | 15 | 75 | 0 | 10 | 15 | 65 | 10 |
| Mountain Brush | 5 | 136,254 | 1 | 0 | 99 | 0 | 20 | 20 | 50 | 10 |
| Pinyon-Juniper | 9 | 442,406 | 5 | 5 | 45 | 45 | 30 | 25 | 35 | 10 |
| Aspen | 10 | 105,792 | 5 | 5 | 45 | 45 | 30 | 25 | 35 | 10 |
| Ponderosa Pine | 6 | 209,672 | 25 | 30 | 35 | 30 | 40 | 25 | 25 | 10 |
| Mixed Conifer | 6 | 200,246 | 10 | 10 | 40 | 40 | 40 | 25 | 25 | 10 |
| Spruce-Fir | 6 | 111,751 | 5 | 5 | 40 | 50 | 40 | 30 | 25 | 10 |
| Riparian | | 19,000 | | | | | | | | |

1/ Timber inventory data on the Forest does not include sufficient information to derive estimates on successional stages. Information displayed here is based on field observation.

2/ Early through mature successional stages required for mule deer and elk. Mature and old growth stages constitute important habitat components for other MIS.

## 1. Aquatic Habitat

The Dixie National Forest provides habitat for trout in over 3,100 acres of lakes and reservoirs and 330 miles of streams. The average habitat condition for fishery streams on the Forest is estimated to be 65 percent of optimum. Stream habitat is presently degraded in some areas by lack of streamside cover, high sediment loads, poor bank stability, and lack of pools. The average fish production for lakes and reservoirs on the Forest is estimated to be 70 percent of potential. Fish production in Forest lakes is presently limited by winter kills, fluctuating water levels, excessive aquatic vegetation, low nutrient levels, and competition from nongame fish.

Habitat condition in a number of lakes and reservoirs on the Forest is declining due to accelerated eutrophication.* Of particular concern is the declining quality of two of the Forest's largest lakes. Panguitch Lake is the Forest's largest and presently its most productive lake. Continued deterioration of water quality could reduce fishing quality in the near future. Navajo Lake, the Forest's second largest lake, presently experiences frequent winter kills which reduces its fish production potential.

e. Threatened, Endangered and Sensitive Species

Mammals. The Utah prairie dog (Cynomys parvidens) is a federally listed "threatened" species (recently downlisted from endangered). The species historically occurred in 9 Utah counties, with the total population exceeding 95,000 animals. Habitat modification and extermination campaigns reduced the distribution to 5 counties.

The Forest is presently cooperating with UDWR and other federal agencies in an effort to re-establish sufficient populations of prairie dogs on public land so that the species can be delisted*. The Forest has designated 11 transplant sites for prairie dogs. Some of these sites are currently occupied; the others are historic prairie dog towns. No critical or essential habitat has been formally designated for the Utah prairie dog.

Birds. The bald eagle (Haliaeetus leucocephalus) is federally classified as "endangered" and occurs on the Forest during the winter months. Bald eagles are commonly seen in winter along many of the lower elevation streams on the Forest where suitable roost trees are available. Essential habitat has not been identified on the Forest.

The peregrine falcon (Falco peregrinus) may occur on the Forest in the spring and summer. Peregrines breed at Zion National Park and at Bryce Canyon National Park. Peregrines are almost certainly hunting on the Forest. Some could be nesting on the Forest.

Fish. The Bonneville cutthroat trout (Salmo clarki utah) has been classified by Region 4 of the Forest Service as a "sensitive" species. The species occurs as a genetically pure strain in three streams on the Forest at present. The UDWR is planning to use these populations to provide transplant stock for other suitable habitat areas on and around the Forest.

Plants. Table II-15 lists plants found on the Dixie which are federally classified. Only one species; Astragalus perianus is officially listed by the U.S. Fish and Wildlife Service (USFWS) as threatened. This species is found in the vicinity of Mount Dutton at elevations around 10,000 feet. It is associated with mixed grass-forb and spruce-fir communities and grows in very shallow, rocky soils.

TABLE II-15
THREATENED AND SENSITIVE PLANT
SPECIES ON THE DIXIE NATIONAL FOREST

| Scientific Name | Common Name | Family | Threat-ened | R-4 Sensi-tive | * UNPS Recog-nized |
|---|---|---|---|---|---|
| Astragulus barnebyi | Barneby milkvetch | Fabaceae | | X | |
| Astragalus lentiginosus var.ursinus | Bear Valley milk-vetch | Fabaceae | | X | |
| Astragalus limnocharis | Navajo Lake milk vetch | Fabaceae | | X | |
| Astragalus perianus | Rydberg milkvetch | Fabaceae | X | | |
| Castilleja aquariensis | Aquarius paintbrush | Scrophulariaceae | | X | X |
| Castilleja parvula var. parvula | Tushar paintbrush | Scrophulariaceae | | X | X |
| Castilleja parvula var. | Reveal paintbrush | Scrophulariacae | | X | |
| Cryptantha ochroleuca | Yellow-white catseye | Boraginaceae | | X | X |
| Cymopterus minimus | Cedar Breaks Bis-cuitroot | Apiaceae | | X | |
| Erigeron proselyticus | Cliff daisy | Asteraceae | | X | X |
| Eriogonum aretioides | Widtsoe buckwheat | Polygonaceae | | X | X |
| Gilia caespitosa | Rabbit Valley gilia | Polemoniaceae | | X | |
| Heterotheca jonesii | Jones golden aster | Asteraceae | | X | |
| Lepidium montanum var. neeseae | Neese peppergrass | Brassicaceae | | X | X |
| Festuca dasyclada | Sedge fescue | Poaceae | | | X |
| Penstemon bracteatus | Red canyon beard-tongue | Scrophulariaceae | | X | X |
| Haplopappus zionis | beardtongue | Asteraceae | | | X |
| Penstemon parvus | Small Beardtongue | Scrophulariaceae | | X | |
| Psoralea pariensis | Paria breadroot | Fabaceae | | X | |
| Silene petersonii var.minor | Red Canyon catchfly | Caryophyllaceae | | X | |
| Astragalus henri-montanensis | Dana Milkvetch | Fabaceae | | | X |
| Hymenoxys helenioides | | Asteraceae | | | X |
| Silene petersonii var. petersonii | Plateau catchfly | Caryophyllaceae | | | X |
| Sphaeromeria capitata | | Asteraceae | | | X |

*Utah Native Plant Society

f. Wildlife Outputs (Demand)

Table II-16 displays the current and projected outputs in Wildlife and Fish User Days* (WFUDS), assuming continuation of current programs. The wildlife resource is primarily a recreation type output. The demand for wildlife related recreation has increased in line with other types of Forest recreation, and is expected to continue this increase throughout the planning period. Under the Current Program, however, availability of terrestrial wildlife

(primarily consumptive use) may only be able to meet increasing demand up to a certain point. Beyond that, decreased hunt success and quality of the experience may cause a leveling off of the terrestrial WFUD outputs as hunters choose to go elsewhere, where success is better.

Demand for fishing on the Forest is expected to increase as the area's population increases. Overall dispersed recreation demand, which includes fishing, is expected to increase by 570 percent by the end of the planning period. During this same time period fish production on the Forest is expected to decrease due to continued degradation of lake habitat.

TABLE II-16
WILDLIFE AND FISH USER DAYS (WFUDS),
CURRENT AND PROJECTED, ASSUMING CONTINUATION OF CURRENT PROGRAMS

| Year or Decade | Terrestrial WFUDS Consumptive & Nonconsumptive | Aquatic WFUD's | Total WFUD's |
|---|---|---|---|
| 1983 | 97,418 | 48,350 | 145,768 |
| 1984 | 107,932 | 48,400 | 156,332 |
| 1985 | 109,000 | 48,450 | 157,450 |
| 1990 | 122,319 | 48,760 | 171,074 |
| 2000 | 130,579 | 52,066 | 182,645 |
| 2010 | 130,579 | 51,240 | 181,819 |
| 2020 | 130,579 | 49,587 | 180,166 |
| 2030 | 130,579 | 47,934 | 178,513 |

g. Wildlife and Fish Habitat Improvement and Maintenance

Table II-17 shows the acres of habitat and number of structures that have been improved, constructed and maintained during the last 5 years. Accomplishments vary greatly from year to year, depending on funding available (PM, O&M, KV, etc.) each year. Lack of maintenance accomplishments from 1979 through 1981 is probably more a result of incomplete reporting than maintenance work not actually being done.

h. Wildlife Transplants and Reintroductions

A number of wildlife species have been established (or reestablished) on the Dixie by transplants or reintroductions. Rocky Mountain elk and wild turkeys are the best examples. Mule deer have transplanted in some areas to supplement low existing populations. The forest's pronghorn population on Parker Mountain is the result of an extremely successful transplant in 1964-1965, and that population is now the source for pronghorn transplant stock to other areas.

From time to time during the Planning Horizon, the opportunity to conduct transplants or reintroductions of certain fish or wildlife species may occur. Some interest has been shown in the possible introduction (or reintroduction) of desert bighorn sheep in the Box-Death Hollow, the Canaan Mountain, and the Pine Valley Mountain areas. These proposals, when submitted through formal channels will be acted upon on a case-by-case basis as per FSM 2640 and other appropriate sections of the Forest Service Manual.

TABLE II-17
WILDLIFE AND FISH HABITAT IMPROVEMENT
AND MAINTENANCE, FY 1979 THRU FY 1984

| Year | Terrestrial Acres | Terrestrial Structures | Aquatic Acres | Aquatic Structures | Maintenance Acres | Maintenance Structures |
|---|---|---|---|---|---|---|
| 1979 | 781 | 113 | 100 | 10 | | |
| 1980 | 466 | 131 | 125 | | | |
| 1981 | 833 | 23 | 22 | 17 | | |
| 1982 | 268 | 7 | 7 | 15 | 60 | 18 |
| 1983 | 542 | 17 | 5 | 25 | 410 | 25 |
| 1984 | 770 | 10 | 0 | 20 | 100 | 16 |

4. Range

There are 104 grazing allotments on the Dixie National Forest; 81 cattle and 23 sheep allotments. Approximately 20,000 head of cattle and their calves and 25,000 head of sheep and their lambs are permitted on the Forest. Table II-18 displays additional range management statistics.

TABLE II-18
RANGE MANAGEMENT STATISTICS, 1983
FOR THE DIXIE NATIONAL FOREST

| | |
|---|---|
| Total Forest Acres | 1,883,500 |
| Suitable Range Acres in Allotments | 685,793 |
| Suitable Range Acres Outside Allotments | 0 |
| Good Condition Range Acres | 262,090 |
| Fair Condition Range Acres | 312,992 |
| Poor Condition Range Acres | 110,722 |
| Total Allotments | 104 |
| Cattle Allotments | 81 |
| Sheep Allotments | 23 |
| Permitted Cattle | 20,000 + Calves |
| AUM's* | 97,000 |
| Permitted Sheep | 25,000 + Lambs |
| AUM's | 18,000 |
| Total Grazing Capacity (AUM's) | 115,000 |
| Actual Grazing Use (5 year average) | 112,000 |
| Wildhorse Population (partly on BLM) | 40-60 Head |
| AUM's | 350 |
| Recreation Use (Horses) | |
| AUM's | 500 |

The Forest has only a portion of the livestock grazing that occurred during the late 1800's and the early 1900's. Severe overgrazing took place in many areas during that time. In the 1940's a program of livestock reductions, range reseeding and allotment management planning was begun.

Only a few downward adjustments in livestock numbers and/or season of use have been made in the last ten years. In many cases, reductions have been avoided by accomplishing revegetation projects, developing additional water and/or modifying grazing systems.

To date, approximately 142,000 acres of depleted rangeland on the Forest have been reseeded. For the most part, these seedings have been very successful and provide a large proportion of the forage consumed by livestock and big game on the Forest. Several hundred miles of fence have been constructed on the Forest boundary and within allotments to control livestock distribution. Hundreds of water developments have been constructed by the Forest Service to provide water to livestock and wildlife in dry areas.

As of 1984, all of the 104 allotments on the Forest have an approved Allotment Management Plan. All of these plans are currently implemented. Range Analysis has been completed on all allotments. Table II-19 summarizes the Forest's range analysis data.

