

RECREATION SUPPLY AND DEMAND REPORT  
FOR THE DANIEL BOONE NATIONAL FOREST

DOCUMENT # 8

of the ANALYSIS OF THE MANAGEMENT SITUATION  
for the PROPOSED REVISION of the  
LAND & RESOURCE MANAGEMENT PLAN

DANIEL BOONE NATIONAL FOREST  
USDA - FOREST SERVICE, SOUTHERN REGION

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# OUTDOOR RECREATION

## Supply and Demand

### 1. General Purpose and Introduction:

The purpose of this supply and demand analysis is to: a) define the Daniel Boone National Forest's role in outdoor recreation; b) discuss recreation capability and historical use; and c) project the demand for outdoor recreation activities on the Daniel Boone National Forest.

Outdoor recreation has changed significantly in the past 50 years. With the exception of a few upscale private resorts, lodges, and "Dude Ranches", recreation activities outdoors in the 1950's were generally considered inexpensive with an acceptance of primitive facilities. Since the 1950's many state resort parks were added to the system with golf courses, full service lodges, swimming pools and other specially developed features. Individual activities have move into high technology equipment, supplies and transportation. Areas previously accessed by dirt roads having single lanes with turnouts are now accessed by paved roads and in some cases have interstate or limited access highways nearby.

Cars became station wagons which started pulling trailers that became recreation vehicles. The demand for tent sites is remaining stable while the demand for full service camping units is increasing .

The Daniel Boone National Forest provides a variety of recreation opportunities to a large population near its borders. The supply of recreation opportunities within proximity to the National Forest will effect the amount and type of recreation users that can be expected to use the Daniel Boone National Forest facilities. While the demand for recreation facilities and opportunities is growing, at the same time user preferences for recreation experiences is continually changing. To effectively plan for the future in the Revised Forest Plan, current supply and demand must be projected into the future.

This Supply and demand analysis will examine the present supply of recreation opportunities in and around the Forest. It will examine past local use trends as well as the regional and national trends in recreation and it will identify the possible role the National Forest might play in providing for future outdoor recreation demand in the area.

This analysis will utilize the information obtained to formulate the National Forest and Rangeland Renewable Resources Planning Act assessment (RPA). It will also use available regional and local surveys and inventories to identify past, present and future trends.

### 2. Relationship with RPA Assessment

Recreation demand is addressed in detail every 10 years because of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), which results in the RPA Assessment. The 1989 RPA Assessment provides an assessment of some of the national trends in outdoor recreation use and recreation activities related to wildlife and fisheries. The RPA Assessment also makes national and regional projections of expected future use and demand. Projecting the number of people engaging in wildlife and fish recreation activities provides information that can be used to anticipate future changes in participation levels and their relative preference for specific recreation activities (Flather and Hoekstra, 1989). According to Cordell et. al (1990), several factors influence the demand for outdoor recreation activities such as population growth or decline, age composition, income, leisure time, and transportation.

From a national perspective, the demand for outdoor recreation continued to grow in the 1980s, but at a slower pace than in the 1960s and 1970s (Cordell et al. 1990). The 1989 RPA Assessment estimates that the demand for backpacking, visiting historical places, running and jogging, day hiking, and pool swimming will grow faster than demand for other outdoor activities.

The RPA Assessment also predicts that sightseeing, walking for pleasure, pleasure driving, picnicking, day hiking, family gatherings, bicycle riding, photography, wildlife observation, visiting historic sites, pool swimming, and developed camping will be the most popular recreational activities by 2040.

The last national assessment of recreational activities related to wildlife and fishing completed in 1981 projected increases for these recreational activities (Flather and Hoekstra, 1989). According to Flather and Hoekstra (1989), the number of licensed anglers has more than tripled over the previous 30 years. However, recent national surveys indicate participation patterns have recently changed which show declining numbers of hunters, increasing anglers, and increasing non-consumptive users. Although national trends show a decline in hunting, regional trends predict the South to have the largest increase in big game hunting (Flather and Hoekstra 1989). Flather and Hoekstra (1989) also state that national forests are expected to become relatively more significant in providing opportunities to hunt big game and small game species.

### **3. Southern Region Management Strategies**

In response to the changing recreational needs, the Southern National Forests have developed management strategies in order to meet the recreational needs of the American public. These strategies include: a) increasing the emphasis on all aspects of recreation, including fisheries and wildlife; b) conducting research to define the outdoor recreation experience and facilities desired by society; c) expanding the number of partnerships with the recreation and tourism industry and others to provide appropriate National Forest recreation opportunities; d) accelerating the development of programs and facilities to serve all of society, including persons with disabilities and non-traditional families; e) intensifying the "Good Host" skills to improve visitor service and safety; f) developing additional programs as an integral part of National Forest recreation; and g) expanding wildlife partnerships and State Wildlife Agency coordination and cooperation (USDA FS Southern Region 1992).

## **II. Daniel Boone Forest Market Area**

The Daniel Boone National Forest is characterized by outstanding variety of land features such as man made lakes, mountain peaks, rivers and streams, gorges, arches, cliffs, caves, a wide variety of vegetative types, and outstanding scenery that enhances and supports heavy recreation use. Because of their location along major roads such as Interstate 75, Interstate 64, The Cumberland Parkway and The Daniel Boone Parkway the Forest is readily accessible to people in Tennessee, Ohio, West Virginia, Virginia, Indiana and Illinois.

The recreation market has two segments.

(1) Local users are in close proximity to the Forest. Most of these users are from a predominantly rural or small town environment. In some cases local users include people from larger cities such as Lexington, Covington, and Ashland Kentucky.

(2) Users from surrounding, more highly populated, areas that are less than 1/2 day's travel or 1 tank full of gasoline. This segment of users stretches east to Charleston, West Virginia, south to Knoxville, Tennessee, north to Cincinnati and Columbus, Ohio and west to Louisville, Kentucky and Nashville, Tennessee.

### III. Recreation Supply and Historical Use

#### A. DEVELOPED RECREATION CAPACITY

- Introduction

The Southern Appalachian Assessment defines Recreation Supply as: "the opportunity to participate in a desired recreation activity in a preferred setting to realize desired and expected experiences. Three components of supply are settings, activities, and facilities. These three components are linked in the following manner.

"Landscapes are available for people to use in recreational pursuits. Landscapes are characterized by settings, which provide the physical and social environments needed to produce experiences. Recreationists choose a setting and activity to create a desired experience. Facilities, such as campgrounds and trails, are supplied to assist uses of the setting and to support activities. Settings, activities, and support facilities are managed to maintain the condition necessary to produce the expected experiences.

"There are limits to the use of settings. When use is too intensive for recreators to achieve desired experiences, the carrying capacity has been exceeded. Providing additional support facilities may increase the capacity of settings."

- Developed Recreation Capacity

There are 134 developed recreation sites that are currently being managed by the Daniel Boone National Forest. These 134 sites have a combined total of 28 campgrounds, 23 picnic areas, 29 boat launch sites, 2 swimming sites, 7 information sites, 2 documentary sites, 6 fishing sites, 24 observation sites, 4 shooting ranges and 13 trailheads. These Developed sites include 1178 campsites and 358 Picnic Sites. Approximately 3,730 acres are devoted to developed recreation.

The Forest Service defines the capacity of a recreation area as being the number of persons at one time the site can support. The developed sites managed by the Daniel Boone National Forest can accommodate a total of 21,344 persons at one time (PAOT). Maximum or theoretical capacity of a recreation area is defined as the sites' PAOT multiplied by the number of days the area is open for use (season). The maximum or theoretical PAOT yearly capacity of all the developed recreation areas on the forest is approximately 5.7million, or approximately 6 million recreation visitor days (RVD's). One RVD is defined as 12 visit hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Maximum yearly capacity values are not directly applicable for Land and Resource Management Planning analysis since they usually represent tradeoffs between theoretical upper limits which seldom, if ever, occur on the ground. However, the reasonable maximum interpretation of capacity does provide values, which can be used in most Land and Resource Management Planning analyses. The reasonable capacity for all developed recreation sites on the forest can be obtained from the following formula:

REASONABLE RVD CAPACITY = MYRVD X PU

Where:

MYRVD = Maximum yearly RVD Capacity for all developed sites

PU = Pattern of use, or relationship between the average weekend use and weekday use (.43)  
 (Based on Pattern of Use Adjustment Factor, Recreation Opportunity Spectrum (ROS) Users  
 Guide 1992)

Based on the above formula, the reasonable developed capacity for the Daniel Boone National Forest is approximately 2,457,360 RVD's. Table 2 lists the developed recreation sites by activity for the Daniel Boone National Forest. Table 1 lists the available sites by activity for each district on the Daniel Boone National Forest.

**Table 1: District Summary of developed Recreation Sites on the Daniel Boone National Forest.**

Recreation Sites	DISTRICTS					
	Morehead	Stanton	London	Somerset	Stearns	Redbird
Family Campsites	634	58	350	64	72	0
Group Campsites	4	0	3	0	0	0
Picnic Areas (Sites)	98	53	127	34	9	37
Group Picnic Sites	2	0	0	0	0	0
Boat Launch Sites	13	1	11	4	0	0
Swim Sites	2	0	0	0	0	0
Shooting Ranges	1	0	1	1	1	0
Interpretive Sites	3	3	1	0	0	0

**Table 2: Daniel Boone National Forest Developed Sites By Activity and Capacity**

<b>Site</b>		<b>Persons at one time capacity (PAOT)</b>
<b>Family Campgrounds</b>	<b>Units</b>	
CLAYLICK BOAT-IN	20	100
CLEAR CREEK RECREATION AREA	23	115
TWIN KNOBS RECREATION AREA	332	1662
WHITE SULPHUR HORSE CAMP	24	120
ZILPO RECREATION AREA	235	1176
KOOMER RIDGE	58	290
S TREE	25	125
TURKEY FOOT	15	75
BARK CAMP	2	10
GROVE	72	360
GROVE BOAT-IN	43	215
HOLLY BAY RECREATION AREA	108	540
ROCKCASTLE	18	90
STAR CREEK	2	10
TWIN BRANCH	4	20
WHITE OAK BOAT-IN	61	305
BEE ROCK AREA EAST	9	45
BEE ROCK AREA WEST	22	110
LITTLE LICK	8	40
SAMS BRANCH	4	20
SAWYER	19	95
STRAIGHT CREEK	2	10
BARREN FORK HORSE CAMP	37	183
BELL FARM HORSE CAMP	15	75
GREAT MEADOW	20	100
<b>Group Campgrounds</b>		
TWIN KNOBS TENT GROUP AREA	2	60
TWIN KNOBS TRAILER GROUP AREA	2	30
CRAIGS CREEK	3	210
<b>Family Picnic Areas</b>		
BILLY BRANCH	26	130
BOAT GUNNEL BRANCH	54	270
CLEAR CREEK RECREATION AREA	14	70
LONGBOW	4	20
COTTAGE FURNACE	12	60
GREYS ARCH	6	30
ROCK BRIDGE	15	75
SKY BRIDGE	9	45
TARR RIDGE	11	55
S TREE REC. AREA	5	25
TURKEY FOOT REC. AREA	6	30
BALD ROCK	22	110
FLATWOODS	20	100
GROVE	12	60
LAUREL BRIDGE	42	210
ROCKCASTLE	20	100
ALPINE	14	70
NATURAL ARCH	20	100
HEMLOCK GROVE	9	45
CAWOOD PICNIC AREA	15	75
BIG DOUBLE CREEK	22	110

**Table 2: Daniel Boone National Forest Developed Sites By Activity and Capacity Continued**

Site	Units	Persons at one time capacity (PAOT)
<b>Group Picnic Areas</b>		
TWIN KNOBS EAST GROUP AREA	1	100
TWIN KNOBS WEST GROUP AREA	1	180
<b>Interpretive Sites</b>		
MOREHEAD OFFICE VISITOR CENTER	1	20
GLADIE	1	130
TWIN KNOBS REC. AREA AMPH	1	200
CLEAR CREEK IRON FURNACE	1	20
KOOMER RIDGE AMPHITHEATER	1	60
ROCK BRIDGE NATURE TRAIL	1	250
HOLLY BAY REC AREA AMPH	1	100
<b>Fishing Sites</b>		
MUSKIE BEND	1	96
RAMEY CREEK	1	25
SHALLOW FLATS	1	78
WINDY BAY	1	60
LONG BEND	1	60
FISHING POINT-ROAD N	1	20
<b>Marinas</b>		
Longbow Marina	20	100
SCOTT CREEK MARINA	175	875
HOLLY BAY MARINA	125	625
GROVE MARINA	117	585
LONDON BOAT DOCK	10	50
<b>Boating Sites</b>	<b>Parking Spaces</b>	
ALFREY	80	400
BANGOR	40	200
BLACKWATER	32	160
CLAYLICK	75	375
CLEAR CREEK	25	125
LEATHERWOOD	40	200
Longbow	74	370
POPPIN ROCK	71	355
SCOTT CREEK	80	400
TWENTY SIX	66	330
TWIN KNOBS RECREATION AREA	80	400
WARIX RUN	54	270
ZILPO RECREATION AREA	53	265
RED RIVER CANOE LAUNCH	2	10
ROCKCASTLE CANOE LAUNCH	2	12
CRAIGS CREEK	40	200
FLATWOODS	60	300
GROVE	63	315
HIGHTOP	60	300
HOLLY BAY	60	300
HOLLY BAY REC. AREA	10	50
LAUREL BRIDGE	38	190
MARSH BRANCH	60	300
MOUTH OF LAUREL	15	75
ROCKCASTLE RAMP	10	50
BEE ROCK	17	85
JASPER BEND	4	18
SAWYER	20	100
NOES BOAT RAMP	4	18

