

# **WILDLIFE AND FISH RESOURCES**

## **Examination of Supply and Demand**

DOCUMENT #10

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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# SUPPLY AND DEMAND

## Fish and Wildlife Resources

### Demand Analysis

#### DEMAND - Hunting

##### National/Regional/KY.

National trends in numbers of hunters have been holding steady over the recent past, as indicated by the USF&W Survey data from 1980 to 1990 (USDI, 1994). This relatively flat trend in hunting was also found true for the East-South-Central Region (Alabama, Kentucky, Mississippi, and Tennessee) and while surrounding states demonstrated little change in hunting interest from 1980 to 1990, but Kentucky had a 23% increase in the number of hunters.

Hunting is big business in Kentucky with over \$50 million dollars spent annually by about 500,000 hunters, according to the USF&W Survey results for 1990. Hunters spend about 5 million days afield each year. This aligns fairly close with the National average.

The relative contribution the Forest makes in supporting hunting is greater than found on surrounding lands.

#### Relative Hunter Use on the Forest

<u>Area</u>	<u>% of Hunter</u>		
	<u>Days on DBNF</u>	<u>% of Land on DBNF</u>	<u>Portion of Hunter Activity on DBNF</u>
E. Kentucky	16.7%	7.9%	2.1 times
Kentucky	8.7%	2.7%	3.2 times
Adjacent States	1.19%	0.45%	2.64 times
U. S.	0.127%	0.031%	4.16 times

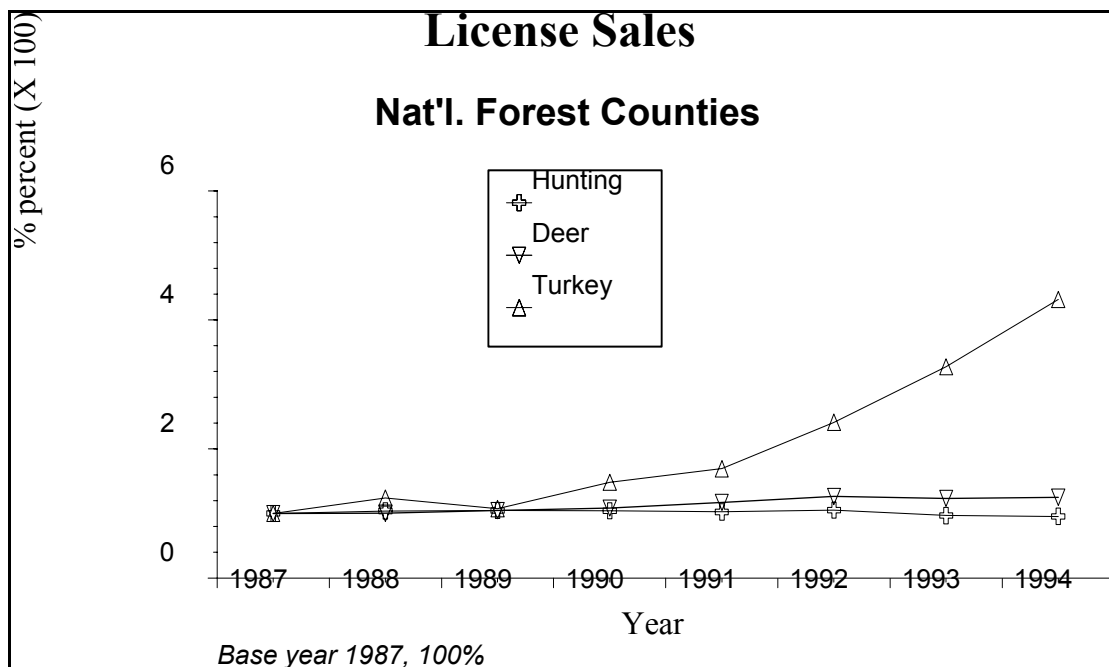
This disproportionate amount of hunting pressure on the Forest is not surprising since it is open to public hunting and provides relatively good habitat for game species associated with forested conditions. However, it does demonstrate the need, or demand, for hunting opportunities and the continued interest in the sport.

Hunter surveys were conducted by the University of Louisville for the Kentucky Department of Fish and Wildlife Resources (KDFWR) in 1984 and 1989 (KDFWR, 1990). During this 5 year period there has been a decline in hunting preference on the Forest in both hunters surveyed

statewide and hunters in East Kentucky. This shift in preference may be due to game population increases throughout the State, overcrowding on the Forest, or a combination of factors. Even so, hunting continues to be one of the most popular outdoor recreational sport on the Daniel Boone.

**Eastern Kentucky**

Hunting license sales in east Kentucky show a slight decline from the period 1987 to 1994, reflected by the total hunting and combination hunting/fishing licenses sold. Deer and turkey hunting permits sold have increased during this period. A similar trend in license sales also occurs in the twenty-one (21) counties that contain a portion of National Forest land (KDFWR,1995).