TABLE II-19
RANGE ANALYSIS DATA SUMMARY
DIXIE NATIONAL FOREST

| Condition Class | Acres | % of Total |
|---|---|---|
| Good | 262,090 | 38% |
| Fair | 312,992 | 46% |
| Poor | 110,711 | 16% |

Suitable Acres by Trend

| Trend | Acres | % of Total |
|---|---|---|
| Up | 423,703 | 61% |
| Down | 0 | - |
| Stable | 262,090 | 39% |

Suitable Acres by Vegetation Types

| Vegetation Type | Acres | % of Total |
|---|---|---|
| Grassland | 129,205 | 19 |
| Wet Meadow | 4,781 | 1 |
| Dry Meadow | 10,820 | 2 |
| Perennial Forb | 568 | 1 |
| Sagebrush | 181,589 | 25 |
| Browse | 67,263 | 10 |
| Conifer | 126,649 | 18 |
| Pinion-Juniper | 70,377 | 10 |
| Deciduous Trees | 94,541 | 14 |

In addition to domestic livestock grazing, a wild horse herd of 40-60 animals grazed on the Forest for part of the year northwest of Enterprise, Utah. The herd moves between Forest Service and BLM administered lands, and a joint FS/BLM management plan has been prepared for the herd.

Noxious weed control on the Forest is directed primarily at Scotch thistle (Onopordum acanthium) which has invaded southwestern Utah in the last few years. In addition, musk thistle (Carduus nutans) and Canada thistle (Cirsium arvense) are also moving into the area.

The Forest management goal is to keep the range resource in an upward trend when it is in less than good condition, and in a static trend when it is in good condition. Maintaining this goal will result in continued improvement of the Forest's range resource. This does not mean that more AUMs will be produced, but that plant composition, ground cover, etc., will be improved. Livestock numbers, seasons of use and distribution will remain approximately the same throughout the planning period.

Demand Analysis. In terms of 1982 dollars the value of an AUM of grazing on the Dixie National Forest is $8.06. Fees that National Forest permittees pay has ranged from $1.35 to $2.50 per AUM over the last few years.

At the present fee levels charged for livestock grazing, the supply is fully utilized. It is not anticipated that this situation will change during the planning period. There are thousands of head of additional cattle and sheep on ranches adjacent to the Forest that ranchers would be willing to graze on the Forest if the opportunity were available.

Table II-20 displays the AUM outputs for the planning period, assuming continuation of current programs. For comparison purposes, the table also displays the Regional (RPA 1980) objective for the Forest and the maximum AUMs that could be produced with no constraints on range management methods and techniques.

TABLE II-20
ANIMAL UNIT MONTH (AUM) OUTPUTS UNDER CURRENT PROGRAM
RPA 1980 FOREST OBJECTIVES AND UNCONSTRAINED RANGE MANAGEMENT
(All outputs in M AUMS)

| | 1985 | 1990 | 2000 | 2010 | 2020 | 2030 |
|---|---|---|---|---|---|---|
| Current Program | 115 | 115 | 115 | 115 | 115 | 115 |
| RPA 1980 Objective | 116 | 119 | 121 | 121 | 122 | 123 |
| Unconstrained | 115 | 119 | 124 | 130 | 136 | 142 |

Feasibility Analysis. The grazing capacity has essentially been determined on the lands classified as suitable for livestock grazing on the Forest under present climatic conditions and in coordination with the other existing land uses. Therefore, if livestock use is to be increased significantly it would have to be done through practices such as:

a. Climatic alteration - increasing precipitation on the arid rangelands.

b. Introduction of new forage species that will greatly out produce the species currently growing on the suitable rangeland.

c. Conversion of commercial timber producing lands to forage producing lands and making them suitable for grazing by developing water, etc.

d. Developing an economical means of converting steep mountain brush types, currently classified as unsuitable for livestock grazing, to suitable forage producing rangelands.

e. Changing classes of livestock from cattle to sheep on some of the allotments. (This proposal would be unacceptable to many of the present cattle permittees.)

Since none of these practices are considered feasible or cost efficient at this time, the present and projected livestock grazing capacity for the Forest will need to remain as it is until there is a technical "breakthrough" in one or more of these areas.

5. Timber

a. Land Suitability

Some 331,200 acres have been classified as available and tentatively suitable for timber production on the Dixie National Forest (Table II-21). This figure was determined in accordance with regulations in 36 CFR 219.14 by the following procedure:

- Total net acres of the Dixie National Forest were classified as water acres and land acres.

- Land area was classed as either forest land (at least 16 percent currently stocked by trees or formerly stocked) or non-forest land.

- The initial regulations in 36 CFR 219.14 required that lands failing to meet the minimum biological growth standard of 20 cubic feet per acre per year set forth in the Draft Regional Plan be classified as unsuitable for timber production. This requirement was later dropped, and instead, these lands are now to be analyzed for their productive capability.

Some of the lands in question can produce marketable industrial products, but most cannot. These lands generally support unmarketable species or trees having poor form or have substantial areas of surface rock and rock cliffs. The value of products that could be sold is low, and the cost of management would be high.

The shortage of time to judge growth response and obvious lack of potential economic productivity for most of these lands suggest that they should now be classified as unsuitable.

In lieu of immediate analysis, the Forest will gather information about the suitability of these low producing sites (less than 20 cubic feet of wood per acre per year) during the next scheduled Forest-wide timber resource inventory. After inventory data have been collected, land suitability will be analyzed in accord with 36 CFR 219.14. If the difference between the existing Forest Plan and the new analysis is significant, the Forest Plan may be revised in accordance with 36 CFR 219.1 (g).

- Lands determined to be productive were judged for their availability for timber production. Not available lands are those potentially productive forest lands legislatively or administratively withdrawn from timber production. This classification includes wilderness, research natural areas, and administrative sites.

Certain productive timber lands are classified as not available on the Dixie National Forest. With the passage of the Utah Wilderness Act of 1984, some productive timber lands have become unavailable and appropriate acreage adjustments have been made.

TABLE II-21
LANDS AVAILABLE AND TENTATIVELY
SUITABLE FOR TIMBER PRODUCTION
DIXIE NATIONAL FOREST

Land Classification

| Classification | M Acres |
|---|---|
| 1. Non-Forest land (includes water) | 1204.9 |
| 2. Forest land | 678.8 |
| 3. Forest land withdrawn from timber production-(not available) | 28.5 |
| 4. Forest land not capable of producing crops of industrial wood | 236.6 |
| 5. Forest land physically unsuitable: | 82.5 |
| irreversible damage likely to occur; | |
| not restockable within 5 years | 0 |
| 6. Forest land - inadequate information 1/ | 0 |
| 7. Tentatively suitable forest land (item 2 minus items 3, 4, 5, and 6) | 331.2 |

TABLE II-21 CONT'

| Classification | M Acres |
|---|---|
| 8. Forest land not appropriate for timber production 2/ (display acres by management emphasis) | 31.1 |
| 9. Unsuitable forest land (Item 3, 4, 5, 6, and 8 | 378.7 |
| 10. Total suitable forest land (Item 2 minus item 9) | 300.1 |
| 11. Total national forest land (items 1 and 2) | 1883.7 |

1/ Lands for which current information is inadequate to project responses to timber management.

2/ Lands identified as not appropriate for timber production due to: (a) assignment to other resource uses to meet Forest plan objectives; (b) management requirements; and (c) not being cost efficient in meeting Forest plan objectives over the planning horizon.

TABLE II-22
VEGETATION MANAGEMENT PRACTICES
(ANNUAL AVERAGE IN FIRST DECADE FOR SUITABLE LANDS)

| Practice | Acres |
|---|---|
| Regeneration harvest: | |
| Clearcut | 578 |
| Shelterwood and seed tree | |
| - Preparatory cut | 0 |
| - Seed cut | 514 |
| - Removal cut | 4433 |
| Selection | 75 |
| Intermediate harvest: | |
| Commercial thinning | 4850 |
| Salvage/sanitation | 75 |
| Timber stand improvement | 5000 |
| Reforestation 1/ | 1588 |

1/ Includes natural and artificial.

TABLE II-23
TIMBER PRODUCTIVITY CLASSIFICATION

| Potential Growth (cubic feet/acre/year | Suitable Lands (acres) | Unsuitable Lands (acres) |
|---|---|---|
| Less than 20 | 0 | 241,667 |
| 20-49 | 89,424 | 64,193 |
| 50-84 | 241,776 | 67,140 |
| 85-119 | 0 | 0 |
| 120-164 | 0 | 0 |
| 165-224 | 0 | 0 |
| 225+ | 0 | 0 |

TABLE II-24
ALLOWABLE SALE QUANTITY AND TIMBER SALE PROGRAM QUANTITY 1/
(ANNUAL AVERAGE FOR FIRST DECADE)

| Harvest Method | Allowable Sale Quantity 2/ Sawtimber (MM CF) | Allowable Sale Quantity 2/ Other Products (MM CF) |
|---|---|---|
| generation harvest: | | |
| Clearcut | 0.68 | 0 |
| Shelterwood and seed tree | | |
| - Preparatory cut | 0 | 0 |
| - Seed cut | 0.25 | 0 |
| - Removal cut | 1.59 | 0 |
| Selection | 0.03 | 0 |
| ntermediate harvest: | | |
| Commercial thinning | 2.38 | 0.2 |
| Salvage/sanitation | 0.03 | 0 |
| | 4.96 | 0.2 |

| | Additional Sales 3/ Sawtimber (MM CF) | Additional Sales 3/ Other Products (MM CF) |
|---|---|---|
| Total for all harvest methods | 0 | 1.87 |

Allowable sale quantity 5.16 (MMCF) 25.7 (MMBF) 4/
Timber sale program quantity 5/ 7.03 (MMCF) 32.2 (MMBF) 4/

1/ Expressed to the nearest .1 MM board and cubic feet.
2/ Includes only chargeable volumes from suitable lands.
3/ Includes only nonchargeable volumes from suitable and/or unsuitable lands.
4/ Based on local unit of measure.
5/ Total of allowable sale quantity and additional sales.