**Table 2: Daniel Boone National Forest Developed Sites By Activity and Capacity Continued**

Site	Parking Spaces	Persons at one time capacity (PAOT)
<b>Trailheads</b>		
BUCKSKIN	10	30
FERN BLUFF	24	72
NORTHERN TIP SHELTOWEE TRACE	4	12
S-TREE ROAD SHELTOWEE TRACE	3	9
BOWMAN RIDGE	5	25
LITTLE LICK	5	25
MIDDLE FORK	5	25
SWAIN RIDGE	5	25
THREE FORKS BEAVER CREEK	10	50
HWY 27 SHELTOWEE	8	24
LAUREL CREEK	4	12
LICK CREEK	1	3
YAHOO ARCH	2	6
<b>Swimming Beaches</b>		
TWIN KNOBS BEACH	1	2100
ZILPO BEACH	1	400
<b>Observation Sites</b>		
KNOBS OVERLOOK	6	30
LAKEVIEW VISTA	15	75
TATER KNOB FIRE TOWER	3	15
ZIPLO SCENIC BYWAY	9	45
CHIMNEY TOP	15	75
DEVILS CANYON OVERLOOK	2	10
GRAYS BRANCH	3	15
PARCHED CORN OVERLOOK	10	50
RAINBOW POINT	3	15
RED RIVER OVERLOOK	3	15
SKY BRIDGE OVERLOOK	3	15
SKY RIDGE OVERLOOK	7	35
SWIFT CREEK OVERLOOK	3	15
BEE ROCK	2	10
GREAT GULF	10	50
GULF RIDGE	3	15
NATURAL ARCH	3	15
PANORAMIC VIEW	2	10
STRAIGHT CREEK	7	35
THREE FORKS OF BEAVER	2	10
PARKERS MOUNTAIN 1	2	9
PARKERS MOUNTAIN 2	2	9
PARKERS MOUNTAIN 3	2	9
PARKERS MOUNTAIN (4)	2	9
<b>Shooting Ranges</b>	<b>Stations</b>	
CLEAR CREEK	4	12
WHITMAN BRANCH	5	60
KENO	5	70
APPLETREE	3	15



Two market analysis have been completed for areas that include the Daniel Boone National Forest. The "Market Analysis of Kentucky's Eastern Highlands - South Region" was completed in 1992. The Eastern Highlands - South include Bell, Breathitt, Clay, Estill, Harlan, Jackson, Knott, Knox, Laurel, Lee, Leslie, Letcher, Owsley, Perry, Powell, Rockcastle, Whitley, and Wolfe county. The "Market Analysis of Kentucky's Eastern Highlands - North Tourism Region" was completed in 1994. The Eastern Highlands - North includes Bath, Boyd, Carter, Elliott, Floyd, Greenup, Johnson, Lawrence, Magoffin, Martin, Menifee, Morgan, Montgomery, Pike, and Rowan county. McCreary, Pulaski and Wayne county are the only three counties within the National Forest that are not covered by these two studies. The two Market Analysis Areas combined provide information about Eastern Kentucky, which is the local market area for the Daniel Boone National Forest. Table 3 illustrates the total developed facilities for Eastern Kentucky and what portion the national forest provides this local area. Table 4 illustrates the developed facilities in each of the two market analysis areas.

**Table 3: Eastern Kentucky Highlands North and South study area facilities compared to Daniel Boone National Forest Facilities within the area.**

	ALL Counties	National Forest Facilities	National Forest % of Facilities
78 Hotels/Motels	5,911	0	
Campgrounds	46	17	37%
with Improved sites	1,996	1051	53%
Marinas	19	5	26%
National historic park	1		
State resort parks	7		
State recreational parks	4		
State historic site	1		
Other attractions	95		

**Table 4: Developed Facilities in Two Eastern Kentucky Market Analysis Areas.**

EASTERN KENTUCKY HIGHLANDS - SOUTH Mid - 1991		EASTERN KENTUCKY HIGHLANDS - NORTH 1993	
78 Hotels/Motels	3,194 rooms	65 Hotels/Motels	2,717 rooms
Campgrounds with Improved sites	30 948	Campgrounds with improved sites	16 1,048
Marinas	9	Marinas	10
National historic park	1		
State resort parks	4	State resort parks	3
State recreational parks	2	State recreational parks	2
State historic site	1		
Other attractions	50	Other attractions	45

Within the Daniel Boone National Forest influence zone the following recreation areas compete for recreation visitors:

**National Areas:** Big South Fork River and Recreation Area, Cumberland Gap National Historical Park and Mammoth Cave National Park,

**Large Lakes:** Cave Run Lake, Laurel Lake, Cumberland Lake, Dale Hollow, Herrington Lake, Green River Lake, Grayson Lake, Dewey Lake, Buckhorn Lake, Fishtrap Lake, Kincaid Lake, Paintsville Lake KY; Douglas Lake, Cherokee Lake, Norris Lake, TN; Ceasar Creek Lake, East Fork Lake, Rocky Fork Lake, Paint Creek Lake, Ohio; Beach Fork Lake, E. Lynn Lake West Virginia.

**State Parks:** Lake Cumberland State Resort Park, General Burnside State Park, Dale Hollow Lake State Park, Green River Lake State Park, Grayson Lake State Park, Greenbo Lake State Resort Park, Jenny Wiley State Resort Park, Buckhorn Lake State Resort Park, Kincaid Lake State park, Barren River Lake State Resort Park, Cumberland Falls State Resort Park, Levi Jackson State Park, Pine Mountain State Resort Park, Natural Bridge State Resort Park, Kentucky Horse Park, Fort Boonesborough State Park, General Butler State Resort Park, Blue Licks Battlefield State Park, Big Bone Lick State Park, Carter Caves Resort State Park, My Old Kentucky Home State Park, Carr Creek State Park, KY; Douglas Lake, Cherokee Lake, Norris Lake, TN; Ceasar Creek Lake, East Fork Lake, Rocky Fork Lake, Paint Creek Lake, Ohio; Beach Fork Lake, E. Lynn Lake West Virginia.

Other Unique Natural Features: Natural Arch, Red River Gorge, McCammon Falls, Van Hook Falls, Rockcastle State Scenic River, Rock Creek State Scenic River, Marsh Creek Proposed Wild and Scenic River, Warfork Proposed Wild and Scenic River.

**B. DISPERSED RECREATION CAPACITY**

(GENERAL FOREST AREA)

The general forest areas's ability to supply dispersed recreation has been estimated through the Recreation Opportunity Spectrum (ROS) process. This process assumes that:

- Forest visitors have a broad range of preferences for recreational activities.
- All acres of the Forest land have a potential for supplying some recreation opportunity.
- Some acres can support certain activities better than others.

The ROS inventory used in the 1984 Analysis of the Management Situation (AMS) for the Daniel Boone National Forest identified four of the six possible recreational Land classes. The Recreation Opportunity Spectrum (ROS) condition of the Forest was re-inventoried in 1990. Due to the size of the areas on the Daniel Boone National Forest there are Semi-Primitive Non-Motorized areas but there are no Primitive areas on the Forest. The Great Smoky Mountains National Park has the only primitive setting in the Southern Appalachians and Kentucky. There are no urban areas within the Forest boundary. To compare past capacity with present capacity, the 1984 AMS analysis was used with the same coefficients.

ROS Land Class	1984	1990
Rural (R)	35,000 acres 5%	40,000 acres (6%)
Roaded Natural (RN)	350,000 acres (52%)	567,600 acres (85%)
Semi-Primitive Motorized (SPM)	190,000 acres (29%)	35,600 acres (5%)
Semi Primitive Non-motorized (SPNM)	90,000 acres (14%)	26,800 acres (4%)
<b>Total Dispersed Acres</b>	<b>665,000 acres</b>	<b>670,000 acres</b>

The general Forest carrying capacity as estimated by the 1984 AMS was 2,230,000 RVD's.

Using the following 1984 AMS criteria, the present general forest area carrying capacity is 2,882,612 RVD's.

$$\text{RVD/acre} = \frac{\text{PAOT} \times \text{MS} \times \text{PU} \times \text{LOS}}{12}$$

- RVD** = Recreation Visitor Day; a 12 hour period of recreational use
- PAOT** = Persons-at-one-time; an instantaneous maximum capacity per acre
- MS** = Managed Season; length of time recreational opportunity is available
- PU** = Pattern of Use; percentage of season that opportunity is utilized. Including relationship between the average weekend use and weekday use.
- LOS** = Length of Stay; typical duration of recreational activity per day
- 12** = the Constant of 12 Hrs = 1 RVD

Class	PAOT*	MS	PU	Los	RVD/Acre
<b>R</b>	0.100	300 days	.71	3 hours	5.33
<b>RN</b>	0.070	300 days	.43	6 hours	4.52
<b>SPM</b>	0.022	300 days	.29	10 hours	1.60
<b>SPNM</b>	0.016	300 days	.29	15 hours	1.75

\* Source: R-8 letter 2310, December 18, 1981.

The recreational "practical maximum" carrying capacity for the general forest area is:

ROS Land Class	Acres	RVD/Acre	RVD Capacity
<b>Rural (R)</b>	<b>40, 000</b>	5.33	213, 200
<b>Roaded Natural (RN)</b>	<b>567, 600</b>	4.52	2, 565, 552
<b>Semi-Primitive Motorized (SPM)</b>	<b>35, 600</b>	1.60	56, 960
<b>Semi Primitive Non-motorized (SPNM)</b>	<b>26, 800</b>	1.75	46, 900
<b>Total Recreation Visitor Days Capacity</b>			<b>2, 882, 612</b>

This capacity may vary as the mix of ROS land classes changes, or as other resource practices impact patterns of use. The major change from the original 1984 inventory to the 1990 inventory was not the amount of roads constructed or other development, but the use of minimum acres within a ROS class to qualify for that land class. This inventory constraint was not applied uniformly in the initial 1984 inventory.

(LAKES)

Additional dispersed capacity is available on the large lakes within the Forest. This supply level was determined from Bureau of Outdoor Recreation (BOR) boating requirement estimates and ROS methodology in the 1984 AMS which estimated capacity at 980,000 RVD. This capacity should be the same using the same criteria except that the capacity of Laurel River Lake was calculated using the spillway level of the lake (6060 acres) instead of the Recreation Pool of the lake which is 5600 acres. Using the same calculations as used in 1984:

Activity	Acreage	% of Total
Fishing	1 acre/ boat	40%
Pleasure Boating	5 acres/ boat	40%
Water Skiing	20 acres/ boat	15%
Swimming and Other	1 acre/ boat	5%

The Average acreage needed per boat is 5.4 acres/boat. It is estimated that average users per boat number three each.

Managed Season: Approximately 240 days  
 Pattern of Use: Approximately 65% of Week  
 Length of Stay: 7.0 hour average for all activities

$$\frac{9280 \times 240 \times .65 \times 7}{12} = 844,480 \text{ RVD}$$

Total supply is:

Lake	Surface Acres	PAOT
Cave Run Lake	8300 acres	4610 PAOT
Laurel River Lake	5600 acres	3110 PAOT
Lake Cumberland	2800 acres	1560 PAOT
<b>Total</b>	<b>16700</b>	<b>9280 PAOT</b>

(ROADS)

Supply of Recreation use on roads was based upon existing use for the 1984 AMS which was 800,000 RVD's or about 40 percent of total participation. 40 percent of 1996 use is 900,000 RVD's.

(TOTAL SUPPLY OF DISPERSED RECREATION)

According to the 1984 AMS and the calculations for present supply: the total supply of dispersed recreation in RVD's was 4,010,000 in 1984 and is 4,627,092 RVD's in 1996. Wilderness supply and Demand is calculated separately in appendix A.

Type of Dispersed Area	1984 RVD's	1997 RVD's
General forest Area	2, 230, 000 RVD's	2, 882, 612 RVD's
Lake Surfaces	980, 000 RVD's	844, 480 RVD's
Roads and Highways	800,000 RVD's	900, 000 RVD's

**Total**

4, 010, 000 RVD's

4, 627, 092 RVD's

**C. HISTORICAL AND CURRENT USE TRENDS IN THE MARKET AREA**

According to Woodall's regional campground directories the total number of campsites in eastern Kentucky has declined from 5490 to 5157 from 1985 to 1996. That is a decline of 333 sites. During this period there was an increase of 25 full hookup sites, a decrease of 463 electric sites, a increase of 294 water and electric sites and a decline of 177 sites with no hookups. There were 7 new listings and 16 listed campgrounds in 1985 not listed in 1996. There was a net loss of 9 campgrounds during this period. In general there has been a net decline in the number of sites while the number of sites with water and electric and full services has increased.

The most visited attractions in the two area Highlands market surveys are Cumberland Falls State Resort Park, Renfro Valley Entertainment Center, Cumberland Gap National Park, Laurel Lake, Levi Jackson State Resort Park, Pine Mountain State Resort Park, Cave Run Lake, Carter Caves State Resort Park, Jenny Wiley State Resort Park, Greenbo Lake State Resort Park, Jenny Wiley State Theatre and Grayson Lake State Park.