FIGURE II-1
DISPLAY OF LONG-TERM SUSTAINED YIELD AND ALLOWABLE SALE QUANTITY

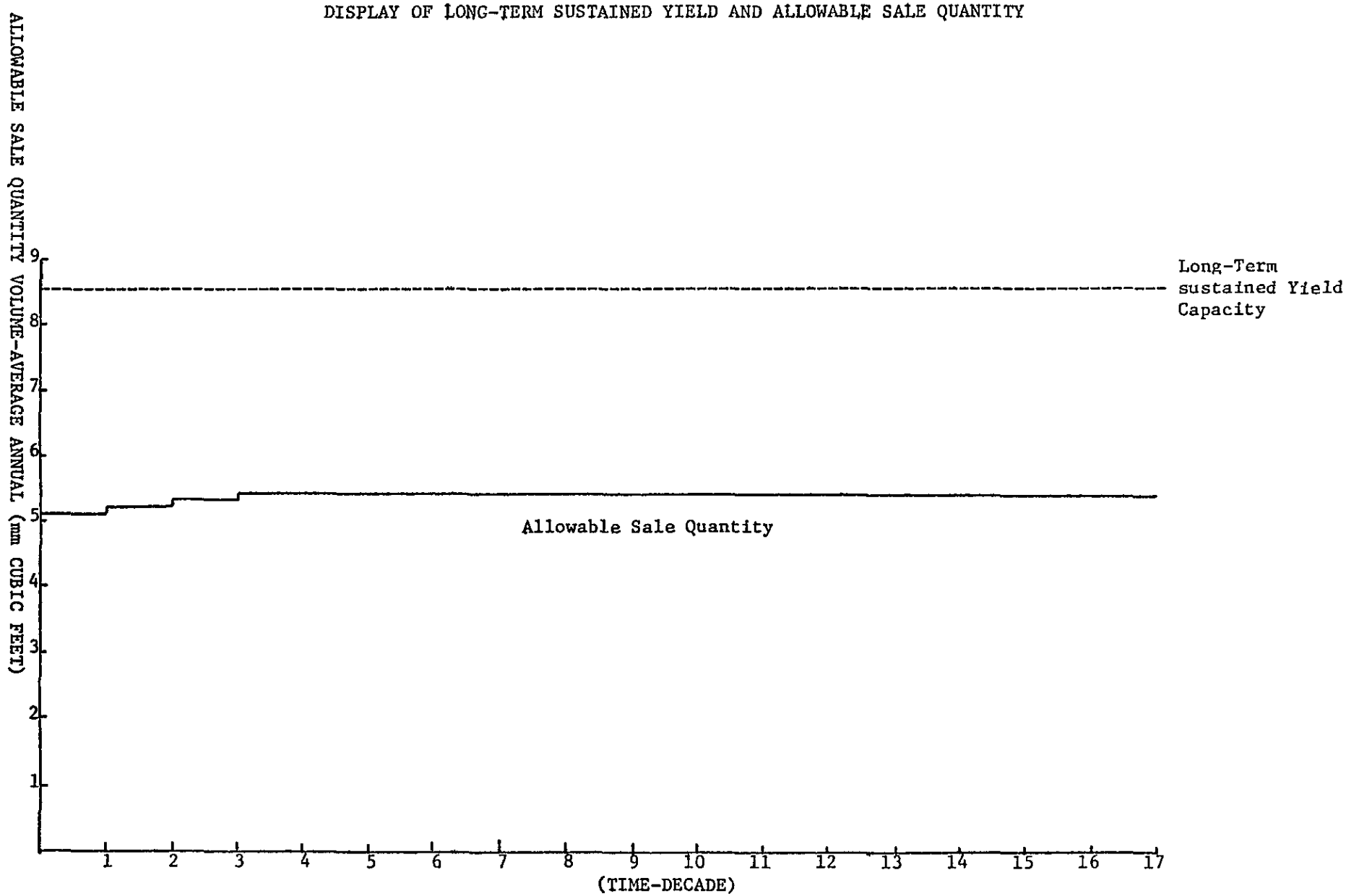


TABLE II-25
PRESENT AND FUTURE FOREST CONDITIONS

| | UNIT OF MEASURE | SUITABLE LAND | UNSUITABLE LAND |
|---|---|---|---|
| Present forest: | MMCF | 316.7 | 357.1 1/ |
| Growing stock | MMBF | 1425.1 | 1607.0 |
| Live cull | MMCF | 9.9 | 11.1 |
| | MMBF | 99.8 | 112.5 |
| Salvable dead | MMCF | No Data | No Data |
| | MMBF | | |
| Annual net growth | MMCF | 3.5 | No Data |
| | MMBF | 17.3 | |
| Annual Mortality | MMCF | 2.5 | 2.8 |
| | MMBF | 14.2 | 16.0 |
| Future forest: (2030) | | | |
| Growing stock | MMCF | 275.4 | |
| Annual net growth | MMCF | 3.5 | |
| Rotation age | Years | 110 2/ to 140 | |

| Age class distribution acres (suitable lands) | Age Class | Present Forest | Future Forest (2030) |
|---|---|---|---|
| | 0-20 | 6473 | 28759 |
| | 21-60 | 174 | 37366 |
| | 61-80 | 129857 | 174 |
| | 81-100 | 161410 | 0 |
| | 101+ | 2152 | 233767 |

1/ Approximation Based on Incomplete Data.

2/ Average rotation age for regenerated stands on lands with timber emphasis by major forest types.

b. Existing Situation

Description - Based on Approved 1975-85 Timber Management Plan. There are eight commercial timber species on the Forest. They are ponderosa pine, Douglas-fir, white fir, Engelmann spruce, Colorado blue spruce, subalpine fir, limber pine, and aspen.

According to the 75-85 plan, the Forest contains an approximate net board foot volume of 2,844,777 MBF*. An analysis was made of the commercial Forest land in the forest to segregate acreages and volumes into standard*, special*, marginal*, and unregulated* components which generally reflect the influences of economics and associated resource protection constraints on management of the timber resource.

The 75-85 Plan shows the following data:

| Stand Size | % of Total |
|---|---|
| Sawtimber | 83 |
| Poles | 10 |
| Seedlings/Saplings | 6 |
| Non-Stocked | 1 |
| | 100% |

Site Quality of Commercial Forest Land

| Site Class | Production C.F.*/Ac./Yr. | % Of Total |
|---|---|---|
| Excellent | 225+ | 0 |
| Good | 165 - 225 | 0 |
| Medium | 85 - 165 | 29 |
| Poor | 50 - 85 | 69 |
| Very Poor | 20 - 50 | 2 |
| | | 100% |

Area Data

| | M Acres |
|---|---|
| Net National Forest Land | 1884.5 |
| Total Forested Land | 1457.1 |
| Total Productive Forest Land | 609.6 |
| Productive Deferred | 30.9 |
| Productive Reserved | - |
| Commercial Forest | 578.7 |
| Standard | 309.4 |
| Special | 77.2 |
| Marginal | 190.3 |
| Unregulated | 1.8 |

Growth and Mortality - All Productive Forest Land

| Gross Annual Growth (MBF) | Annual Mortality (MBF) | Total Net Growth (MBF) |
|---|---|---|
| 44,395 | 10,860 | 33,535 |

Potential Annual Yield 1/

| | MBF |
|---|---|
| Standard Component | 17,175 |
| Special Component | 2,211 |
| Marginal Component | 10,040 |
| TOTAL | 29,426 |

1/ Potential annual yield. The average annual amount of commercial timber harvested for the next 10 years which is the maximum harvest that could be planned to achieve the optimum perpetual sustained yield level attainable under intensive management.

Programmed Average Annual Harvest 2/

| | MMBF |
|---|---|
| Standard Component | 18.7 |
| Special Component | 0.8 |
| Marginal Component (Dead Spruce) | 0.6 |
| Unregulated | 0.1 |
| TOTAL | 20.2 |

2/ Programmed Average Annual Harvest. That portion of the potential yield that is actually scheduled for harvest expressed as an average annual volume per year for the next ten year period.

Problem Situations Affecting Timber Harvest. A mountain pine beetle epidemic currently affects about 30,000 acres on the Forest. A harvest program is underway on the Escalante District to reduce the effects of this epidemic. A western spruce budworm outbreak affects about 45,000 acres on the Cedar City District. Other insect populations remain at endemic levels. Dwarf mistletoe in Douglas-fir is a serious disease problem and mainly affects the timber stands on the Powell District. Dwarf mistletoe and limb rust are found in ponderosa pine throughout the Forest. They are primarily in scattered pockets throughout the type. Porcupine feeding has created many unmerchantable and poor quality trees throughout the ponderosa pine type.

Until recent years, most timber harvesting occurred in the ponderosa pine type, with less volumes harvested from the mixed conifer type. Early harvests were mainly selection and sanitation-salvage harvests with little emphasis on regeneration. Large areas of spruce-fir remain uncut with heavy volumes of old growth. Seedlings, saplings, and poletimber are proportionately lacking in many areas of all timber types.

Policies, Silvicultural Systems, and Cultural Treatments. Timber management policy is currently based on a broad classification of land use classes (LUC); Standard,* Special,* and Marginal* as described in the 75-85 Timber Plan.

Commercial Forest Land (CFL) must have potential to produce 20 cubic feet per acre per year. If growth potential is lower, land is classed as non-commercial.

Timber is currently managed intensively in the Standard LUC to the extent that management practices are compatible with other resource values. Management objectives in the Special LUC relate to values other than timber production (e.g., visual quality, etc.).

Timber harvest is constrained in the Special LUC for visual quality or other stated objectives. Timber harvest has been limited in the Marginal LUC because of inaccessibility (excessive development costs), slopes too steep for tractor logging, excessive regeneration costs, or inability to regenerate the area within five years of harvest. Nearly all harvested timber has been from the Standard LUC. Limited cable logging has occurred on Escalante and Teasdale Ranger Districts during 1983 and 1984. Insignificant sanitation and salvage harvesting may be done on unsuitable land to counter insect and disease buildups and impacts.

Prescriptions for stand treatment on the Forest have been based on the species and the particular area involved. The principles of even-aged and uneven-aged management are being followed therefore, harvest cutting ranges from clearcutting through shelterwood to the selection system. Some intermediate cutting is desirable to improve stand condition, utilize timber which may be lost through mortality and to make economic sale offerings. The application of modified cutting practices has been necessary in some areas to meet management objectives for the specific area.

Reforestation is a continuing practice where final timber harvest has taken place. Historically, plantation survival for all species has averaged about 50 percent. Seedling survival has increased during the last few years by using better site preparation, planting techniques, use of containerized seedlings and plantation protection.

Precommercial thinning is also a standard recurring practice, mostly in ponderosa pine. Many thinned areas have not responded well. In the absence of a small roundwood market, areas thinned before 1980 may need a second precommercial entry to produce sawtimber size trees within 80 - 100 years. Recent thinning applications using wider tree spacing have shown improved gains in diameter growth including these in the Engelmann spruce type.

All timber harvest and cultural treatments applied will be consistent with the silvicultural prescription for each stand. Prescriptions will be consistent with the environmental assessment for each timber sale or project and follow standards and guidelines set forth in the Forest Plan (chapter IV) and Regional Guide (3-13 to 25). These tiering documents contain direction to manage the Forest toward the desired future condition.

Past Production. Following is a table of recent 10 years' production from the Forest:

TABLE II-26
TIMBER PRODUCTION FROM THE FOREST

| YEAR (FY) | SAWTIMBER (MBF) | ASPEN CORDWOOD (MBF) 1/ | POSTS & POSTS MBF | FUELWOOD COMMERCIAL | (CORDS) PERSONAL USE 3/ |
|---|---|---|---|---|---|
| 1975 | 17,401 | 83 | 79 | 1,361 | NA |
| 1976 | 14,384 | 541 | 103 | 709 | 8,351 |
| 1977 | 21,826 | 1,147 | 126 | 1,545 | 29,182 |
| 1978 | 20,255 | 90 | 223 | 665 | 22,965 |
| 1979 | 17,722 | 40 | 86 | 1,004 | 32,637 |
| 1980 | 21,604 | 373 | 157 | 1,057 | 32,061 |
| 1981 | 18,389 | 207 | 303 | 1,066 | 28,348 |
| 1982 | 9,845 | 35 | 338 | 827 | 36,360 |
| 1983 | 12,227 | 0 | 231 | 461 | 17,018 |
| 1984 | 24,765 | 0 | 209 | 472 | 13,596 |
| TOTAL | 177,878 | 2,516 | 1,855 | 9,167 | 220,518 |
| AVERAGE | 17,788 | 252 | 185 | 917 | 24,502 |

1/ The cordwood production of the Forest has been primarily aspen used for excelsior. The demand for this product is now less than in earlier years.

2/ NA - information not available.

3/ These figures reflect permitted removal. Actual removal may be substantially less.

Other ownerships and other National Forests contribute only minor insignificant volumes to local mills.

Adjacent Landowners. There are minimal conflicts with adjoining land and timber production on the Forest.

c. Current Management Direction

The current timber management direction is expressed in the 1975-1985 Timber Management Plan. Management direction is also further defined in the various planning unit Land Use Plans. Briefly stated, current timber management direction is to:

-Obtain optimum use of the timber resources.
-Offer for sale the full potential yield of the standard and special components.
-Assure timber harvesting is compatible with all other resource values.
-Reforest nonstocked areas and increase stocking on understocked areas.
-Improve the quality and/or growth rate of immature timber stands through timber stand improvement work.

d. Future Conditions if Current Direction is Continued

Long range objectives for timber management in the 75-85 Plan include achieving a balance in the distribution of age classes. However, if curent direction is continued, this balance would not be reached until the year 2216, for ponderosa pine and mixed species in the Standard Component and the year 2056 for aspen in the Standard Component.

The following tabulation shows information from the 75-85 Plan on six class distribution within all the Commercial Forest Land acres:

TABLE II-27

| Size Class | Year 1975 | Year 2030 |
|---|---|---|
| Seedlings/Saplings | 6% | 14% |
| Poles | 10% | 29% |
| Sawtimber | 83% | 57% |
| Non-Stocked | 1% | - |
| TOTAL | 100% | 100% |

At the year 2030, under current management direction, many acres of Commercial Forest Land would remain unharvested - including essentially all of the marginal component.

The following is the likely flow of timber outputs to the year 2030 if current direction (from the 75-85 Timber Plan) is continued:

TABLE II-28

| FY | Average Annual Offerings (MMBF) |
|---|---|
| 1981 | 33.1 |
| 1982 | 28.8 |
| 1983 | 25.8 |
| 1984 | 25.4 |
| 1985 | 24.3 |
| 1986 - 1990 | 23.0 |
| 1991 - 2000 | 20.2 |
| 2001 - 2010 | 20.2 |
| 2011 - 2020 | 20.2 |
| 2021 - 2030 | 20.2 |

(Note: Offerings through 1990 reflects accelerated sale efforts to control mountain pine beetle in ponderosa pine)

e. Demand Analysis

Discussion. All of the sawtimber from the Dixie National Forest is purchased and manufactured locally. The local communities Panguitch, Escalante, and a few smaller communities depend largely on forest products for their economic

base. Over the past several years, the Forest has offered a steady supply of products to provide for economic and social stability in these dependent communities. Market areas served by local manufacturers include Southwestern markets and areas as for east as Pennsylvania. Receipts from timber sales returned to the counties have aided in programs such as schools and roads.

The present slump in the building industry nationally has resulted in a temporary decline in timber demand. Selling values (wholesale) for manufactures wood products from the mills are down, and labor and fuel costs are increasing.

Long-term growth of population and the economy in the regional marketing area should sustain an increased demand for Dixie National Forest sawtimber. Within reasonably expected out put levels, there will be a demand for Dixie National Forest sawtimber in excess of the supply.

The Forest does not have a roundwood market for paper production. Aspen is being sold periodically by the cord for the manufacture of excelsior. This limited demand is expected to fluctuate and possibly decline. Aspen has been harvested on a very limited basis by Kaibab Industries and a couple of smaller mills as sawtimber. The current demand for aspen is significantly below the potential yield. An opportunity exists for the utilization of aspen and conifer roundwood for flakeboard, waferboard or similar products.

There is a demand from local rancher and residences for some posts, poles, rough-sawn corral boards, and cabin logs. The demand for posts, poles, and corral boards has been fairly constant over the past several years. The demand for cabin logs is increasing with the development of summer home areas in and around the Forest.

The demand for fuelwood increased substantially in 1977. This was probably due to the sharp increase in fuel oil and electric rates. The impact of this demand was felt the hardest by the Cedar City and Pine Valley Districts. The demand centers are from Cedar City and St. George, Utah and Las Vegas, Nevada. There are a substantial number of people who travel from southern California to the Forest for a recreation experience and return home with a load of fuelwood. Figures for 1981 show a decrease in demand for personal use permits.

No significant differences are foreseen between Regional and Forest demand trends.

Consideration of the Cumulative Effects of National Forest Timber Sale Levels of the Proposed Action

Communities in the Dixie National Forest Primary Zone of Influence are dependent to varying degrees on the contribution of timber industry to their economics. This is especially true in Panguitch and Escalante, Utah and several small communities in Wayne County, Utah. The Dixie National Forest is the primary source of raw materials supplied the timber industry in these areas. Negligible amounts of timber are supplied from private lands. Small amounts of timber are supplied to industry in the Dixie Zone of Influence from the Fishlake National Forest and 10-12 MMBF in small logs are transferred annually from Kaibab Industries mill in Fredonia, Arizonia (mainly from the Kaibab National Forest) to Kaibab's mill in Panguitch, Utah.

The stability of local communities dependent on the timber resource in the Dixie Zone of Influence from the latter part of the first decade through the fourth decade of the planning horizon will largely depend upon overall market prices for timber and the ability of local industry to adopt to changing products from the Dixie National Forest, including smaller material and increasing amounts of aspen. The cumulative effects of timber supplies from surrounding National Forests and private lands on local industries should provide for a stable supply of timber from these sources. Contributions from private lands will probably remain negligible while planned harvest levels on the Fishlake National Forest (as of this writing) will remain close to historical levels (3 MMBF/year) in the first decade and could increase to 9 MMBF of softwood sawtimber in the second decade of the planning horizon. This could reduce dependence on aspen from the Dixie National Forest. The Fishlake National Forest also has a significant inventory of aspen volume. Any increased contribution to timber industry in the Dixie Zone of Influence from the Fishlake National Forest will depend on market prices sufficiently high enough to offset higher hauling costs. Log transfers by Kaibab Industry should not be affected as much by harvest levels on the Kaibab National Forest as by prices commanded for timber products that will effect the economics of log transfer.

Estimated Mill Capacity. Two major purchasers of sawtimber on the Forest are Kaibab Industries and Allied Forest Products. Several other small purchasers operate on the Forest on a part-time basis. Local sawmills depend completely on National Forest land for their sawlogs. The current maximum annual capacity is estimated to be:

| | |
|---|---|
| Kaibab Industries | 30 MMBF |
| Allied Forest Products | 20 MMBF |
| Small Purchasers | 5 MMBF |
| TOTAL | 55 MMBF log scale |

Currently, local sawmills are operating well below their maximum capacity.

6. Water

a. Water Quantity

Water from the Dixie National Forest represents one of the moxt valuable commodities in southwestern Utah. A significant portion of the water yield in this "water-poor" region of the state is produced in the high elevation areas of the Forest. However, the total water yield is low compared to other Forests in the region, amounting to an annual average of 481,000 acre-feet or about 3 inches per acre. Average water yields over 12 acre inches occur on only four percent of the Forest. The Dixie National Forest is near equally divided between the Colorado River Basin and the Great Basin in both area and water production. Approximately 224,000 acre-feet of water yield occurs in the Colorado River Basin.

b. Water Quality

The quality of waters on the Dixie National Forest is an important management concern. Past water quality monitoring has not indicated any significant degradation of water quality due to management activities. However, many stream originating on the Forest have naturally high sediment concentrations by the time they reach the Forest boundary. This is especially true for those streams flowing through areas with highly erosive soils and outcrops of certain sedimentary rock strata. Most of the sediment load is delivered to the channel during flash flood events. These conditions, combined with often highly erratic flow regimes, limit the aquatic community development of many stream reaches. Most water quality monitoring has occurred in the higher value waters where potential for significant degradation from management activities exits. Although these reaches generally meet State water quality standards, there is still concern that sediment producing activities may degrade them below their biological potentials. Road construction, timber harvest and grazing in riparian areas all tend to increase the sediment loading to streams and lakes. Mitigating measures are employed in resource development activities to ensure that this degradation does not reach unacceptable levels. Best management practices identified in this plan and in individual project plans are implemented in land management projects to control sedimentation to the extent feasible. These practices should allow all streams on the National Forest to meet the requirements of the State of Utah anti-degradation policy. An exception to the general rule of no significant human-caused water degradation exists at Panguitch Lake. This heavily used recreational resource is experiencing an accelerated eutrophication* rate which may ultimately cause series impairments of its fisheries and aesthetic values. A cooperative program is now underway to reduce the nutrient input.

The Forest Service will carefully manage the grazing and timber management programs in this drainage with an emphasis on preventing and controlling erosion. Specific measures will be developed on a case by case basis.

c. Special Conditions and Situations

Hazard areas with potential to degrade water quality on the Forest are associated with erosional concerns. These hazards are described in the Soils Section of this Chapter. An additional hazard occurs in the East Fork of the Sevier River. Unstable streambanks in this drainage have resulted in excessive sedimentation and loss of fisheries values. This stream is sensitive to factors that promote further destablization.

d. Flood Prone Areas

Intense thunderstorms occurring from July through September account for most of the summer precipitation in southern Utah. These summer storms can produce severe flash flooding in numerous dry washes, alluvial fans, and many perennial streams across the Forest. Few drainage bottoms on the Forest are immune to this type of flooding. Some of the larger streams which originate in the higher elevations of the Forest (e.g. Santa Clara River, Panguitch Creek, Mammoth creek, and the East Fork of the Sevier River) are subject to more extensive and prolonged flooding during the spring snow melt period. The primary flood hazard areas for this type of flooding are off-Forest in the communities and agricultural lands along the streams.

e. Water Storage and Transmission Facilities

Most of the water yield occurs during the spring and early summer months when the winter snowpack melts. Snow melt usually commences before the irrigation season and stream flows are much reduced by late summer. Consequently, those drainages with storage facilities are capable of providing a more constant and reliable supply of water. The water resources of the Forest have been extensively developed through the construction of numerous storage facilities, diversion structures, and ditches. There are approximately 70 reservoirs on the Forest. Most of the streams on the Forest either have diversions or impoundments above the Forest boundary. None of the exisiting facilities are perceived as detrimental to the management of the Forest for multiple use purposes. There are currently at least two water transmission facilities with associated erosion problems needing correction. Some of the impounding structures on the Forest currently have structural deficiencies requiring correction to meet Federal or State safety standards.

f. Water Uses - Consumptive

Most of the consumptive water use occurs off-Forest. The primary uses are for irrigation and culinary water supply in the alluvial valleys below the forested lands. Presently, the amount used for mining and industrial operations is minor. This situation may change in the future if the considerable energy reserves of southern Utah are developed. Eleven communities in southern Utah obtain at least part of their municipal culinary water supply from spring sources within the Forest boundary. Municipal supply watersheds have been designated for seven of these eleven community systems. They are Brian Head, Enterprise, Escalante, Panguitch, Parowan, St. George, and Teasdale. Management emphasis in these areas is for protection of water quality at culinary sources. Federal consumptive uses on the Forest are minor in quantity, but very important to the management of the Forest. Domestic use at administrative sites and in campgrounds, and livestock and wildlife watering are the primary consumptive uses.

g. Water Uses - Non-Consumptive

Instream flow represents an important non-consumptive use of water for National Forest. Instream flow needs include maintenance of fisheries, riparian ecosystems, recreational uses and stream channel integrity. These instream uses generally do not conflict with other uses of the water since most consumptive uses occurs off-Forest. However, in recent years there has been considerable interest in diverting small streams on the Forest for small-scale hydropower projects. Although non-consumptive, this use often presents serious conflicts with the management of other resources dependent upon the availability of surface waters. The Forest has initiated a program to identify instream flow needs for multiple use purposes. This program has been completed on approximately 30 percent of the streams on the Forest. When environmentally compatible with management objectives for an area, new permits to divert surplus water above identified instream flow needs may be issued. In all cases, the weighing of net public benefits of diversion of storage projects versus instream flow values plays an important role in the decision making process.

h. Riparian Areas

Riparian areas are recognized as unique, high value, hydrologic-biotic components of the Forest resource base. They are quite limited in a real extent on the Dixie National Forest. Riparian areas account for only one percent of the total Forest land base. Management activities within these areas must comply with Executive Order 11990 on Protection of Wetlands. The condition of some riparian areas is currently below potential due primarily to overuse by permitted livestock. This situation represents some degree of difficulty to rectify; however, over the long term, conditions of the riparian areas should progressively improve.

i. Demand

In southern Utah, the demand for water currently exceeds the existing supply. No slackening in future demand is foreseen. However, the mix of water uses will probably range with agriculture use becoming less with more water going to municipal, industrial, and minerals development uses. Any increase in water yield from the Forest, now or in the future, would undoubtedly be utilized by the surrounding or downstream water uses. However, the opportunities to increase water yield are limited. The primary means to improve water yield on the Forest include vegetative manipulation and cloud seeding. Vegetative manipulation opportunities include emphasis on clearcut harvest in aspen and patch/strip clearcut in spruce-fir and mixed conifer stands. These activities could be carried out on a maximum of 61,625 acres of timberland to augment water yield by approximately 4,000 acre-feet per year. This amounts to a 0.8 percent increase over current levels. A cooperative cloud-seeding program of the State of Utah and several local governments has been carried out in recent years in the mountains of southwest Utah. Preliminary results indicate a positive response to the cloud-seeding effort.

There is also very limited opportunity to meet significant demands for non-consumptive water uses such as hydroelectric power generation. Most of the economically justifiable reservoir sites have already been utilized. The remaining unimproved streams on the Forest are mostly quite small. It would be difficult to economically develop these streams for hydropower purposes without having serious impacts on other multiple use values.

7. Minerals and Energy

Minerals information relating to the current situation is discussed in detail in the AMS. Additional discussion is contained in the other chapters of the plan. Here we have included a very brief summary of the AMS and related information to describe the current condition of the Forest as it relates to minerals management. Minerals exploration and development activities are directly related to the interest generated by industry. Management of this resource is responsive to these public interests along with industry interest in coordination with various other public agencies and resources.

Satisfying demand for locatable minerals is the responsibility of the mining industry. Public domain land is available for mineral exploration and development under all applicable laws and regulations. Saleable minerals are the only type of mineral commodity for which the Forest Service can directly

affect the supply by selling common variety mineral materials to individuals and private industry. The Forest Service also uses some common varieties for In-Service use.

a. Acres Available, Capable, Suitable

Availability. In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), the Forest Service must consider that all National Forest System lands are available for mineral exploration and development unless they are withdrawn from mineral entry and leasing.

Valid existing leases can still be developed in the three Dixie National Forest Wildernesses, but establishment of new leases is prohibited. The Utah Wilderness Act of 1984 provided for excluded portions of the Box-Death Hollow Wilderness to be leased, explored and developed for carbon dioxide known to underlie the area.

Existing withdrawals will be reviewed for continuation, modification or revocation prior to 1991, as directed by FLPMA. The review schedule may be found in the Appendix of the Forest Plan.