In the two analysis areas there are 143 hotels/motels with 5,911 rooms. There are 46 campgrounds with 1,996 improved campsites. Based upon Woodall's 1996 Campground Directory 740 of the 948 sites or 78% of the sites in the Eastern Kentucky Highlands - South are within 10 miles of Interstate 75. 266 of the 1,048 sites or 25% of the sites in the Eastern Kentucky Highlands - North are within 10 miles of Interstate 64. With 78% of the campsites along interstate 75 there are more visitors farther from home. Florida, Canada, and South Carolina are in the top nine home states of visitors. Even with the heavy north south traffic along the interstate almost 60 % of visitors to the south half of the Forest are within 200 miles of home. 40% are from Kentucky. In the north half 73% of the visitors are within 200 miles of home with 51% from Kentucky. A 1993 customer survey conducted at Cave Run Lake found that over 80% of all activities are being conducted within 200 miles of home and two thirds are being conducted within 100 miles except house boating which has just over half traveling 100 miles from home. The above surveys are close to the same results obtained from the National Recreation Survey that found over 80% of visitors in the Southeast travel 200 miles or less to participate in recreation activities and over two thirds travel 150 miles or less.

**D. HISTORICAL AND CURRENT USE TRENDS ON THE DANIEL BOONE NATIONAL FOREST**

The record system used by the Forest Service to maintain use information by activity is knowd as the recreation information management System (RIM). The Rim inventory tracks different recreation activities offered on the Daniel Boone National Forest. As part of the forest planning process, current data is being verified by field observation, public comments, and concessionar records. In the RIM database, recreation use is measured in RVD's.

**Table 5: 1996 RIM Activity Summary for the Daniel Boone National Forest.**

<b>Activity</b>	<b>Reported RVD's</b>	<b>Rank</b>
<b>Camping</b>	454,400	1
<b>Mechanized Travel and Sightseeing</b>	323,700	2
<b>Boating</b>	267,200	3
<b>Fishing</b>	230,200	4
<b>Hunting</b>	215,800	5
<b>Water Sports</b>	149,600	6
<b>Hiking</b>	132,800	7
<b>Picnicking</b>	81,400	8
<b>Horse Riding</b>	64,100	9
<b>Bicycling</b>	33,600	10
<b>Nature Study</b>	22,300	11
<b>Canoeing</b>	21,600	12

#### **E. CAPACITY COMPARED WITH USE ON THE DANIEL BOONE NATIONAL FOREST**

The total reasonable outdoor recreation capacity for the Daniel Boone National Forest is approximately 7 million RVD's. Dispersed recreation accounts for approximately 4.6 million of the total forest reasonable RVD capacity, with all developed sites totaling 2.4 Million RVD's. Comparing the 1996 RIM use data to the capacity, as listed in Table 6.

Developed Sites on the Daniel Boone National Forest show a higher percentage of use compared to capacity than does dispersed recreation. Camping and picnicking show the most use compared to capacity than other developed sites.

Approximately 670,000 acres of the 692,164 acres on the Daniel Boone National Forest are open for dispersed recreation. The Daniel Boone National Forest reasonable capacity for dispersed recreation is approximately 4.6 Million RVD's compared to the RIM reported use of 1.3 RVD's. Based upon the 1996 RIM report, dispersed recreation use is at 28.2% of reasonable capacity (Table 6). The 1996 RIM report showed that dispersed recreation accounted for 56% of the total reported RVD's on the Forest. RVD's for dispersed activities shown as a percentage of the total dispersed RVD total are listed in Table 7.

Table 12 indicates a large surplus of annual capacity for dispersed recreation. However, during certain times of the year (hunting Season, summer weekends, holidays), actual use approaches capacity.

**Table 6: Current use Compared to Reasonable RVD Capacity for Developed and Dispersed Recreation Activities on the Daniel Boone National Forest.**

Activity	Reasonable RVD Capacity	Reported 1996 RIM RVD's	Use as a Percent of Capacity
<b>Developed Recreation</b>			
Boating	742,085	290,200	39.1%
Camping	640,799	513,200	70.9%
Picnicking	198,346	104,800	41.0%
Interpretive Sites	96,888	25,700	26.5%
Shooting Ranges	24,641	No Record	
Sub – Total	1,767,947	943,500	53.4%
<b>Dispersed Recreation</b>			
	4,627,092	1,303,500	28.2%
<b>Total</b>	6,395,039	2,247,000	35%

**Table 7: RVD's for Dispersed Recreation Activities Shown as a Percentabe of the Total Dispersed RVD's.**

Activity	Percentage
Hunting	17.8%
Mechanized Travel	40.3%
Fishing	19.0%
Hiking	11.9%
Horse Riding	5.3%
Nature Study	1.1%
Bicycling	2.8%
Canoeing	1.8%
	100.00%

**F. THE DANIEL BOONE NATIONAL FOREST ROLE IN THE MARKET AREA**

Although the Daniel Boone National Forest is the largest federal administrative unit of land in Kentucky it provides a small portion of all the dispersed recreation opportunity in the state. The increase in the total number of people participating in dispersed recreation has impacted the land being used. Many private and company landowners have placed restrictions on the use of their lands or stopped use altogether. Public lands have also added restrictions on the kinds of use permitted in specific areas. This has concentrated some uses into highly impacted areas and created additional impacts to the dispersed areas. The amount of acreage available for dispersed recreation by the public is declining. This has augmented the increase in demand on public lands for dispersed recreation.

The availability of national forest facilities in the immediate vicinity (Eastern Kentucky) was compared to the total number of facilities in the area. The Daniel Boone National Forest provides 53% of the Campsites and 26% of the Marinas. Based upon the 1989 SCORP for Kentucky the Daniel Boone National Forest provides Kentucky 8.5% of camping, 1.5% picnicking, 00.4% boating and 00.5% Waterskiing facilities. The role of the Daniel Boone National Forest in developed recreation within the Market area is not very significant in total numbers (The market Area includes much more than just Kentucky). The Daniel Boone National Forest is unique because it offers developed recreation sites located within large undeveloped areas available for dispersed recreation activities. This is particularly important for full day hiking, horseback riding, bicycling, cross country skiing, driving for pleasure, all terrain vehicle riding on trails, and hunting.

### **G. RECREATION OPPORTUNITIES FROM THE ROS PERSPECTIVE.**

The Recreation Opportunity Spectrum (ROS) provides a framework for defining classes of outdoor recreation opportunity environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into six classes: Primitive, Semi-primitive non-motorized, Semi-primitive motorized, Roaded Natural, Rural, and Urban.

The names of these classes were selected because of their descriptiveness and utility in Land Management Planning. The system has application to all lands regardless of ownership or jurisdiction. However, not all classes or activities would necessarily exist on all lands. It is not expected that National Forests would provide the entire ROS spectrum, although a few forest may occasionally do so. Opportunities for experiences along the ROS spectrum represent a range from a very high probability of solitude, self-reliance, challenge, and risk to a very social experience where self-reliance, challenge, and risk are relatively unimportant.

Under the current Forest Plan most of the acreage on the Daniel Boone National Forest falls into the Roaded Natural ROS class, due to the high road density on the Forest. There are 567,600 acres classified as Roaded Natural, 26,800 acres of Semi-primitive Non-motorized (the wilderness areas), 35,600 acres of Semi-primitive motorized, and 40,000 of Rural.

## **III. Projected Use and Demand for Outdoor Recreation Activities**

### **A. NATIONAL TRENDS AFFECTING OUTDOOR RECREATION**

Several social and demographic characteristics effect outdoor recreation demand. These factors effect the type of recreation opportunities selected and when during the year or during the week the recreation activity will occur.

Some changing social characteristics (Cordell 1990):

- The population is aging with earlier retirements.
- There is a decline in available leisure time.
- There is an increase in immigration.
- The population is becoming more ethnically diverse.
- There is an increase in dual income families.
- There is an increase in single parent families.
- There is a reduction in extended families.
- People are marrying and having children later in life (Cordell 1990).



These changing social characteristics are having the following effect on leisure activities:

- Total hours of use in federal recreation areas have remained constant or increased slightly over the past 10 years, but the total number of visits has increased.
- The number of 2 or 3 week vacations are declining and the number of day trips or long weekend trips are increasing.
- The percentage of all trips that were 2 hours or less in travel time increased from 43% in 1977 to 72% in 1986, on national forests.
- The number of trips of greater than 8 hours travel time dropped sharply from 23% in 1977 to 6% of all trips in 1986 for national forests and from 41% in 1977 to 9% in 1986 for national parks.
- The proportion of visits that are 1 day or less is increasing while the number of visits more than 1 day (24 hours) is declining.

The 1993 update to the RPA Assessment of the Forest and Rangeland Situation in the United States (Report 27) considered the above changes and identified some shifts in recreation demand:

- The total number of people participating in recreation is expected to increase across all recreational activities during the next five decades.
- The percentage of the total population participating in recreation has stabilized in recent years, as has the per capita allocation of leisure time to recreational pursuits.
- Total demand for recreation would keep in line with population growth if this pattern continues in the future.
- In addition, real per capita income is projected to more than double by 2040. This extra income will contribute to differential rates of growth in recreation activities. For example, demands for snow - related recreation are expected to grow at a faster rate than for most land- and water based activities, but the latter activities will continue to dominate total recreation patterns.
- If the public and private sectors continue to provide and expand opportunities at rates comparable to recent trends, the projected increases in supplies will meet most of the projected increases in demands.
- Closure of private land to free public access does not necessarily mean that the land is lost for recreation opportunities.
- Most of the increase in demand will be near existing population centers.....
- National Forests and other public lands in the North, South, and Pacific Coast regions are expected to become relatively more important for all forms of recreation if access remains generally unrestricted and free.
- Wilderness use accounts for less than 1 percent of all outdoor recreation. Total time spent in wilderness areas has been relatively stable in recent years.

#### **B. PROJECTED RECREATION DEMAND IN THE DANIEL BOONE NATIONAL FOREST.**

Regional Demand and Supply Projections for Outdoor Recreation are tabulated in General Technical Report RM-230 (English 1993). Table 8 illustrates the projected increase in demand for recreation activities from 1987 to 2040.

English et al. (1993) predicts the fastest growing outdoor recreation activities for the south to be pool swimming, rafting/tubing, day hiking, running/jogging, visiting prehistoric sites, bicycling, and backpacking. Although national trends show big game hunting activities to decrease, the south shows an

increased or steady demand for big game hunting. However, small game hunting is predicted to decrease throughout all regions of the United States. Freshwater fishing activities are expected to increase significantly over the next 50 years (Flather and Hoekstra 1989).

Future participation trends in fee-hunting, or leasing are also important because of the implications to wildlife management on private lands (Ruff and Isaac 1987, Wiggers and Rootes 1987). According to Flather and Hoekstra (1989) less than one-third of all hunters used public lands in 1980, emphasizing the importance of private land in consumptive wildlife related recreation. However, access is beginning to constrain the opportunity to hunt on private lands. The National Shooting Sports Foundation (1986) found that of the 19 factors that could curtail hunting, access to huntable land was considered the number one problem facing hunters nationwide. In 1980, 1.4 million hunters (8% of all hunters) paid either access or lease fees (Langer 1987). Lease agreements have increased over the last 10 years and are most prevalent in the South and Mid-Atlantic regions (Wiggers and Rootes 1987). According to Flather and Hekstra (1990) as many as one in five hunters may be participating in some form of fee-hunting by 2040.

Wilderness Supply and demand is calculated separately in Appendix A.

**Table 8: RPA Projections for Future Recreation Demand in Percent Growth From 1987**

	<b>1987</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>
<b>Developed Camping</b>	100	114	127	137	153	174
<b>Primitive Camping</b>	100	109	118	125	137	151
<b>Picnicking</b>	100	103	109	112	121	131
<b>Sightseeing</b>	100	111	122	134	152	174
<b>Day Hiking</b>	100	122	145	168	203	247
<b>--Walking for Pleasure</b>	100	109	121	128	144	162
<b>--Running &amp; Jogging</b>	100	124	148	167	201	241
<b>Backpacking</b>	100	126	151	171	203	238
<b>Horseback Riding</b>	100	117	132	144	159	176
<b>Bicycling</b>	100	117	136	150	176	206
<b>Driving for Pleasure</b>	100	109	119	126	139	153
<b>Offroad Vehicle Driving</b>	100	101	104	106	111	118
<b>Wildlife Observation</b>	100	111	122	130	145	162
<b>Nature Study</b>	100	100	105	108	117	128
<b>Photography</b>	100	116	133	145	167	191
<b>Visit Prehistoric Sites</b>	100	120	138	158	184	216
<b>Visiting Historic Sites</b>	100	113	128	143	167	198
<b>Canoeing/Kayaking</b>	100	107	117	124	139	158
<b>Stream/Lake Swimming</b>	100	100	104	105	111	118
<b>Rafting/Tubing</b>	100	100	119	128	176	249
<b>--Rowing/Paddling, etc.</b>	100	107	116	122	135	150
<b>Motorboating</b>	100	102	105	108	113	118
<b>Waterskiing</b>	100	106	114	118	127	137
<b>Sailing</b>	100	133	168	197	244	302
<b>Collecting Berries</b>	100	106	114	124	139	158
<b>Collecting Firewood</b>	100	106	114	122	136	152
<b>Cross-Country Skiing</b>	100	135	160	164	181	194
<b>Nonconsumptive trips</b>	100	182	193	208	224	240
<b>Big game hunting</b>	100	125	134	137	139	141
<b>Small game hunting</b>	100	98	103	107	113	119
<b>Migratory bird hunting</b>	100	109	116	121	127	133
<b>Fishing</b>	100	89	96	101	108	115

### **C. PROJECTED RECREATION USE ON THE DANIEL BOONE NATIONAL FOREST.**

The Daniel Boone National Forest provide for a variety of outdoor recreational opportunities and experiences. Historically camping, driving for pleasure, boating, fishing, and hunting have been the five most popular outdoor recreation activities based upon RIM records. As demand for outdoor recreation opportunities and experiences increases within the Daniel Boone National Forest market area, it is presumed that demand for similar outdoor recreation activities would also increase on the national forest. Table 9 projects RVDs to the year 2040 for selected activities on the National Forest using 1987 RIM data as a base year.