In summary, 1,781,779 acres are presently available for mineral leasing and 1,773,319 acres are available for mining entry. This is 95 percent and 94 percent of the Forest, respectively.

Capability. The determination of capability is largely a function of private sector interest and pursuit. The Forest is recognized as an attractive resource, in its entirety, for mineral and energy potential. However, the dynamics of economical and technological factors limit the development of predictions beyond blanket-level recognition of this resource potential.

Suitability. All lands not withdrawn from mineral entry and lyasins on the Forest are considered suitable for exploration and development of minerals.

Land management planning encourages or discourages minerals/energy activity by imposing restrictions on access to public lands. These restrictions are expressed through stipulations to mitigate potential adverse effects to other resources. These range from total withdrawal from leasing, through No Surface Occupancy lease stipulations, special lease restrictions, down to the most permissive case which contains standard stipulations.

Development of oil and gas and other minerals, may be further restricted by limitations placed on permits to drill and approved operating plans. Such restrictions can be imposed to protect wildlife, soil, steep slopes, water quality, cultural resources, visual resources and other environmental factor.

Another consideration relating to suitability of mining are the provisions of the Surface Mining Control and Reclamation Act (SMCRA). This Act provides for the application of Department of Interior criteria to determine suitability of certain National Forest coal lands for surface mining. The criteria were applied to 39,980 acres of coal lands on Dixie National Forest determined to have high or medium coal development potential or be under existing preference right lease applications (6). The results were ten acres classified as suitable/available for coal strip mining; and, the rest of the studied area can

be considered available for coal leasing where surface operations and impacts are considered incident to an underground coal mine. Any leasing of potential coal lands outside of the study area will require subscription of the standard USDI criteria prior to leasing.

A special management situation was created under authority of 522 (c) and (d) of SMCRA by a Secretary of the Interior decision December 16, 1980. Effective that date, certain lands adjacent to Bryce Canyon National Park were declared unsuitable for all types of surface coal mining operations. This includes some land on the Dixie National Forest. The decision classifies 27,781 acres of National Forest land adjacent to the Park as being unsuitable for surface coal mining, including surface impacts incidental to underground mining which would be visible from the Park. Another 7,782 acres of National Forest land northwest of the Park were classified by the same decision as unsuitable only for mining by surface methods.

b. Current Management Direction and Situation

General Direction. The current management direction is to integrate the exploration and development of mineral and energy resources within the National Forest System with the use and protection of other resource values. Accordingly, mineral resources are treated as a resource on the Dixie National Forest. A basic difference, however, is that, contrary to other resources, mineral development is initiated and carried forth by private interest.

Minerals being considered a non-renewable resource, is treated with special consideration for rehabilitation of disturbed areas. Regional Direction concerning minerals can be found in the Appendix of the Forest Plan.

All minerals owned by the United States available for exploration and development are subject to disposal under one of these three categories -- locatables, leasables or salables.

For locatable minerals, any person proposing to conduct operations that might significantly disturb a surface resource must file a Notice of Intent with the District Ranger.

Permits, licenses, or leases for Leasable Minerals (i.e. oil, gas, coal, geothermal on all Federal lands and hardrock minerals on acquired lands) are issued by the Department of Interior. The Forest has opportunity to perform environmental analysis, recommend action, list stipulations, and propose requirements for rehabilitation. For all minerals on acquired lands, the Forest Service has authority to consent to or deny permits, licenses, and leases. For oil and gas proposals on public domain lands, the Forest Service has the authority to make recommendations to the USDI which has the ultimate responsibility for a decision on leasing.

Saleable Minerals are managed by the Forest Service. Permits are issued for use of these materials in accordance with Forest Service policy, and are kept on file at the Supervisor's Office.

Current Situation

Locatables. Approximately 5000 claims exist on the Forest. Assessment work is kept up on many of these, but, there is only minor exploration and development of locatable mineral resources at this time. Because of a depressed market there is little production. An operating plan to remove 20,000 tons per year was received for an open pit gypsum mine on the north side of Boulder Mountain, and mining began in 1984. A gold strip mine is being developed on private land within the Forest near New Harmony, with 22 lode and placer claims being located on adjacent National Forest lands. A road-use permit to cross National Forest lands provides access to the operation. The Forest Service, State of Utah, local communities and miners are cooperating to ensure orderly development occurs, and a comprehensive plan reflecting the concerns of these interests will be prepared should the operation expand to National Forest land. A Notice of Intent to Operate has been received for work on silver claims in the Leeds area. Throughout the Forest other claims have been located for uranium, limestone, iron, silicasand, building stone, and jasper; however, there has been no recent activity outside of annual assessment work.

Leasables. The Dixie National Forest has been rated for potential development of oil and gas, coal, and geothermal resources. Data used to determine geologic potential was furnished by industry, the Department of the Interior, and the Forest Service. The potential for oil and gas ranges from low on the west side of the Pine Valley District to high on all of the Escalante and Teasdale Districts.

About 800 oil and gas leases exist on 75 percent of the Forest. Annually, 100 to 200 new applications for oil and gas leases are processed, between 10 to 30 geophysical prospecting permits are issued, and one or two wildcat exploration wells are drilled. Currently, the rate of geophysical prospecting is low, but drilling wildcat wells and leasing has been increasing. Increased use of improved seismograph techniques and equipment throughout the Forest during recent years has yielded better quality data than was obtained in the past. This improved data stimulated extensive drilling in southern Utah along the Overthrust (overthrust belt passes through the Forest) in the Hingeline, in the Kaiparowits Region, and along key faults and anticlines. Many of the dry wells drilled showed oil present, but not in economically attractive quantities or quality. Exploration recently was conducted at a high rate between Antimony and the Tropic Reservoir area for oil and gas.

The Forest has a producing oil field at Upper Valley. This field, developed in 1964, currently has 23 oil wells which produce in excess of 1300 barrels of oil per day. About 21 million barrels were produced through the end of 1985. This field also have nine injection wells and one temporary shut-in well. Two more oils wells will be drilled in the oil field in 1985. The field has been stimulated, by using recovery-enhancing polymers. The oil field operator

worked cooperatively with the BLM and USFS in late 1983 and early 1984 to prepare a comprehensive surface protection and reclamation plan for Upper Valley Oil Field. The BLM estimates the field has about 20 years of life left.

Through the cooperation of the oil company, an abandoned oil well drilling site on the Teasdale Ranger District was converted to a developed trailhead for recreationists in 1984.

Carbon dioxide ($CO_2$) has been discovered on National Forest System land in several locations. A well drilled in the Sand Creek drainage, on the Escalante Anticline in 1983, yielded 124 million cubic feet of $CO_2$ gas per day at 100 lbs. per square inch. The operator/lessee estimated the total $CO_2$ resource in the field to be 1.3 trillion cubic feet, possibly the largest $CO_2$ field on the continent. In 1984, one additional well was drilled in Sand Creek, and it too, yielded $CO_2$. In late 1984, a third well was drilled for $CO_2$ on Antone Ridge between the Box-Death Hollow drainages. The third well said to be needed to confirm the volume of $CO_2$ in the field, and to determine whether the $CO_2$ field is economically feasible for development. If the project is feasible, then the concerned leasees will probably unitize and submit a comprehensive plan for full development of the $CO_2$ field. A market for $CO_2$ may exist in either $CO_2$ enhanced oil recovery in depleting oil wells, and/or in coal-liquified $CO_2$ slurry pipelines. There is a possibility $CO_2$ from the Escalante Anticline area could be used for enhanced oil recovery, in other areas of the country and in the transportation of coal from Kaiparowits and Alton coal fields.

Coal resources extend onto the Forest in four fields. Much of the coal is covered by more than 3000 feet of overburden, making it unavailable. In addition, much of it is of a quantity or quality that makes it uneconomical for industrial development. Commercial opportunities on the Forest exist in the Alton and Kaiparowits fields, where the quality of the coal is generally very good. Interest in coal development has been restricted by lack of market and isolation of the resource. ON the Forest there is one existing 40-acre coal lease and 3 old coal mines, but no mining has taken place since the 1960's. The Forest has six preference right coal lease applications (PRLAs) pending on the Escalante District. These involve approximately 20,000 acres of National Forest land. During 1983, a study was completed which employed the Department of Interior's coal unsuitability criteria for the hgh and medium potential coal lands (technical data was furnished by USDI) to determine which National Forest lands can be made available for surface coal mining. The results of that study can be found in the Appendix of this Plan. Upon completion of the Coal Unsuitability Study, two environmental assessments were prepared by the Forest for the six preference right coal lease applications. There were in the draft stages when the BLM stopped all work on an EIS being prepared for all Preference Right coal lease - application areas in Utah. The EIS preparation was suspended because the 1984 Appropriations Act prohibits leasing activity in a Wilderness Study Area and one of the areas involved was a WSA. The PRLAs on National Forest lands are not encumbered by WSA status.

There have been a variety of proposals to develop the two billion ton Alton field and 15 billion ton Kaiparowits field. These proposals have stimulated considerable controversy due to their close proximity to Bryce Canyon National Park.

Development of coal is in a dormant stage now. However, large companies (primarily) have leased much of the commercially developable coal on Federal, State and private lands. Since removing large volumes by truck from the Kaiparowits-Alton fields is impractical, the coal when mined will have to be transported by rail or pipeline. When development occurs, it is unlikely the coal will be utilized in the immediate area of the coal fields because of the extremely sensitive scenic and air quality values.

In the event USDI conducts a regional competitive lease coal sale in the area, it is possible industry may express interest in bidding on coal resources which were not included in the Forest's Coal Unsuitability Study. If this occurs, the USDI criteria will need to be applied to the unstudied area before the coal can be leased.

The potential for geothermal resources exist on the west side of the Forest. Thirty-six applications for lease were received on the Cedar City District, and eight on the Pine Valley District. All were withdrawn just prior to completion of Forest Service environmental assessments. A competitive-bid lease area (Known Geothermal Resource Area) exists at Navajo Lake, because applicants inadvertently overlapped to create a competitive bid situation. Geothermal interest on the Forest has dropped because of the current economic condition. Exploration and development continue in the Escalante Desert north of the Pine Valley District, where the potential for discovery is greater and where there are existing surface expressions of a geothermal resource. A moderate temperature geothermal - heated greenhouse industry has developed at Newcastle, adjacent to the Pine Valley Ranger District. The Forest is the recharge area for desert warm water aquifers.

c. Common Variety Mineral Materials

Common variety mineral materials are made available throughout the Forest by commercial sales and free use. Many common varieties are used for Forest Service projects. The west side of the forest has several good deposits of cinders which have been utilized extensively. Sand and gravel have been developed in numerous areas on all Ranger Districts.

Some of the pits are under special use permit and the use is exclusive to the permittee. Other pits are of a community type. Depending on the case, charge type or free-type permits are issued upon request. An operating plan is issued with each permit. The Pine Valley and Cedar City Districts have prepared comprehensive management plans for each community pit. In 1984 the Powell District completed a comprehensive management plan for common varieties covering the entire District. Surface protection and reclamation practices are on-going at all areas.

A seven-year history (1977-1983) of common variety mineral materials disposal on the Forest shows the average amount of common varieties (sand, gravel, cinders, and rock) disposed to be:

TABLE II-29

| | |
|---|---|
| Sold | 4,698 tons/year |
| Given Away Free | 60,241 tons/year |
| Used by the Forest Service | 87,233 tons/year |
| TOTAL = | 152,165 tons/year |

(The estimated value at the present on-site rate charged by the Forest Service, 152,165 X $0.30/ton = $45,650/year.)

d. Expected Future Condition

Future technology, change in economic conditions, new discoveries, and changing needs will determine to a large extent where, when, and which minerals are developed. As these things occur, special stipulations and operating procedures ae included in federal licenses, permits, leases and operating plans to coordinate with other resources as required. These stipulations and procedures may exclude surface occupancy, require special provisions, and/or may result in increased operating costs.

The policy and procedures set forth in the Interagency Agreement (IA) effective June 19, 1984, between the BLM and Forest Service covering mineral leasing, will be followed whenever a proposal is received by the Dixie National Forest. This IA will be followed in respect to the processing of authorizations, such as licenses, permits, and leases, that grant rights to federally owned minerals in the National Forest System and in adjoining lands with Federal minerals (split estate lands). A copy of the IA may be found in the Appendix to this plan.

8. Human and Community Development

The Forest is currently operating six major manpower programs which provide employment, skill training, experience, and education for a wide range of age groups interested in natural resource management. Manpower programs provide a valuable service to the Forest and at the same time fulfill a U.S. Department of Agriculture commitment to serve the unemployed, underemployed, minorities, and economically disadvantaged youth and elderly through related forestry activities. The following programs exist on the Forest:

-Youth Conservation Corp (YCC). Funding changes have necessitated a cut back in this program. Over the years it has played an active and important role.
-Senior Community Service Employment Program (Older American). The Older American Program, being very active on the Forest, employs part-time elderly persons whose incomes are within poverty level standards.
-Volunteers. Because individuals participate in this program without compensation numbers of volunteers actively participating at any one time varies substantially. Campground host duties are popular volunteer projects on the Forest.
-Comprehensive Employment and Training Act (CETA). This program has been reduced. It is doubtful the Forest will be able to host the enrollees of the various titles of the Act.

-College Work Study (Coop. Ed.). This cooperative program is one which the Forest has supported within the limits of its funding capacity.
-Student Volunteer Program - With Southern Utah State College nearby, the Forest has an excellent opportunity to use students, especially in the Business Management area.

All participants benefit from the manpower programs. The enrollee receives income and training or employment opportunities that are not otherwise available.

b. Demand Trends

The outlook for manpower and youth training programs on the Forest is not encouraging. Many of the programs and Federally funded, with monies coming from other Federal agencies.

## E. SUPPORT ELEMENTS

### 1. Lands

Landownership and Land Uses

Ownership. The Dixie National Forest has a gross acreage of 1,967,187 with 1,883,734 acres of National Forest administered lands and 83,453 acres in other ownership. The major portion of the Forest was reserved from public domain when the Forest was established. Land status factors affecting acreage are 31,754 acres of exchange, 68 acres of donation, 10,724 acres transferred from other agencies, and 1,191 acres reserved and acquired for riparian purposes.

Classification. Special classifications of land often restrict resource uses and may effect objectives for land acquisition or disposal. The following tables indicate these lands which are withdrawn, classified or designated for a special purpose:

Wilderness With Subsequent Withdrawal from Mineral Entry

| | |
|---|---|
| Pine Valley | 50,000 acres |
| Ashdown Gorge | 7,000 acres |
| Box-Death Hollow | 26,000 acres |
| | 83,000 acres |

Withdrawn from Mineral Entry

| | |
|---|---|
| Administrative Sites | 3,109 acres |
| Recreation Sites | 5,351 acres |
| | 8,460 acres |

The Federal Land Policy and Management Act directed that all withdrawals be reviewed for continuation or revocation prior to 1992.

| | |
|---|---|
| F.E.R.C. (F.P.C.) Withdrawals | 500+ acres |

These lands are not being used for the purpose for which they were withdrawn, no action has been taken on them. The Forest will recommend removal from the records by revocation of the withdrawals.

Classified, Designated or Set-Aside for Special Purpose

| | |
|---|---|
| Coal and/or Mineral Reserve Areas | 285,550 acres |

Some of these special classifications apply to the same acreage, therefore acreage figures are duplicated in some instances. effects of these classifications on land adjustment activities cannot be generalized as each allows and/or restricts specific activities.

Research Natural Areas and Other Classifications. No research natural areas have been designated; however, three potential areas have been identified. These are: The timbered Cinder Cone (640 acres), Table Cliff (1,235 acres) and Red Canyon (460 acres). All streams and rivers that meet the criteria for wild and scenic rivers as discussed in (PL 90-542) are located off the Forest. They will not be evaluated in the Forest Plan. The Forest was examined for potential National Natural Landmarks and no suitable candidates were found.

Land Adjustments. The land adjustment activities on the forest consist of purchase, exchange and donation. A lack of funds for purchase limits opportunities to block Federal ownership in those areas suitable for National Forest management. The only funding for purchase on the Forest is the Land and Water Conservation Fund Act of 1964. While the Forest has had approved tracts, there has never been funds for purchase made available to the Forest. The exchange program has been the land adjustment vehicle for the Forest. While the exchange program has been in effect for years, an active program was initiated in 1975. The Asset Management Program limited the activities for a couple of years, but it is anticipated that an active program can be reestablished. The exchange program can be characterized as trading on a value basis certain lands with limited benefits to the National Forest (selected lands) for private lands (offered lands) that would better meet the needs and objectives of the Forest. In recent times this program has resulted in a small net loss in National Forest acreage as lower valued Forest lands were used in exchange for higher valued private lands, however, such results are strictly a result of the lands used. The donations received originate from landowner initiative rather than a program, and they have typically been of small acreage and low value.

Since land adjustment activities are normally conducted only with willing parties there is an inherent degree of uncertainty when forecasting changes and accomplishments. Improvements in landownership pattern are expected in the future as the land adjustment activities are carried out. A pattern of mixed ownership will prevail on the Forest with the land adjustment activities following a variety of resource needs and objectives.

Interchange is a land adjustment activity that does not involve the private sector. Interchanges involves the exchange of Federal lands between one or more Federal agencies. The objectives of such activities are similar to those outlined in the land adjustment discussion. The Forest, in the interest of

improved management, has explored this option in the past and will continue to look at opportunities to improve management by interchange activities on a local basis.

Rights-of-way activities on the Forest involve road and trail rights-of-way usually in the form of easements. While the Forest has access in many locations due either to dedicated public or acquired rights, such rights do not begin to cover all of the rights needed. There are rights-of-way needed for existing roads and trails not covered by deeded rights. This last group of needed rights-of-way consist of prescriptive rights developed by the public through past prescriptive use for roads and/or trails. These prescriptive rights perfected by the public need to be carried forward to formal rights when they will serve the needs of the public and the National Forest.

Again the right-of-way activities are normally conducted only with willing parties, therefore, there is an inherent degree of uncertainty when forecasting changes and accomplishments. The rights-of-way activities are expected to improve the public access to the Forest and assist in the utilization of the resources.

The amount of private land boundaries adjacent to and inside the Forest creates a high priority for landline location and boundary marking. This program has a significant amount of work backlogged from earlier times when a limited program was in effect. Each mile of line established usually produces some type and degree to trespass. With the more active landline program in recent times, a sizeable backlog of cases has developed and grows with the landline program. These cases generated by the landline program generally call for action under one of the following classifications trespass, title claims, or the new Small Tracts Act of 1983.

The nonrecreation special use program continues to grow at a fairly constant rate. Every effort is made to respond to applications for new permits in the shortest time possible. The program involves a considerable investment in time both in permit processing and field inspects pre and post permit. The requirement of annual fee determination and billing also represents a sizeable investment in time. A listing of permits as of fiscal 1984 and fees collected from them are shown in Table II-30.

TABLE II-30
PERMITS AS OF FY 1984 AND FEES COLLECTED

| Use | Annual Fee | Miles R/W Length | Acres Permitted Area | Number of Cases Charge | Free | Other Agency | Total |
|---|---|---|---|---|---|---|---|
| Agriculture | 69.50 | 1.7 | 611.7 | 8 | 2 | 0 | 10 |
| Community | 0 | 0 | 14.0 | 0 | 6 | 0 | 6 |
| Industrial | 2,539.40 | 0 | 48.6 | 81 | 8 | 0 | 89 |
| Public Information | 25.00 | 0 | .2 | 1 | 1 | 0 | 2 |
| Research Study and Training | 50.00 | 0 | 562.0 | 2 | 1 | 0 | 3 |
| Transportation | 419.60 | 80.5 | 492.2 | 6 | 25 | 1 | 32 |
| Utilities and Communication | 17,531.99 | 248.8 | 1,508.9 | 39 | 29 | 6 | 74 |
| Water | 2,513.00 | 133.3 | 3,149.0 | 85 | 30 | 2 | 117 |
| Total | $40,688.49 | 464.3 | 6,773.5 | 291 | 105 | 9 | 405 |

## 2. Soils

The Dixie National Forest is located primarily in the Colorado Plateau Province where topography consists of broad plateaus bounded by receding escarpments and dissected by vast canyons. The extreme southwest portion of the Forest occurs in the Basin and Range Province noted for its internal drainage characteristics and steep mountain ranges rising abruptly out of the valleys.

The complex geology of the area accounts for an intricate variety of soil types. The interbedded sedimentary rocks, including limestone, sandstone, shale, conglomerate and gypsum have been modified by faulting, folding and uplifting. The Pine Valley mountain laccolith consists of quartz monzonite porphyry. Extrusive igneous rocks consisting of latites, dacites, ignimbrites, breccia and tuffs, andesite and basalt occur over much of the area. Glacial morain and outwash are associated with the highest elevations. Landslides and landflows have altered the topography, especially below the plateau rims. Some geologic formations are especially susceptible to land movements.

Vegetation varies from desert shrub types at the lower elevations to alpine meadows at the higher elevations. Because of the combined effects of differences in geology, geomorphology, climate, vegetation, and aspect, a very complex pattern of soils has developed.

A number of special soil limitations have been identified on the Forest that affect management practices and resource uses. These include areas of low soil productivity, high erosion hazard, and geologic contact zones subject to slumping. Methods of timber harvest, road location and design must be altered to take into account those kinds of hazards.

### a. Watershed Condition

Watershed conditions have improved dramatically across the Forest since the 1940's. Prior to this time, overgrazing had seriously depleted ground cover and increased soil erosion. Large reductions in livestock numbers and implementation of modern range management techniques have allowed most of the upland areas to recover to good condition. There are, however, numerous areas on the Forest where structural measures are needed to combat accelerated erosion. These areas are usually characterized by advancing gully networks or unstable stream channel conditions. A recent watershed improvement needs inventory catalogued 725 acres of high priority watershed restoration projects needing work. There are an additional 1515 acres of smaller projects that require watershed restoration. In addition, there are 110,000 acres of poor condition range which has not yet been brought back to satisfactory condition This acreage occurs on several different allotments. Because these areas are scattered and of small size, they are not generally amenable to vegetative manipulation or land treatment. The majority will be improved naturally through improved grazing management.

### b. Soil Erosion

Several areas of extremely high soil erosion rates exist on the Forest, such as the pink cliffs (Wastach/Cedar Breaks/Claron Formations) on the plateau sideslopes and blue shales above the Paria River and Henrieville Creek. Erosion rates from these unvegetated escarpments are difficult or impossible to

significantly reduce. Other areas exist with high soil erosion hazard, but which are vegetated and can be managed for multiple resource outputs (e.g., areas with soils derived from the Claron and Carmel formation). On these areas greater restrictions are called for in timber harvest, grazing intensity, road construction, vegetation manipulation and other activities which might decrease protective ground cover.

c. Soil Productivity

Soil productivity varies considerably across the Forest with differences in elevation, precipitation, temperature, geology, vegetative cover, aspect, soil depth, texture, rock fragment content, slope, and drainage.

Generally, the lower elevation areas with pinyon-juniper vegetative cover types on steep slopes have shallow droughty soils with low productivity potential.

Sagebrush valleys and gently sloping areas of pinyon-juniper have moderately high productivity potentials. Many of these areas have been chained and seeded to increase the forage production for livestock and wildlife.

Plateau lands with ponderosa pine and mixed conifer vegetative cover types have moderately deep and deep soils with moderate to high productivity potential. Generally soils derived from basalt or andesite parent materials are the most productive timber producing soils.

Shallow droughty soils on steep slopes with south aspects derived from livestone parent materials typically have very low productivity potential for producing commercial timber. Soil erosion rates are typically high and regeneration success is poor.

High elevation plateau lands with spruce fir vegetation typically have moderately deep soils with low to moderate productivity due primarily to short growing seasons and cold temperatures. Regeneration success has generally been poor.

The extreme elevation and climate of 11,000 foot Boulder Mountain has produced soils of low productivity potential for both timber and rangeland.

d. Geologic Hazards

Geologic hazard areas identified on the Forest include potentially active fault zones and slump zones. Varying degrees of resource management implications are associated with each of these hazards.

Seismic hazard zones on the Forest have been identified and mapped. These zones extend approximately 1.25 miles from faults active in Recent or Quaternary times. These zones represent areas where there is a potential of rupture or shaking damage from earthquakes associated with fault slippage. Potential seismic hazards will be considered when designing buildings, dams, transmission facilities and other structures in these zones.

Slump zones commonly occur in broad bands along plateau slide slopes on the eastern portion of the Forest. The Wasatch-Kaiparowits contact zone is an especially important area of soil mass movement. Slump zones present special

problems for those management activities involving road construction or other earth moving activities. Road cuts and other excavations frequently will initiate large scale soil mass movements which are difficult or impossible to control. Careful attention must be given to proper road location and design in these areas to minimize the incidence of slumping and associated resource costs.

e. Soil Resource Inventory

Detailed soil information is needed to provide information to resource managers to mitigate soil and geologic hazards. At present, an uncorrelated Land Systems Inventory has been completed for the entire Forest, however, the mapping units are quite broad, therefore, the data is often inadequate for specific project planning.