By combining the RPA projections with the actual use in the past, the applicability of the regional trends become apparent. Inconsistencies also are illustrated. From 1966 to 1987 there have been many fluctuations in the recreation visitor days. Some of the fluctuations can be attributed to the construction and completion of Cave Run and Laurel River Lakes and their attached recreation improvements. Some changes occurred due to changes in local and regional population demographics. The growth from 1987 to 1995 come from annual Recreation Visitor Day reports. Starting at the year 2000 the graphs show the projected growth by RPA.

Travel Activities: Driving for pleasure, day hiking and backpacking come close to the predicted regional trends. Horseback riding, bicycling, and offroad vehicle driving are growing faster on the Daniel Boone National Forest than the regional trend predicts.

Camping, Picnicking & Sight-seeing: Developed camping, and sight-seeing are growing faster on the Daniel Boone National Forest than predicted by the regional projection but Primitive camping and picnicking are growing slightly slower than predicted.

Water Activities: Canoeing, swimming, and motorboating are growing slower than the regional projection but water-skiing is growing faster than predicted. Sailing is growing as predicted.

Viewing Activities: Both Wildlife observation and nature study is growing faster than predicted. There has been an emphasis in environmental education and two visitor centers are now in operation on the Forest. This accounts for much of the rapid increase in visitor days from 1987 to 1995.

Wildlife Activities: The growth in Non consumptive trips is increasing as predicted. The growth in big game hunting, small game hunting, migratory bird hunting and fishing is growing significantly faster on the Daniel Boone National Forest than it is predicted to do regionally. A portion of this change can be attributed to the re-introduction of game animals in the 1980's and increase in animal populations due to habitat improvement programs during the planning period. Also as populations increased to harvestable levels new areas have been opened and/or seasons extended for this recreational activity.

**Table 9: Daniel Boone National Forest Projected Recreation Demand in Thousands of Visitor Days**

<b>Grouped Activities</b>	1966	1974	1982	1990	2000	2010	2020	2030	2040
<b>Developed</b>									
<b>Camping</b>	43.5	198.5	303.0	371.7	386.3	430.4	464.3	518.5	590.0
<b>Primitive</b>									
<b>Camping</b>	13.0	36.7	56.4	56.9	60.0	64.9	68.8	75.4	83.1
<b>Picnicking</b>	38.9	112.2	124.2	84.8	86.3	91.3	93.9	101.4	110.0
<b>Sightseeing</b>	17.6	74.6	82.2	81.4	79.5	87.4	95.9	108.8	125.0
<b>Day Hiking</b>	<b>28.5</b>	<b>116.0</b>	<b>169.7</b>	<b>116.0</b>	<b>126.9</b>	<b>150.8</b>	<b>174.7</b>	<b>211.1</b>	<b>257.0</b>
<b>Horseback</b>									
<b>Riding</b>	<b>4.9</b>	<b>26.1</b>	<b>28.1</b>	<b>42.7</b>	<b>35.9</b>	<b>40.5</b>	<b>44.2</b>	<b>48.8</b>	<b>54.0</b>
<b>Bicycling</b>	<b>3.8</b>	<b>7.3</b>	<b>7.9</b>	<b>9.5</b>	<b>9.1</b>	<b>10.6</b>	<b>11.7</b>	<b>13.7</b>	<b>16.1</b>
<b>Driving for</b>									
<b>Pleasure</b>	<b>126.6</b>	<b>476.1</b>	<b>516.2</b>	<b>236.7</b>	<b>273.0</b>	<b>298.1</b>	<b>315.6</b>	<b>348.2</b>	<b>383.0</b>
<b>Offroad Vehicle</b>									
<b>Driving</b>	<b>1.5</b>	<b>50.4</b>	<b>79.6</b>	<b>66.4</b>	<b>49.2</b>	<b>50.6</b>	<b>51.6</b>	<b>54.1</b>	<b>57.5</b>
<b>Backpacking</b>	<b>5.0</b>	<b>20.5</b>	<b>30.0</b>	<b>20.5</b>	<b>23.1</b>	<b>27.6</b>	<b>31.3</b>	<b>37.1</b>	<b>43.6</b>
<b>Cross-Country</b>									
<b>Skiing</b>	<b>0.0</b>	<b>0</b>	<b>0.5</b>	<b>0.4</b>	<b>0.8</b>	<b>1.0</b>	<b>1.0</b>	<b>1.1</b>	<b>1.2</b>
<b>Canoeing/Kayak</b>									
<b>ing</b>	3.1	30.5	46.2	22.7	26.5	29.0	30.8	34.5	39.2
<b>Stream/Lake</b>									
<b>Swimming</b>	10.4	10.2	57.1	68.5	66.7	69.4	70.0	74.0	78.7
<b>Motorboating</b>	29.3	96.3	249.7	266.5	269.5	277.4	285.3	298.5	312.0
<b>Waterskiing</b>	6.2	25.3	54.5	61.5	56.6	60.9	63.0	67.8	73.2
<b>Sailing</b>	0.1	1.1	14.7	21.8	29.0	36.6	42.9	53.2	65.8
<b>Wildlife</b>									
<b>Observation</b>	<b>1.1</b>	<b>6.8</b>	<b>23.8</b>	<b>10.0</b>	<b>10.9</b>	<b>12.0</b>	<b>12.7</b>	<b>14.2</b>	<b>15.9</b>
<b>Nature Study</b>	<b>12.8</b>	<b>39.3</b>	<b>59.0</b>	<b>49.7</b>	<b>25.0</b>	<b>26.3</b>	<b>27.0</b>	<b>29.3</b>	<b>32.0</b>
<b>Nonconsumptive</b>									
<b>Trips</b>	1.1	6.8	23.8	10.0	17.8	18.9	20.4	22.0	23.5
<b>Big Game</b>									
<b>Hunting</b>	6.1	33.0	24.2	42.2	34.0	36.4	37.3	37.8	38.4
<b>Small game</b>									
<b>hunting</b>	71.3	144.1	120.3	143.4	125.9	132.4	137.5	145.2	153.0
<b>Migratory Bird</b>									
<b>Hunting</b>	2.7	7.2	5.3	5.8	5.5	5.8	6.1	6.4	6.7
<b>Fishing</b>	63.7	120.5	232.1	205.9	172.4	186.0	195.6	209.2	223.0

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## Appendix A: Wilderness Supply and Demand Estimates

### Wilderness Supply Estimates

#### Practical Maximum Capacity:

Coefficient Approach is based on Recreation Opportunity Spectrum (ROS) direction (1986 ROS Book, page IV-23). Adjustments to the capacity coefficient may be made following direction in ROS Book.

$$\frac{C \times MS \times PU \times LOS}{12} = \text{RVD's per acre per year}$$

12

#### Where:

C = Capacity Coefficient in PAOT per acre (.015 PAOT per Acre Coefficient) based on ROS class. The Coefficient for Appalachian forests comes from Coutant's 1981 letter. Coefficient may be adjusted with more detailed Forest data. For example, the George Washington National Forest developed a coefficient of .016).

MS = Managed season of use = accessible 240 days;

PU = Pattern of use = for every 1 weekday visitor there are 3 weekend visitors = .50;

LOS = Length of visit = 22.6 hours Regional standard;

12 = the constant of 12 hours = 1 RVD;

RVD = Recreation Visitor Day.

**Thus:**  $\frac{.015 \text{ PAOT/acre} \times 240 \text{ days} \times .50 \times 22.6 \text{ hours}}{12 \text{ hours}} = 3.39 \text{ RVD/acre/year}$

12 hours

**Then,** 3.39 RVD/acre/year x 4,791 acres Beaver Creek Wilderness = 16,241 RVD's per year

**And,** 3.39 RVD/acre/year x 13,300 acres Clifty Wilderness = 45,087 RVD's per year

The **Total Practical Maximum Capacity** = 61,328 RVD's per year for both Wilderness areas

#### Existing Condition Capacity:

Observations and use studies have shown that people tend to use wilderness along a corridor, mainly developed trails. In wilderness, recreation use normally occurs within a 300-foot corridor of developed trails. Incidental use is outside this corridor. The SAA used this process to establish carrying capacity.

There are 8 miles of trail in the Beaver Creek Wilderness and 22.1 miles of trail in the Clifty Wilderness. (SAA Social, Cultural, Economic Technical Report, pages 160-162) indicate that groups should be separated by one-half mile (to derive solitude) and that the user group size is six (maximum). Thus PAOT is six people per half-mile of trail or 12 people per mile.

Using the PAOT to RVD conversion formula found in the ROS book (page IV-23, 1986 ROS Book) RVD = PAOT x MS x PU x LOS divided by 12. PAOT = 12 people per mile times number of miles. Thus Beaver Creek is 12 x 8 = 96 PAOT and Clifty is 12 x 22.10 = 265 PAOT. MS would be managed season of use in days, which is 240 days. PU would be the pattern of use relationship or .50 (found on page IV-24, 1986 ROS Book). LOS would be 15 minutes or .25 hours per half-mile of trail (or 1/2 hour per mile). This is based on the average hiker/backpacker traveling 2 miles per hour.

$$\text{Beaver Creek RVD} = \frac{\text{PAOT (96)} \times \text{MS (240)} \times \text{PU (.50)} \times \text{LOS (.5)}}{12} = 480 \text{ RVD Beaver Creek Trails}$$

$$\text{Clifty RVD} = \frac{\text{PAOT (265)} \times \text{MS (240)} \times \text{PU (.50)} \times \text{LOS (.5)}}{12} = 1325 \text{ RVD Clifty Trails}$$

Thus, existing condition capacity of the Forest Wilderness along trails is 1805 RVD.

Existing condition capacity of campsites (those identified) would be: PAOT = group size per site x number of sites. Length of stay of 12 hours was chosen, based on the amount of time people set up, eat, sleep, and then break down camp.

Thus: Beaver Creek PAOT is 3 sites x 6 people per site or 18 PAOT.

Clifty PAOT is 79 sites x 6 people per site or 474 PAOT.

And

$$\text{Beaver Creek camping RVD's is } \frac{18 \text{ PAOT} \times 240 \text{ days} \times 12 \text{ hrs.} \times .50}{12 \text{ hrs. Per RVD}} = 2,160 \text{ camping RVD's}$$

$$\text{Clifty camping RVD's is } \frac{474 \text{ PAOT} \times 240 \text{ days} \times 12 \text{ hrs.} \times .50}{12 \text{ hrs. Per RVD}} = 56,880 \text{ camping RVD's}$$

Therefore Beaver Creek has a total existing condition capacity of 480 RVD Trails plus 2,160 RVD camping for 2,640 RVD and Clifty has a total existing condition capacity of 1,325 RVD trails plus 56,880 RVD camping for 58,205 RVD. **The Forest total existing condition capacity is 2,640 plus 58,205 for 60,845 RVD capacities.**

If the SAA standards for thresholds of use by settings and activity are followed there should only be a campsite for every 1/2-mile of trail. Thus the total camping RVD capacity of the Forest would be 6 people per campsite 2 sites per mile equals 12 PAOT per mile times 30.1 miles or 361 PAOT in both wildernesses.

$$\text{Forest camping RVD's is } \frac{361 \text{ PAOT} \times 240 \text{ days} \times 12 \text{ hrs.} \times .50}{12 \text{ hrs. Per RVD}} = 43,320 \text{ camping RVD's}$$

This reduces the total existing condition capacity of the Forest to 45,125 RVD.

These calculations project a steady stream of visitors every day for 240 days out of the year. If this use occurred the trails and campsites would show signs of over use. Some of this use will occur in the dispersed areas of the Wilderness and some users will venture off of trails to travel cross-country. The Existing condition capacity of 45,000 is **reasonable with an upper limit of 50,000** if some areas of concentrated access are considered acceptable.



### Accessibility of Wilderness to Population Centers

Population centers of 50,000 people or more (1990 census) were selected within a 250-mile radius of the Daniel Boone National Forest. Each of these population centers was analyzed to see if there was a Wilderness area within 250 miles of the City. There were 37 population centers. Fortyne and Terre Haute Indiana had the fewest Wildernesses (4) within 250 miles. Winston-Salem, North Carolina had the most Wilderness areas, 56 within the 250-mile radius.

Statistics for the four Populations Centers in the North, South, East and West Direction from the Forest are:

Direction	City	Number of Wilderness Areas	Acres of Wilderness
North	Huntington, WV	39	247,976
West	Lexington-Fayette, KY	35	314,849
South	Knoxville, TN	37	352,256
East	Roanoke, VA	38	215,649

#### Accessibility To Wilderness:

All population centers within 250 miles of the Daniel Boone National Forest are within 250 miles of a National Forest Service Wilderness Area (NFSWA). Population centers are urbanized areas of 50,000 or more as defined in the Census of Population and Housing, US Department of Commerce, Economics and Statistics Administration, Bureau of the Census. A Gap does not exist in accessibility of Wilderness. The Closest population center to the Daniel Boone National forest is Lexington, Kentucky. There is 314, 849 acres of Wilderness in 35 areas within 250 miles of Lexington. The Daniel Boone National Forest is not the sole source for wilderness in the area.