Detailed soil information has been collected on approximately 800,000 acres of the Forest (Order 2 and 3 soil survey). Currently, approximately 50,000 acres are inventoried annually. Current direction is to continue the soil resource inventory at an Order 3 level on the productive forest and rangeland, and an Order 4 level on lower producing lands.

Approximately 46,200 acres of timber land were removed from the timber base in this planning period, due to the lack of adequate soil and geologic information. The Forest will determine whether or not irreversible resource damage would occur if logging were allowed on these acres. It is important to collect this inventory information prior to the next Forest Planning update, in order to accurately determine the resource potential of these areas.

3. Facilities

The Dixie National Forest has numerous facilities including roads, bridges, administrative sites, buildings, dams and water systems. They require considerable time and money for operation and maintenance. There has been large investment in these facilities to enable the development, protection, and use of forest resources.

The Forest's Transportation System, including roads, bridges, and major culverts, provide access for forest users. The system serves this function, but many miles of the Forest's road and trail systems are below the standard actually needed to support land management. All bridges and major culverts are usable, but six bridges do not meet Utah State Standards.

Most administrative sites and buildings on this Forest are old. An aggressive program of maintenance and reconstruction is required. However, under the provisions of the National Historic Preservation Act of 1966 (36 CFR 800.3), the effects of any program of maintenance and reconstruction on the existing administrative facilities must be determined for appropriate properties. Appropriate properties are those that are at least 50 years of age and/or represent a Civilian Conservation Corps construction project from the 1930's. As with any cultural resource, the property will be evaluated for eligibility to the National Register of Historic Places. Adverse effects to significant properties will be mitigated by data recovery plans.

The Forest has 28 water systems, used by both the public and Forest employees. Many of these water systems need major maintenance or reconstruction.

The Forest has responsibility for inspection of both special use and Forest-owned dams, canals and pipelines.

The trail system is described in the recreation section.

a. Transportation (Roads)

The Forest has over 2,100 miles of Forest Development Roads on inventory. This includes 527 miles of arterial roads, 615 miles of collector roads, and 984 miles of local or terminal roads. The Forest is in the process of an on-the-ground review of the roads system. There are many roads that exist and are utilized as a transportation network that are not yet inventoried.

The Forest does maintenance work on approximately 570 miles of Forest road each year. This is about one-fifth of the total road system.

The arterial system does not meet the standards necessary to support existing uses. The arterial roads were generally constructed as single lane with turnouts. Maintenance over the years has widened the travelway to a lane and a half width in most instances.

The collector road system is being increased each year by approximately four miles and an additional two miles is being reconstructed. The majority of this work is associated with the timber program. The collector system is being designed to accommodate all weather continuous use, with a single lane and turnout standard. It is anticipated that the collector system will be in place by the end of the present ten year timber harvest program. The local and terminal system is being increased yearly at the rate of approximately 20 miles. The majority of the increase is the result of the timber sale program. The normal timber sale activity creates a road network density of approximately three to four miles of road per 640 acres. These roads will be used for future activities and will remain part of the Forest Development System. Roads not needed are closed for resource protection and/or improvement. This also eliminates the need for unnecessary expenditures for road maintenance.

The Forest has 46 bridges and 9 major culverts. Forty of the bridges meet Utah State Standards. The remaining six have been signed for loading capacity and may need to be repaired or replaced.

b. Administrative Sites, Buildings, and Support Facilities

There are 66 buildings used as offices, residences, and warehouses. Most of these buildings are over forty years old. The buildings are all included under a maintenance schedule. The Forest intends to place needed new buildings on the Regional Priority Construction LIst. Smaller facilities are constructed as feasible with available funds.

The Forest's 28 water systems serve administrative sites, recreational sites, and special use areas. Many of these water systems do not comply with Utah State Standards. The water systems that do not comply with Utah State Standards are being rehabilitated as funds permit.

Thirty-nine dams on the Forest are operated under special use permit. The Forest Service inspects these dams and requires permittees to perform necessary maintenance. The Forest owns and maintains four dams.

c. Highway Corridors

The following are the federal and state highways that provide access to the Forest:

-Interstate 15 - St. George through Cedar City
-Utah State Highway 18 - St. George to Enterprise
-U.S. Highway 89 - from Orderville through Panguitch to Richfield
-Utah State Highway 143 - from Parowan through Cedar Breaks to Utah Highway 14
-Utah State Highway 56 - from Cedar City west to New Castle.
-Utah State Highway 14 - from Cedar City east to U.S. Highway 89
-Utah State Highway 20 - from I-15 east to Utah State Highway 89
-Utah State Highway 12 - from U.S. Highway 89 to Escalante.
-Forest Highway 41 - from Escalante to Teasdale
-Forest Highway 17 - from Widtsoe east to Utah State Highway 12
-Cedar Breaks-Panguitch Lake Road - FS No. 30040 - this road goes from Cedar Breaks to Panguitch

d. Utility Corridors

The following are rights-of-way on the Dixie National Forest meeting standards for corridor designation:

-The Diamond Mountain portion of Utah Power and Light Company's 138 kV transmission line from Cedar City West Substation to St. George, Utah, via Central, Utah (Pine Valley Ranger District). a/

-Garkane Power Association's 69kV transmission line, from Henrieville substation to Escalante substation. a/

-Intermountain Power Project's 500 kV dc transmission line, from New Castle to Veyo, Utah (Pine Valley Ranger District). a/

-Utah Power and LIght Company's 230 kV transmission line in South Johns Valley and Cedar Fork (Escalante Ranger District). a/

-Utah State Road 18 from Enterprise to Central Utah (Pine Valley Ranger District. a/ b/

-Utah State Road 12, from the junction of Utah State Road 63 to Escalante, Utah (Escalante Ranger District). a/ b/

a/ These transmission lines and road rights-of-way are part of and within the New Castle-Veyo and/or Johns Valley/Upper Valley Main Canyon planning window areas.

b/ State road routes are considered as portion of potential corridors or window for energy transportation facilities. These routes are not evaluated for the purpose of potential expansion or upgrading of Forest Highway system.

e. Window Areas

Six areas on National Forest land have been evaluated and designated as windows (these planning "window areas" are critical segments of terrain through which energy transportation and utility rights-of-way could pass in traversing the Forest).

These planning window areas are:

-New Castle, Utah to Veyo, Utah (Pine Valley Ranger District)
-Three Creeks (Cedar City Ranger District: two separate signments).
-Hillsdale Canyon-Ahlstrom Hollow (Powell Ranger District)
-Johns Valley and Upper Valley (Powell and Escalante Ranger Districts)
-Main Canyon to Widtsoe, Utah (Escalante Ranger District)
-Escalante, Utah to Antimony, Utah via Davis Flat Junction (Escalante Ranger District)

f. Exclusion Areas

These areas on the National Forest have been identified as Exclusion areas. (These areas have statutory prohibition to rights-of-way for linear facilities on corridor/window designations.

These exclusions areas are:

-Pine Valley Mountain Wilderness (Pine Valley Ranger District)
-Ashdown Gorge Wilderness (Cedar City Ranger District)
-Box-Death Hollow Wilderness (Escalante Ranger District)

g. Avoidance Areas

Areas have been identified on the National Forest where environmental, statutory and/or technological effects form energy transportation and utilities would be difficult or impossible to mitigate. These areas include all Dixie National Forest lands not identified in the discussion above.

4. PROTECTION

a. Fire and Fuels Management

From 1971 through 1979, the Forest averages 81 fires per year, approximately 20% of which were man-caused. The total area burned during this period was 8,917 acres.

In the June 5, 1984, Federal Register the Forest Service invited public comments on a proposed policy change to permit prescribed fires ignited by trained professionals to be used in wilderness areas. The purpose is to reduce the risk from wildfire and its consequences and to permit lightning-caused fire to more nearly play their natural ecological roles within wilderness. There are no approved Fire Management Areas on the Forest.

The Forest has completed a Level II Fire Analysis to document its most cost efficient fire management program. It considered the kind, number, location, timing, cost, and efficiency of fire management forces and activities at

alternative budget levels under current management direction. The Analysis includes forces and resources available through Inter-Agency Cooperative Agreements, as well as resources available within the Forest Service through other Forests and Regions.

The hazard of wildfire on the Forest is increased significantly by the presence of summer homes, residence areas, and real estate developments on private land adjacent to the Forest, refuse dumps located near the Forest, seismic surveys involving the use of explosives, the public use of the Forest for recreation, and activities associated with logging and thinning.

At special risk from these hazards are large areas of thinning existent on the Forest; recreation and aesthetic values, including values associated with National Parks and Monuments adjacent to the Forest; Forest capital investments, and the large number of summer homes and residences scattered on private holdings throughout the Forest.

b. Forest and Rangeland Pest Management

The principal insects and diseases affecting the the Dixie National Forest timber stands are mountain pine beetle, Douglas-fir beetle, Engelmann spruce beetle, western spruce budworm, dwarf mistletoe, and root rots. Labops, grasshoppers, and Mormon crickets are the principal insects affecting forage on the Forest. Pocket gophers and the porcupine are animals of significance affecting the timber resource.

Mountain pine beetle has caused extensive mortality in overmature, overstocked stands of ponderosa pine for several decades. Epidemic levels of the beetle, recorded since the 1950's have continued to cycle throughout the Forest, removing many of the larger diameter trees and up to 70 percent of the volume in infested stands. The most recent infestations began in the early 1970's, but accelerated in 1976 through the present. Infestations are continuing in the Cowpuncher and Grimes Creek areas of the Escalante Ranger District and are intensifying on other areas of the Escalante and Teasdale Districts. Mountain pine beetle will continue to have a significant impact in the future on overstocked and unmanaged stands of ponderosa pine.

A serious epidemic of Engelmann spruce beetle occurred on Boulder Top and part of the Aquarius Plateau in the 1920's. Another outbreak of Engelmann spruce beetle in 1948 caused severe mortality through 1963 despite control efforts. The most recent outbreak started in 1968 and was controlled in 1969 after logging 3 MMBF of infested timber. Spruce beetle populations have been at endemic levels since 1970.

Douglas-fir beetle has historically caused mortality in mature and overmature stands of Douglas-fir. The most significant outbreak occurred from 1954 to 1963, though small localized infestations have occurred since 1963. At present, beetle populations are at endemic levels.

Thousands of acres of spruce-fir have extensive mortality caused by a bark beetle/root rot complex. Significant mortality began in 1976 and has since accelerated. The causal agents appear to be a combination of root rots predisposing trees to the western balsam bark beetle. This mortality is expected to continue with progressive expansion of present root rot mortality

centers. A root rot complex of 1300 acres in the Peterson Grove on the Aquarius Plateau is presently being studied. Root rots caused by Fomes annosus and Armillaria mellea cause mortality and growth loss in localized centers, and pose a threat to regeneration on infested sites. Damage from root rots can be expected to increase steadily unless control measures are undertaken.

Western spruce budworm has caused several thousand acres of moderate to severe defoliation in the Red Creek area on the Cedar City Ranger District. Defoliation of Douglas-fir, white fir, and subalpine fir is expected to intensify over the next 4 to 5 years. About 15,000 acres were affected in 1983, expanding to 45,000 acres in 1984.

Dwarf mistletoe causes significant losses to infected stands, retarding growth and causing significant volume loss and eventual tree mortality. A survey of the Dixie National Forest in 1978 indicated that most of the Douglas-fir and about 40 percent of the ponderosa pine were infected.

According to the 1980 Timber Inventory, insect related mortality accounts for a 6 percent MMBF timber loss per year and disease related mortality accounts for a 12.6 MMBF loss per year.

Black grass bugs (Labops hesperius) are found throughout the created wheatgrass reseedings on the Forest. These insects lower forage productions significantly if the grass stand is a monoculture. Control of this insect using pesticides has not proven to have any long term effects on the Forest.

Infestations of grasshoppers and Mormon crickets periodically appear on various ranges of the Forest. Should sizeable areas be seriously affected by these insects, pesticide control measures are available.

Management direction for the Forest includes an Integrated Pest Management (IPM) program in which all aspects of a pest-host system are studied and weighed to provide the resource manager with information for decision making.

Current pest management practices include stand hazard rating to identify high-risk stands, monitoring insect and disease levels, and control measures such as harvest and thinning to reduce the potential for outbreaks. High value trees in developed and administrative sites may also be treated with a protective spray when bark beetle population are epidemic in the area.

A principal current method for minimizing the impacts of forest pests is the conversion of unmanaged timber stands to manage stands in the shortest time feasible. This would involve harvesting many of the old growth timber stands which are sustaining the greatest impact from insects and disease.

Economics and timber demand will play a large part in the Forest's ability to manage these high risk stands. A good proportion of the remaining old growth is located on slopes over 40 percent, and require the use of cable or aerial systems for harvest. Stumpage value and locally developed technology are important factors in the feasibility of harvesting high risk stands on these areas.

c. Air Quality

The National Clean Air Act requires tha airsheds be designated under one of three classes:

Class I - Only minor quality deterioration.
Class II - Permitted moderate deterioration.
Class III- Permitted deterioration up to National Ambient Air Quality Standards.

The entire Dixie National Forest is designated Class II. There are no non-attainment areas because of the lack of pollution sources. Class I area sheds at Zion, Bryce, and Capital Reef National Parks provide an umbrella of air quality protection over most portions of the Dixie National Forest.

Forest activities contribute very little to deterioration of air quality except for uncontrolled wildfire. This source is recognized by the State as unavoidable and occurs only occasionally.

The Forest burns by prescription about 200 acres per year and may expand the program in the future. By using the clearing index*, especially on burns below 6,500 feet, prescribed burning will not contribute additional pollutants to the non-attainment areas. Other sources of pollutants in the Forest are dust from unpaved roads and exhaust from motor vehicles.

Based on anticipated resource uses such as timber harvest levels, no change in air quality conditions over the Forest is predicted.

No serious problems of off-Forest pollution source affecting the Forest are anticipated because of the close proximity of Class I National Park areas.

d. Law Enforcement

The Forest Service has certain statutory responsibility for law enforcement on National Forest Lands. The Dixie National Forest, in cooperation with State, Local, and other Federal law enforcement agencies, maintains a law enforcement program that strives to ensure compliance with laws and regulations, protection of the public and their property, protection of Forest Service employees, and protection of Forest Service property and resources.

The following activities are existing and potential law enforcement problems on the Dixie National Forest.

- Vandalism
- Fee deposit break-ins
- Theft of timber and Christmas trees
- Drug trafficking and growing of cannabis
- Misuse of motorized vehicles
- Threats, intimidation, assaults, and battery against Forest officers
- Man-caused wildfires

The Forest's approach to meeting its responsibilities is to:

-Cooperate to the fullest extent possible with State and local agencies through the use of cooperative law enforcement agreements.
-Support a Shared Services Special Agent located in Salt Lake City.
-Train selected forest Officers to investigate and initiate the limited law enforcement actions.
-Designate and train at least one Level IV Law Enforcement Position on the Forest.

The Forest has five cooperative law enforcement agreements with State and local Law Enforcement agencies, at an annual cost of approximately $13,000. National statistics and local trends indicate an increase in the Public's use of National Forest land, and a resultant increase in law enforcement activities. Therefore, there is an increasing need for law enforcement program emphasis to meet the Forest's statutory responsibility.

F. NEED TO ESTABLISH OR CHANGE MANAGEMENT DIRECTION

The Forest planning process included a determination of the need to change management direction. This was accomplished by assessing the current situation, determining production potentials, and reviewing the public issues and management concerns of the Forest. The following are the more significant changes in management direction which were identified:

Desired Condition: Provide developed recreation sites necessary to accommodate future recreation demand. Developed site capacity is currently exceeded on peak days. For the Forest as a whole, recreation use at developed sites will exceed capacity during the decade 1991-2000.

Need for Change: "Harden" existing sites, and increase the capacity by expanding existing sites and developing new sites.

Desired Condition: Provide sufficient dispersed recreation areas and facilities to accommodate dispersed recreation users.

Need for Change: Dispersed recreation opportunities should provide increased cross country ski and snowmobile trails, trailheads, sanitation facilities, and informational signing.

Desired Condition: Focus wildlife and fish habitat improvement efforts to those habitats most in need of improvement.

Need for Change: Use data in the wildlife and fish section of the plan to develop Forest-wide habitat improvement priorities. Gather additional data on riparian areas and streams for use in identifying and prioritizing habitat improvement opportunities.

Desired Condition: Achieve a timber harvesting program on steep slopes that will allow for the benefits of managed stands to be applied to more acres on the Forest.

Need for Change: Develop cost efficient opportunities for harvesting on lands too steep for tractor logging.

Desired Condition: Achieve a well-managed supply of firewood that is consistent with other Forest goals and helps meet the needs of people.

Need for Change: More intensive management of the fuelwood resource.

Desired Condition: Achieve a management strategy for pinyon-juniper resource.

Need for Change: Inventory and preparation of management strategies for the pinyon-juniper resource.

Desired Condition: Gain a better understanding of aspen resources and their increasing future potential.

Need for Change: Obtain better information on inventory and economics of aspen harvest to assess market potential and coordinate harvest to meet other resource needs.

Desired Condition: Maintain sufficient quantities of water to meet all on-Forest resource requirements.

Need for Change: Water yields from the Forest do not meet desired consumptive needs for irrigation and other water uses on many areas. In addition, there is increasing pressure from off-Forest groups to initiate diversions from headwater areas for irrigation, power generation, energy development and other purposes. These diversions may further threaten the stability of affected stream channels and their associated aquatic ecosystems. Deleterious effects on recreation, aesthetics, wildlife and watershed values may result. Non-consumptive instream flow requirements need to be assessed and appropriate water rights developed to assure that all resource needs are adequately protected.

Desired Condition: Integrate the exploration and development of mineral and energy resources on the Forest with the use and protection of other resource values.

Need for Change: On the ground administration must be increased to provide protection of resources. More training is needed for Forest Service employees to fulfill responsibilities.

Desired Condition: Achieve an acceptable survey of all high site density areas and some medium site density areas before the end of the planning period.

Need for Change: Accelerate cultural resource surveys.

Desired Condition: Achieve a level of cultural resource protection by the year 2030 that will safeguard against loss by vandalism and natural forces.

Need for Change: Increase emphasis on protection of cultural resources.

Desired Condition: Provide for the establishment of Research Natural Areas, as needed, and as available according to the criteria for their identification.

Need for Change: Continue the Research Natural Area establishment process.

Desired Condition: Achieve a sustained level of prescribed fire and fuels management that will reduce fire control costs and will produce through vegetative manipulation, increased productivity of the range resource and wildlife habitat.

Need for Change: Increase the emphasis on prescribed fire and fuels management.

Desired Condition: Provide optimum public ownership and rights-of-way.

Need for Change: Need to accelerate land exchange program and rights-of-way acquisitions. Need ability to purchase those private parcels that have potential public values where there is a willing seller.

Desired Condition: Complete survey, marking and posting of Forest property lines by 2030.

Need for Change: Accelerate the maintenance of posted property lines.

Desired Condition: Achieve a basic road transportation system that is adequate to meet resource use and management needs.

Need for Change: Provide increased road maintenance.

Desired Condition: Provide for needed major facilities corridors.

Need for Change: The Forest Plan needs to provide for major utility corridors.

Desired Condition: Provide substantial progress in reducing losses from insects and disease.

Need for Change: Provide increased emphasis to reducing damage caused by root rots. Increase emphasis on bark beetle protection by identifying high risk stands, monitoring and thinning stands.

## G. RESEARCH NEEDS

The Forest planning process identified a number of potential problems. Many of these problems may be resolved by further research. Some of them are summarized below for consideration as research projects. The list will be updated during periodic evaluations of Plan implementation.

### Fish and Wildlife

Research needs in relation to fish and wildlife management are:

-Resolution of the eutrophication problem in Panguitch Lake.

### Timber Management

-How best to manage and utilize the Forest's pinyon-juniper resource.

-How to reduce damage caused by root rots.

-How to increase the potential uses of aspen resources.

# CHAPTER III
# PLAN RESPONSES TO ISSUES, CONCERNS, AND OPPORTUNITIES

This chapter shows how the proposed Plan addresses and responds to major public issues, management concerns, and resource opportunities that have been identified during the planning process.

A discussion of the process used to identify the issues to be resolved in this Plan is found in Appendix A of the accompanying Appendix document for the Plan. Additional information may be found in the public involvement records of the Dixie National Forest.

The specific methods for resolving and implementing management actions for the 14 issues dealt with are found in Chapter IV of this Plan. In that chapter the Forest's multiple-use goals and objectives are listed, as are the multiple-use prescriptions and associated standards and guidelines for each management area. Included with the management area discussion are the proposed and probable management practices.

The responses to the 14 issues are as follows:

Issue 1. To what degree should the Dixie National Forest place a greater emphasis on fire management?

Analysis of past fire occurrence and past fire suppression efforts provided a basis for determining a cost-efficient level of fire protection for the future. The plan provides for the cost efficient level, provides for prompt cleanup of logging slash, and a modest use of prescribed fire for resource management.

Issue 2. How much of an increased demand on Forest resources should be anticipated?

Planning analysis determined that the demand for forest resources would increase during the planning period. The plan provides for increased use of the forests recreation, mineral, and wildlife resources, and for no increase in the range, timber, and water resources.

Issue 3. To what degree should the Dixie National Forest consider the economic and social stability of communities dependent on Dixie NF resources?

The planning process evaluated the economic and social consequences to local communities. The plan provides for the continued stability of those communities dependent on forest resources. However, declining softwood timber harvest volumes in the latter decades of the planning period may require a shift in dependency to those forest resources that will be increasing.

Issue 4. To what extent should the Dixie National Forest accelerate the harvest of overmature timber to reduce mortality losses?

The plan provides for a continuation of timber harvest levels that will treat those overmature stands susceptible to insect attack and mortality where it meets Forest goals and objectives. This will be done in the most cost efficient manner practicable. Prescribed fire may also be used in low value stands.

Issue 5. To what extent should the Dixie National Forest emphasize wildlife management?

The plan provides increased emphasis on wildlife management, especially in the areas of wildlife habitat improvements and management direction to protect and coordinate habitat needs with other resource uses.

Issue 6. How should the Dixie National Forest manage its firewood resource?

Firewood will continue to be available at current levels throughout the planning period. However, the location of firewood gathering areas will shift with the timber harvest areas. Increased use of pinyon-juniper stands is also provided for.

Issue 7. What level of livestock use should be planned for?

Livestock use is planned to continue at 115,000 AUM's. Continued maintenance of existing revegetation areas will be required, along with maintenance of structural range improvements.

Issue 8. How should the Dixie National Forest protect the on-site values of streams, lakes, springs, riparian areas, and their associated fishery values?

The plan provides through its use standards and guidelines and management direction for increased emphasis on water and water related values.

Issue 9. How should the Dixie National Forest coordinate the leasing exploration, and development of energy and mineral resources, including location of energy transmission corridors, with other resource values?

The plan provides for the continued coordination of mineral activities with other resource values through the use of standards and guidelines and management direction. Existing and future needs for energy transmission corridors are identified and planned for.

Issue 10. How much emphasis should the Dixie National Forest place on coordinating or restricting Forest activities in order to maintain or enhance scenic values along major roads, other travel corridors, and areas of outstanding scenic quality?

Increased emphasis is placed by the plan on scenic values through the use of management direction and standards and guidelines.

Issue 11. What should the balance be between accommodating increased recreation use and other resource uses?

Recreation use occurs where there is an attraction. The location of facilities is based on the need to accommodate this use and preserve the physical

environment. Developed facilities should be located to take advantage of local attractions and to enhance dispersed recreation activities. Recreation facilities will be located to meet the needs of public, unless there is a conflict with other resources which cannot be resolved.

Issue 12. Should the Dixie National Forest emphasize developed group sites over single family units when considering new recreation site construction?

The plan provides for constructing primarily single family units in new recreation sites because they will be located in areas not favored for group use. However, the plan also provides for reconstructing existing group sites to accommodate heavier use.

Issue 13. What should be done to separate the recreational activities of conflicting user groups such as cross-country skiers and snowmobilers?

The plan provides separate and distinct areas of the forest where the management direction will provide for recreation experiences ranging from primitive to rural. Conflict between recreational user groups will be minimized because there are sufficient areas of each experience type to accommodate the expected increase in user groups.

Issue 14. How much emphasis should we put on a transportation system that is safe and convenient for public use?

The plan provides for increased maintenance and reconstruction of the existing transportation system to enhance the safety and convenience of the public in a cost efficient manner. The new construction of roads, while primarily planned for resource utilization, will also be designed for the safety and convenience of the general public.