### Wilderness Demand Estimates

Future Number of Trips as a Percentage of 1987 Demand \*

<u>Activity</u>	<u>1987</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>
Backpacking	100	126	151	171	203	235
Day Hiking	100	122	145	168	203	247

\* "The Regional Demand and Supply Projections for Outdoor Recreation", dated August 1993 (USDA Forest Service, GTR RM-230, by English et. al.)

This converts to:

#### Annual Percentage Increase

<u>Activity</u>	<u>1987-2000</u>	<u>2000-2010</u>	<u>2010-2020</u>	<u>2020-2030</u>	<u>2030-2040</u>
Backpacking	1.79%	1.83%	1.25%	1.73%	1.50%
Day Hiking	1.54%	1.74%	1.48%	1.91%	1.98%



use patterns within the gorge. The Red River Gorge is now a gathering place for local residents, college students from Eastern Kentucky University, University of Kentucky and Morehead State University as well as national and international visitors. Use patterns within the Wilderness were established before Wilderness designation. Some of the uses are not compatible with the purpose and intent of the Wilderness Act. Private Campgrounds that were purchased and reclaimed are still being used for wild parties and family gatherings. Present use records include activities that are not related to the Wilderness designation of the area. Because the present use patterns and activities within the Clifty Wilderness are having a negative effect on the Wilderness resources, the capacity for recreation use is considered exceeded at the present time. Portions of the Wilderness receive acceptable levels of use. Visitors enter and leave the area with no signs that they visited the area. A large portion of the Wilderness is clearly impacted by mans' visits to the area. Wilderness is established to protect the area from man's influence so that man is a visitor that enters the area and leaves without affecting the wilderness area. Recreation experiences that can be experienced outside the Wilderness must be relocated outside the Wilderness. Sites impacted by use must be reclaimed and use patterns must be changed to disperse use so that visitors to the Wilderness no longer impact the Wilderness environment. Once all of this is completed the capacity of the Wilderness will no longer be considered exceeded. If existing activities continue and the land does not recover, greater controls will be necessary in order to provide the Wilderness required by Law.

The Beaver Creek Wilderness lies within the steep side slopes and narrow creek bottom of Beaver Creek. The wilderness is long and narrow with dense under brush. It is difficult to travel cross-country within the Wilderness.

Wilderness use patterns are restricted or enhanced by the natural features found within Clifty and Beaver Creek. Cliff lines, deep gorges with dense vegetation channel use along narrow corridors. These same features draw people to specific points of interest.

It is unrealistic to assume that use can be dispersed evenly throughout the Wilderness areas. Contact with other users is more likely because most corridors require both entrance and return along the same narrow route. The proximity of large urban centers immediately adjacent or in close proximity to the two wildernesses, means a wide variety of visitors are accessing the Wilderness. The Wilderness may be the destination for an extended vacation but is more likely to be a day outing away from an urban setting. A large portion of existing Wilderness visitors are seeking social as well as outdoor recreational experiences. A smaller proportion is visiting the Wilderness with the anticipation of solitude and isolation.

Management of the two Wildernesses must be adjusted to insure the protection of the Wilderness resources. Recreation management of the Daniel Boone must be adjusted to insure the visitors receive the anticipated recreation experience in a setting capable of handling the recreation activities.

The above supply and demand calculations are based upon optimum conditions for parameters used and are therefore provided only as a reference.

**Appendix B: Additional Tables and Graphs**

EASTERN KENTUCKY HIGHLANDS - SOUTH Mid - 1991	EASTERN KENTUCKY HIGHLANDS - NORTH 1993
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**HOME STATE OF VISITORS**

KENTUCKY	40.4%	KENTUCKY	51.6%
OHIO	17.1%	OHIO	15.1%
INDIANA	9.0%	WEST VIRGINIA	7.1%
MICHIGAN	6.5%	INDIANA	4.0%
TENNESSEE	4.3%	MICHIGAN	3.6%
FLORIDA	3.9%	VIRGINIA	2.9%
ILLINOIS	2.8%	ILLINOIS	2.5%
CANADA	2.2%	TENNESSEE	2.3%
SOUTH CAROLINA	1.9%		
OTHER STATES	11.9%	OTHER STATES	10.9%

**DISTANCE TRAVELED**

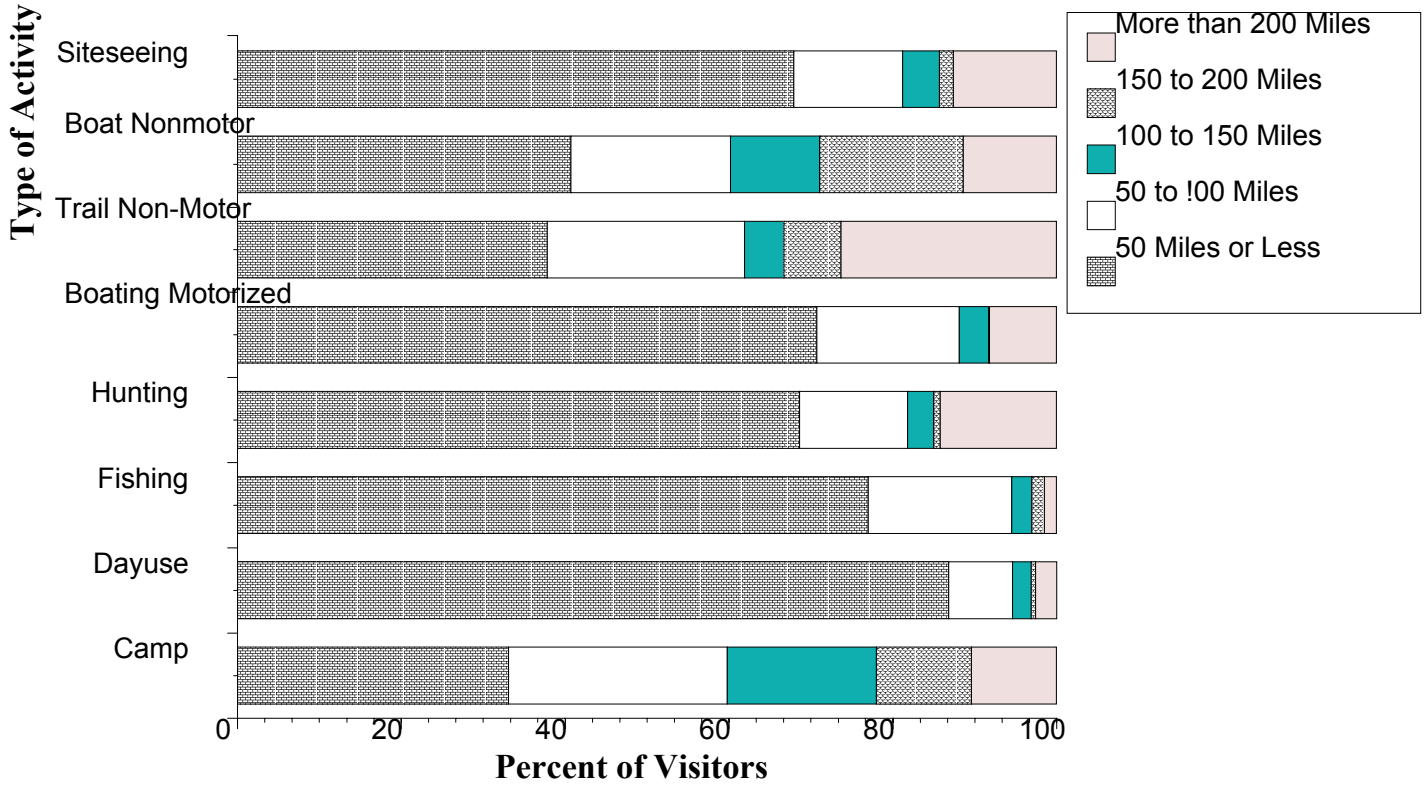
LESS THAN 50 MILES	12.7%	LESS THAN 50 MILES	25.8%
LESS THAN 100 MILES	29.6%	LESS THAN 100 MILES	55.9%
LESS THAN 150 MILES	44.5%	LESS THAN 150 MILES	69.5%
LESS THAN 200 MILES	58.5%	LESS THAN 200 MILES	73.4%
400 MILES OR MORE	16.9%	400 MILES OR MORE	8.1%

**ACTIVITIES OF VISITORS IN REGION**

Swimming	41.8%	Swimming	70.1%
Hiking	19.2%	Relaxing	19.5%
Sight-seeing	15.4%	Fishing	13.5%
Boating	10.0%	Golfing	11.5%
Visiting relatives	8.4%	Hiking	10.8%
Fishing	8.2%	Boating	9.9%
Visiting local attractions	8.2%	Business	9.6%
Relaxing	7.9%	Visiting friends/relatives	8.8%
Camping	7.7%	Shopping	6.7%
Shopping	5.6%	Camping	6.1%
		Picnicking	5.1%

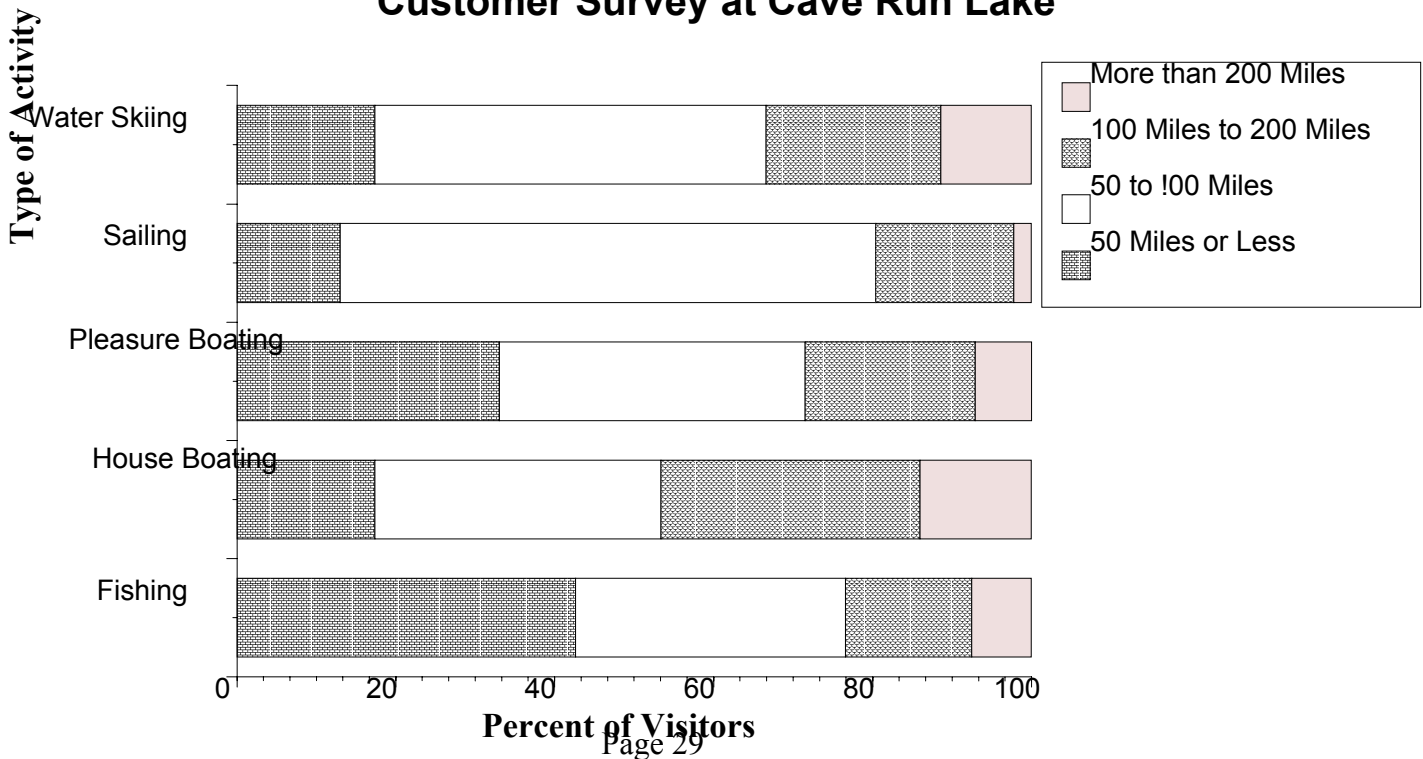
## Distances Traveled by Visitors in Region 8

### From National Recreation Survey

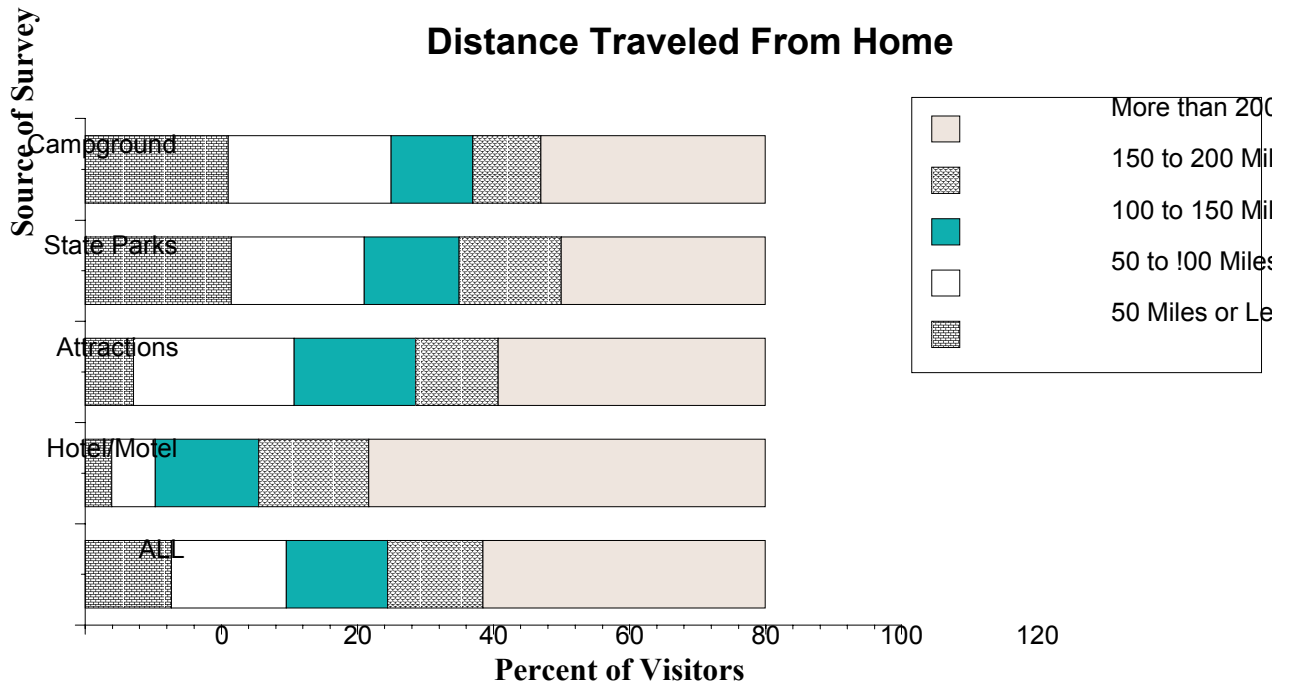


## Distance Traveled by Visitors

### Customer Survey at Cave Run Lake

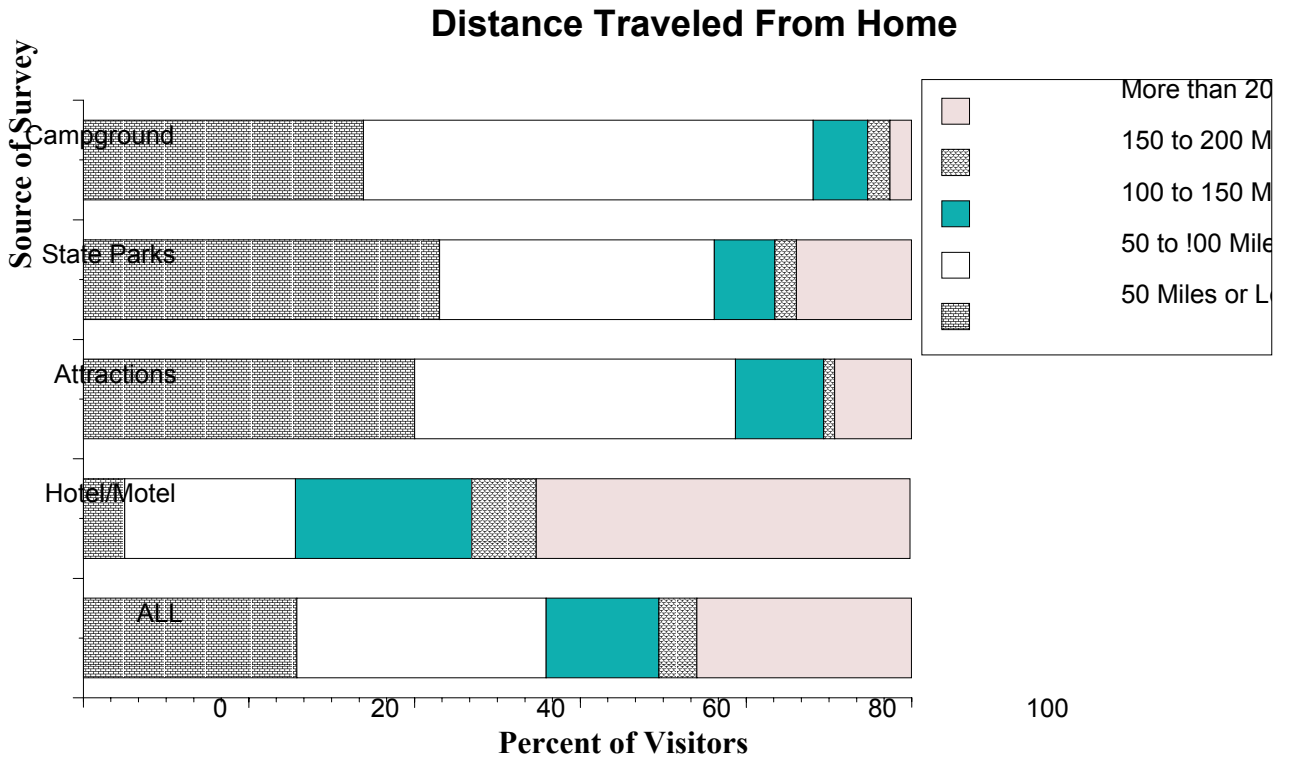


## Eastern Highlands-South Region



Kentucky Dept. of Travel Development

## Eastern Highlands-North Region



Kentucky Dept. of Travel Development

**The Following Table illustrates which activities are found in inventoried ROS Classes.**

RPA Activities by ROS Class				
Activity	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Rural
Primitive Camping	****	****	****	
Horseback Riding	****	****	****	****
Day Hiking	****	****	****	****
Walking For Pleasure		****	****	****
Bicycling	****	****	****	****
Offroad Vehicle Driving		****	****	****
Driving for pleasure		****	****	****
Sight-seeing		****	****	****
Picnicking		****	****	****
Developed Camping			****	****
Canoeing / Kayaking	****	****	****	****
Stream / Lake Swimming	****	****	****	****
Motorboating				

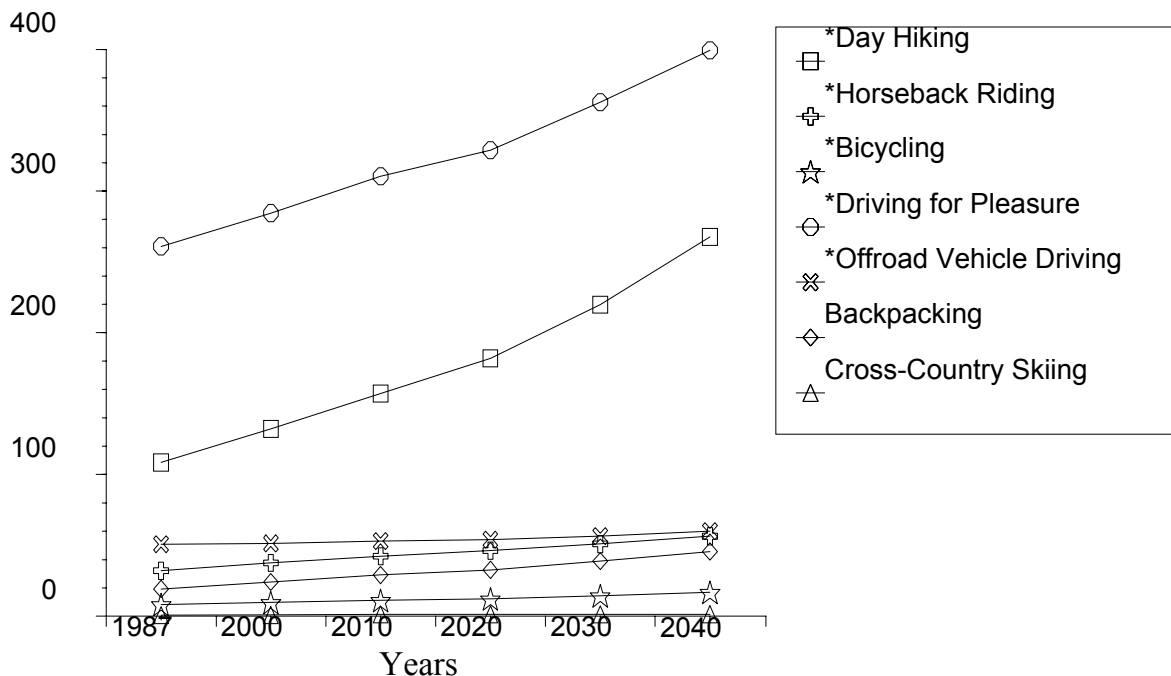
The Tables in RM-230 are illustrated using Daniel Boone National Forest Recreation 1987 use.



Recreation Visitor Days

### Travel Activities

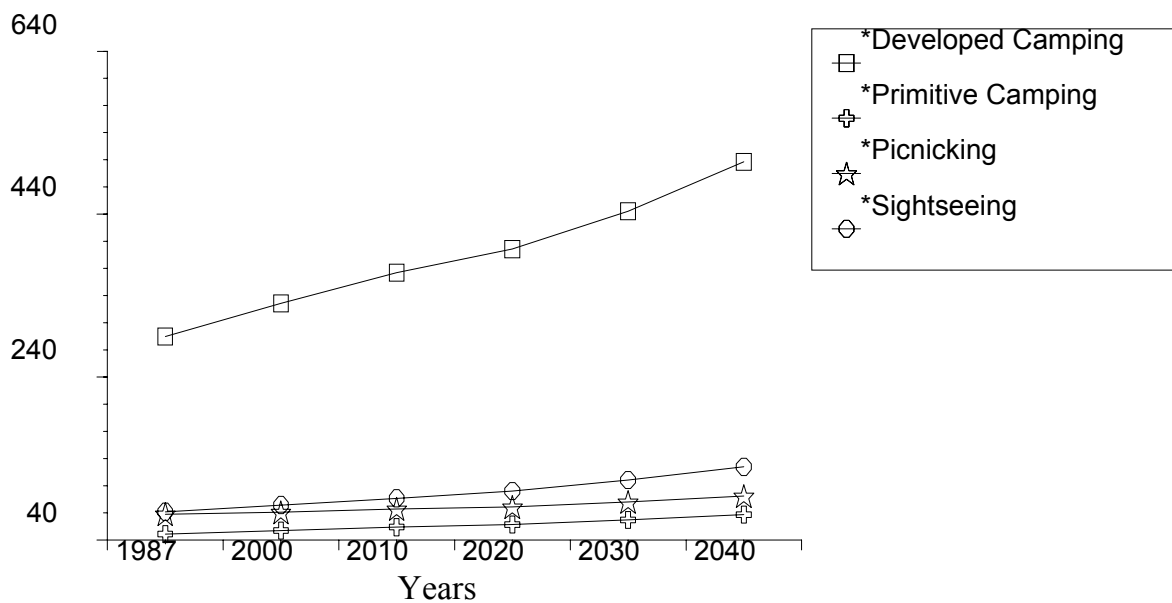
Predicted by RPA



Recreation Visitor Days

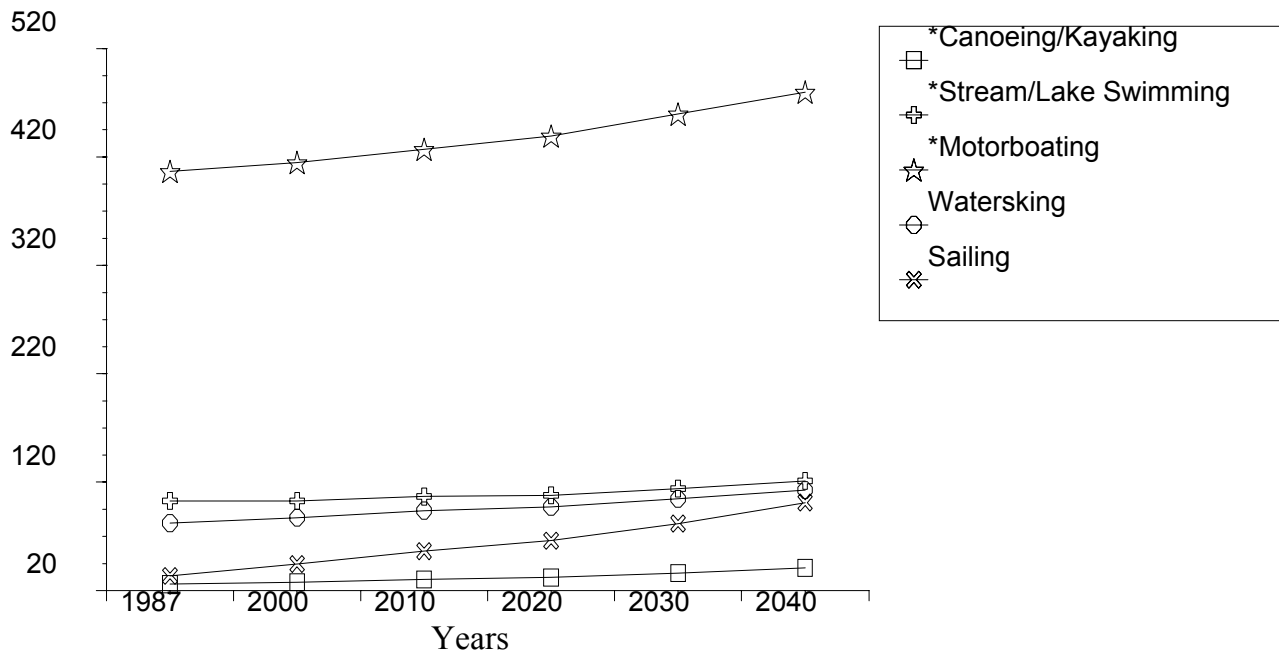
### Camping, Picnicking & Sightseeing

Predicted by RPA



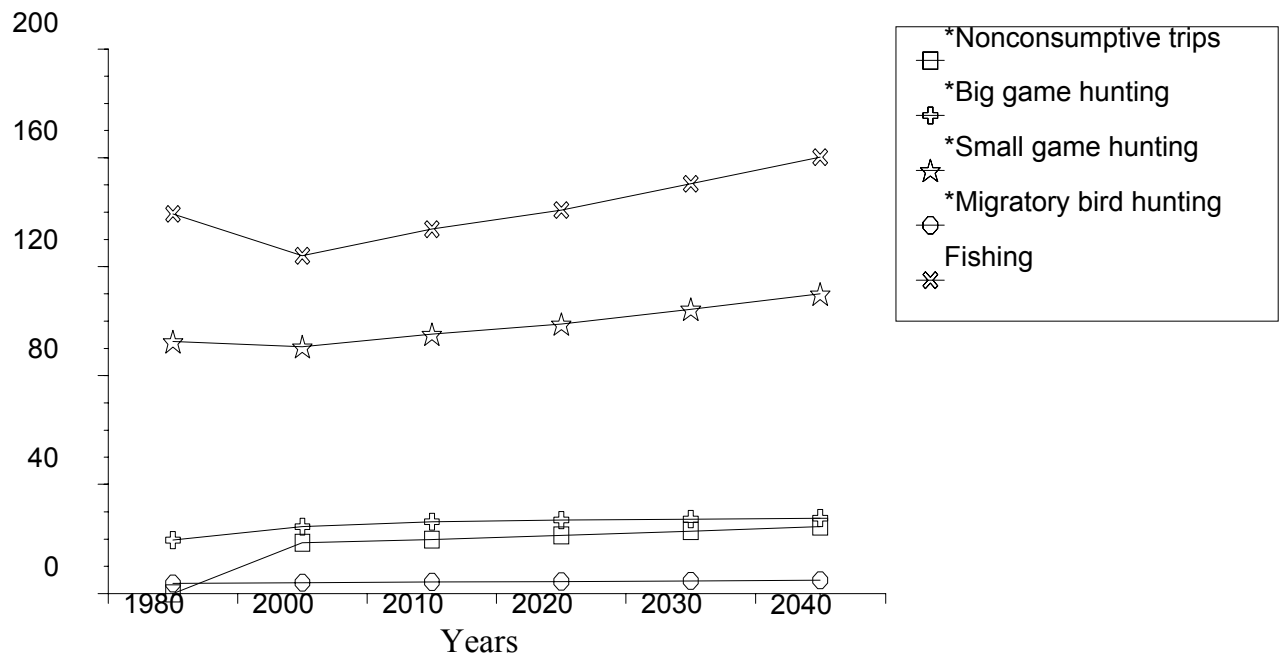
Recreation Visitor Days

## Water Activities Predicted by RPA



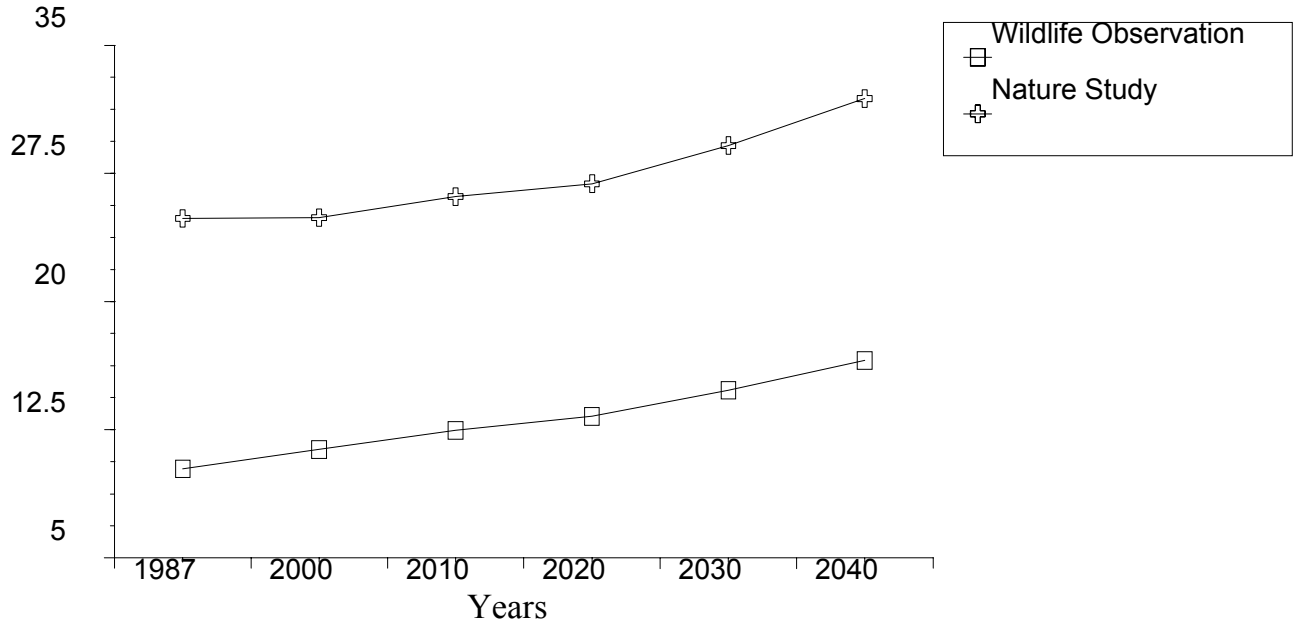
Recreation Visitor Days

## Wildlife Activities Predicted by RPA



Recreation Visitor Days

## Viewing Activities Predicted by RPA

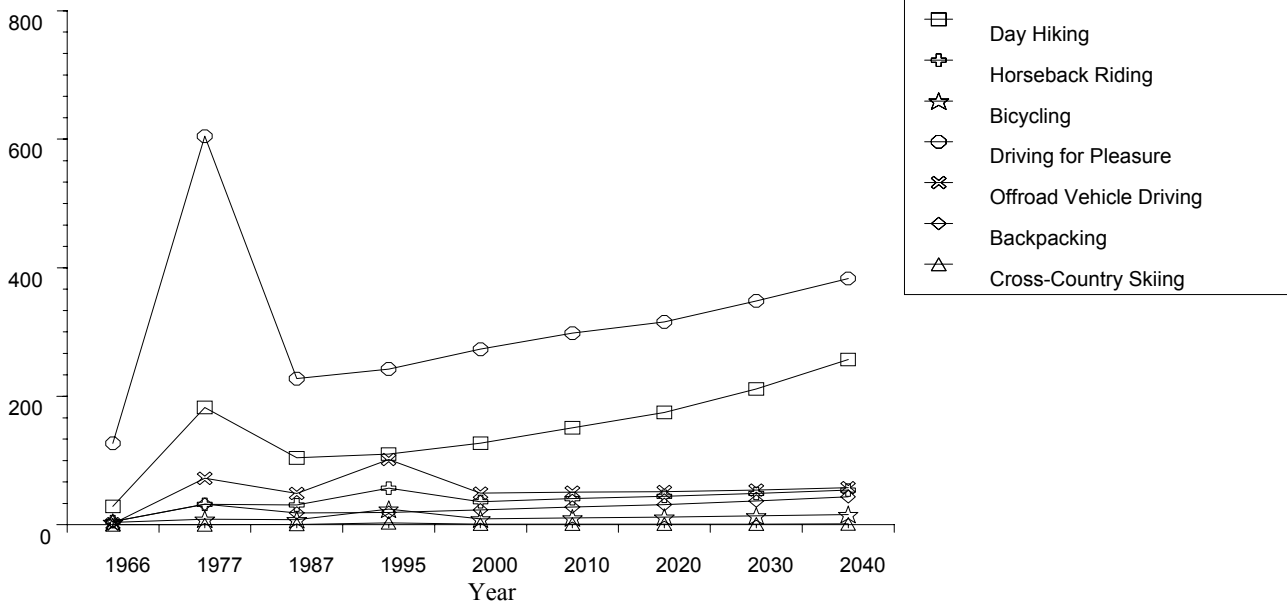


Thousands of Recreation Visitor Days (RVD)

Thousands of Recreation Visitor Days (RVD)

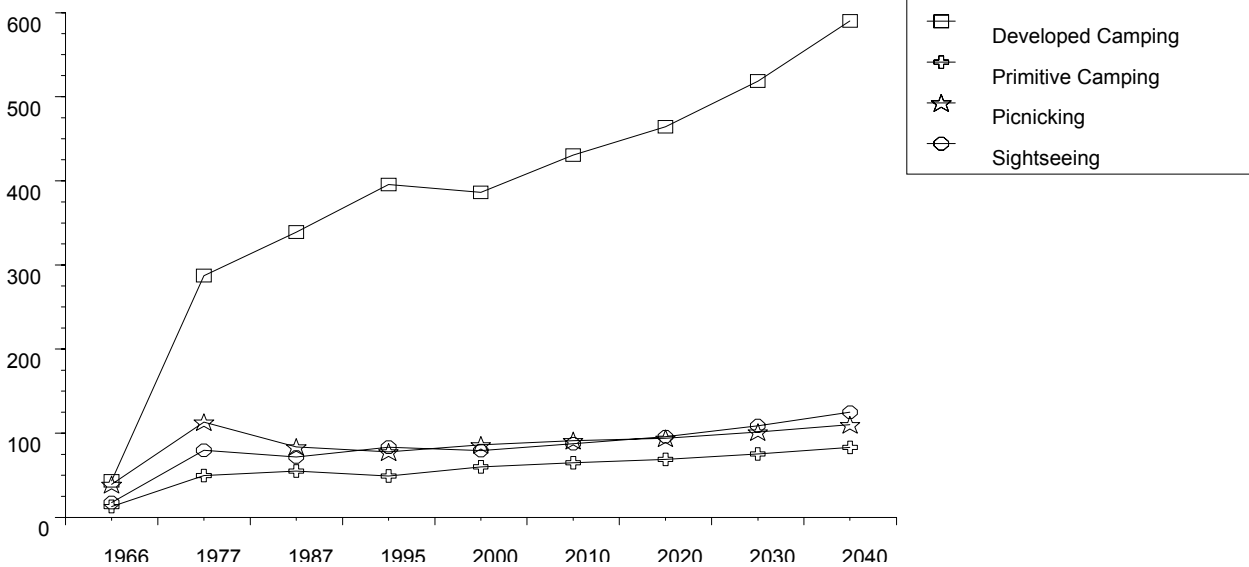
### Travel Activities

Actual RVD & RPA Predicted



### Camping, Picnicking & Sightseeing

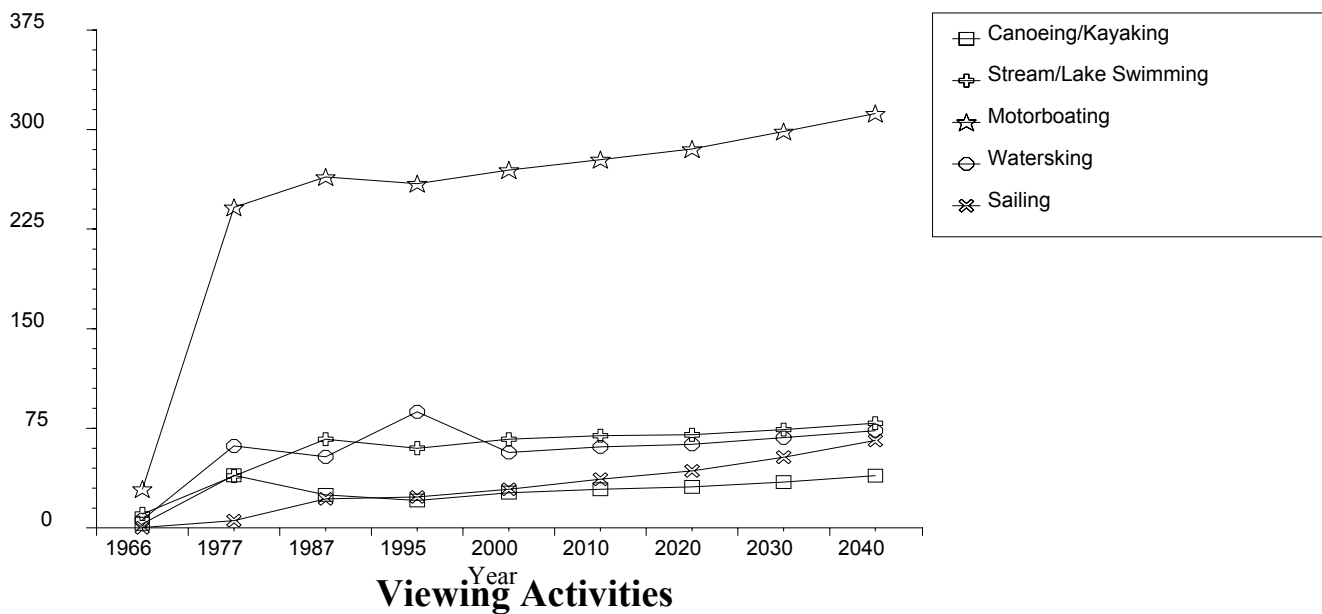
Actual RVD and RPA Predicted



Thousands of Recreation Visitor Days (RVD)

### Water Activities

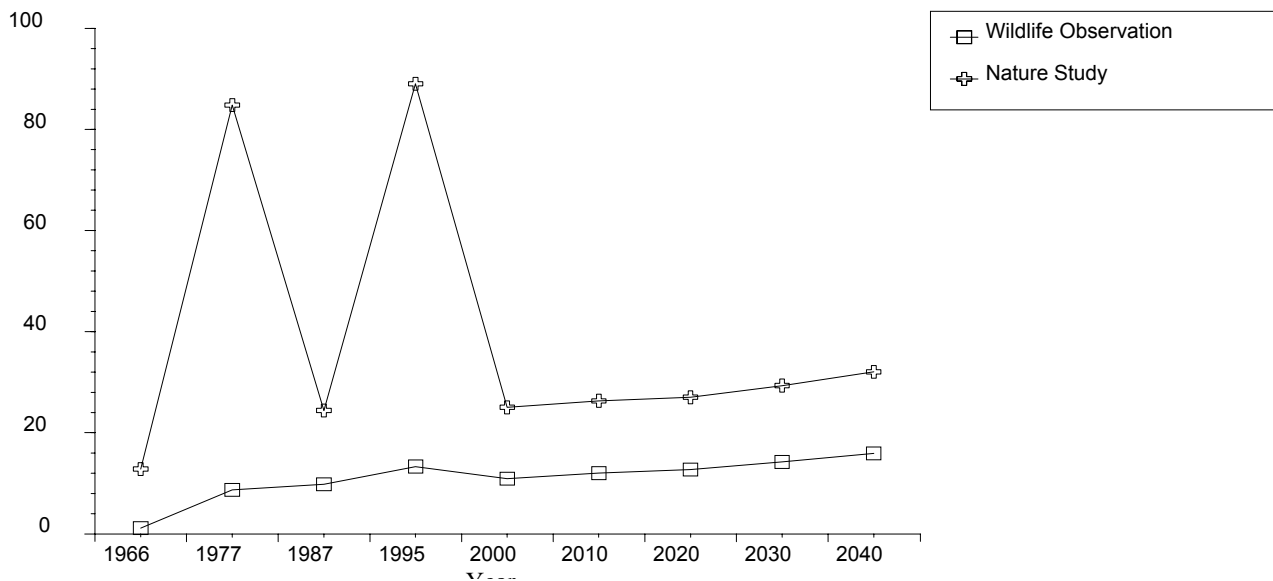
Actual RVD & RPA Predicted



Thousands of Recreation Visitor Days (RVD)

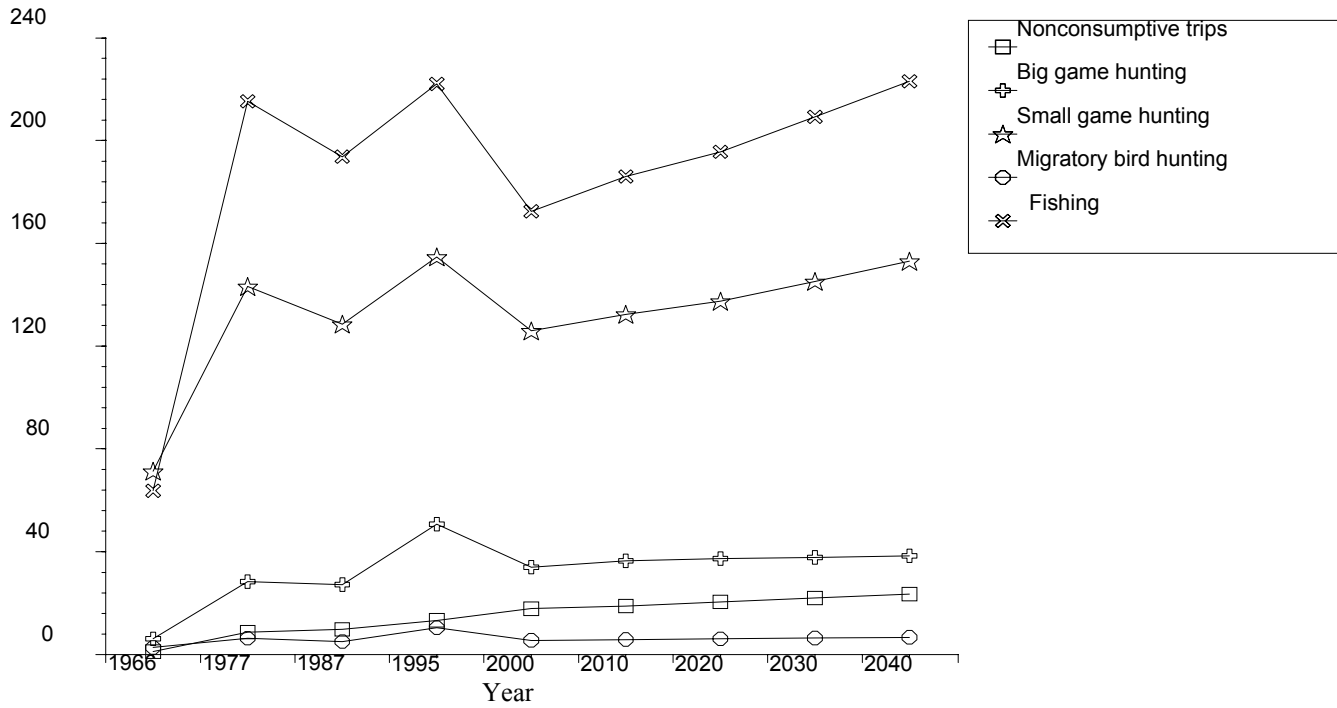
### Viewing Activities

Actual RVD & RPA Predicted



Thousands of Recreation Visitor Days (RVD)

### Wildlife Activities Actual RVD & RPA Predicted



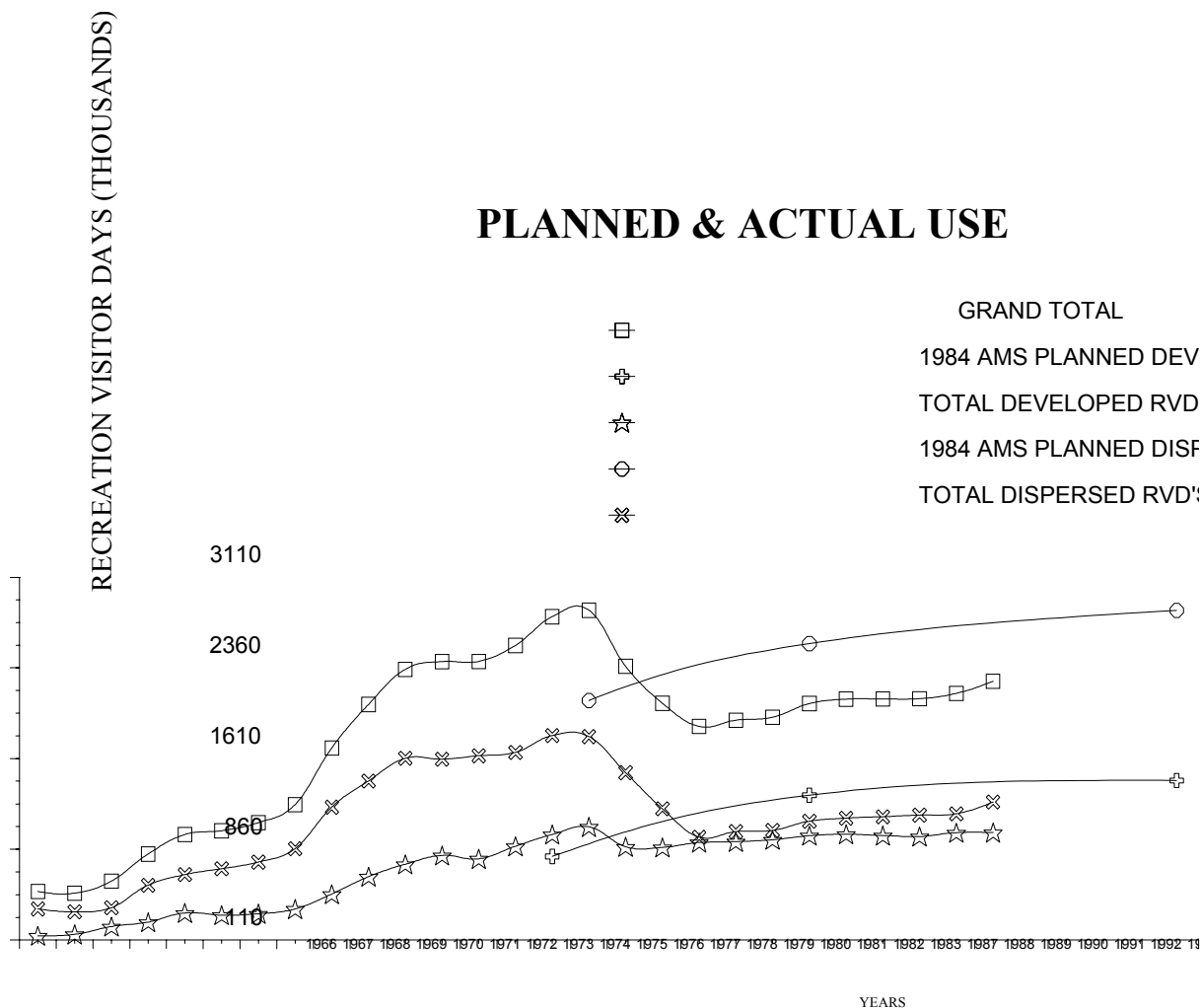


FIGURE 1 Planned and Actual Recreation Visitor Days

**Appendix C: Existing plan direction**



EXISTING PLAN DIRECTION:

The present Forest Plan describes the desired future condition of the Forest for outdoor recreation and proposes a path to take to get to this condition. The Plan was based in part on the 1984 Analysis of the management Situation. This analysis noted areas where management direction should be changed or direction established. Three items were considered critical to the entire Forest:

1. As existing facilities age a substantial increase in costs for construction and reconstruction is expected. This kind of funding has historically been difficult to obtain. An effort should begin immediately to win support for future funding needs. This is recognized as a National Problem.
2. Where soil compaction occurs in recreation areas it is difficult to re - establish vegetation. Soil ripping will be used to prepare a site before reseeding. This will enhance success in vegetation recovery.
3. It will be difficult to meet modest increases in dispersed recreation demand such as hunting and fishing. Demand will increase as private lands become developed or closed to public use. To meet the increased demand the land ownership pattern of the Forest should be improved through land acquisition.

The Plan addressed the supply of recreation opportunities in three issues. (FLMP III - 1, 2) :

Issue #1 The lakes areas

The existing facilities will continue to be managed for a broad rang of opportunities. These facilities will be re - constructed every 30 years to insure they meet the existing needs.

The Zilpo Recreation area on Cave Run will be completed and offer an additional 1350 PAOT. The Caney Site on Cave Run lake will be offered for development by a concessionaire. The Caney site has the potential of 1700 PAOT as a marina/lodge facility. The Grove Recreation site on Laurel River Lake will be offered for concessionaire development as a marina with a 300 PAOT capacity.

After the first decade, but within forty years, there is planned recreation construction on 1,920 acres of Forest (700 acres of which will be associated with the lakes and their surroundings), this would offer an additional 6,975 PAOT capacity."

Issue #2: Recreation

All existing recreation sites will continue to be managed. Additional roads will be constructed which will provide additional access to the Forest. Approximately one third of constructed roads will remain open for all weather use. Many closed roads will offer opportunities for access by foot travel or horseback.

Loop trails between existing facilities are emphasized, with trail head facilities constructed as needed to provide access to existing trails and where new trails are constructed, .

Many facilities support "dispersed" and "less developed" forms of recreation activities. These facilities, such as canoe launches and day use facilities, will be developed.

Certain areas of the forest will be managed to enhance "semi - primitive, non - motorized" opportunities by road closures and timber harvest schedules.

Issue #3: Wilderness and other Designations

Management of the existing specially designated areas such as Beaver Creek Wilderness, 4,791 acres; Red River Gorge Geological Area, 25,662 acres; Natural Arch Scenic Area, 945 acres; and Clifty Wilderness Study Area continues.

Following the above Plan guidelines has led to a net increase in recreation carrying capacity even though no cooperators was found to develop the Caney Site on Cave Run Lake. The table below illustrates the change in carrying capacity.

DEVELOPED RECREATION CAPACITY

**Change in Developed Recreation Sites from 1982 to 1996:**

	# of Sites 1982	# of Sites 5/21/96	Change in #	PAOT 1982	PAOT 5/21/96	Change in PAOT*	%Change in PAOT
Boating Site	22	32	10	5,625	6,848	1223	21%
Swimming Site	1	2	1	2,100	2,500	400	19%
Campground Total	26	30	4	4,000	5,877	1877	47%
Picnic ground Total	20	24	4	1,940	2,205	265	14%
Information Site	1	1	1	40	280	240	600%
All Other	32	48	16	1691	2939	1248	74%

- PAOT = People at one time.