In the counties containing National Forest, hunting license sales have declined by 5% from 1987 to 1994. Deer permits sold increased by 25% and turkey permits sold increased by 331%. Waterfowl hunting licenses sold in the area remained fairly flat at an average of about 280 sold annually over the period. License sales trends in the Forest area are probably an under estimate of demand. Total population trends in these twenty-one counties have declined by 6.5% during the period of 1981 to 1990 (Kentucky Cabinet for Economic Development, 1994). Considering this decrease in the population of the area there is probably an overall increase in hunting interest in the vicinity of the Forest.

Of the counties that contain National Forest, greatest increases in hunting license sales (including combination licenses) from 1987 to 1994 were Laurel, Rowan, and Menifee, in order, and greatest decreases were Rockcastle, Clay, and Estill. Change was calculated by comparing the mean change for the period to the base year of 1987. Counties with the greatest increase in deer tag sales were Laurel, Rowan, and Pulaski, and least increase were Bath, Powell, and Lee.

Greatest increases in turkey tag sales were in Pulaski, Rowan, and Perry counties, and least increases in Owsley, Bath, and Wolfe counties. The biggest seller of turkey permits over the period was Harlan county, and it consistently sold more permits year-after-year.

**Small Game Hunting**

The number of hunters pursuing small game has generally declined throughout the State. Between 1984 and 1989, deer hunting popularity moved from third place to first place, replacing squirrel as the most popular species hunted. In 1989, squirrel was second and rabbit third in hunter popularity (KDFWR, 1990).

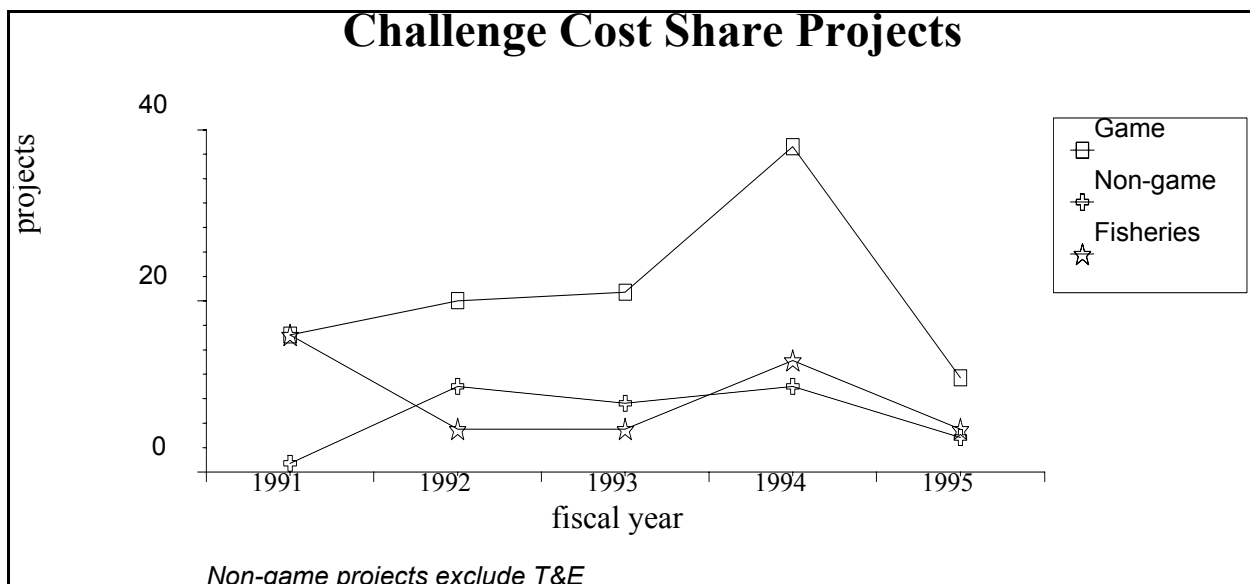
**Demand for Hunting**

Over 40% of the hunters in Kentucky reported some difficulty in finding a place to hunt in 1989. For most game species this was reported to be greater in east Kentucky than west Kentucky.

In the 1989 Hunter/Harvest Survey (KDFWR,1990), hunters were canvassed to determine if they would be willing to pay additional fees to improve wildlife habitat management and acquire more lands for public hunting. Responses to both of these questions were strongly supportive. This reflects a strong demand of hunting interests and willingness to personally support their sport.

**Cooperative Habitat Improvement**

Local hunter clubs in the vicinity of the Forest have historically supported wildlife habitat management, as demonstrated through the many cost-share arrangements implemented to facilitate improvement activities. Cooperative wildlife habitat improvement projects climbed to 38 in 1994 involving 33 clubs, individuals, and organizations (WFRP Report). Involvement to date is only limited by agency funding and manpower limitations essential to support cooperative interests and potential activities/projects.



## **Demand Analysis - Hunting**

Analysis was done to approximate recreational hunting on the Forest and project future demand. This was done through a 4-step process based primarily on the 1991 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for Kentucky, by the USDI, Fish and Wildlife Service and US Department of Commerce, Bureau of Census (FWS, 1993).

### **Step 1. Determine the number of hunters on the Forest**

The number of hunters in Kentucky (big game, small game, migratory, and others) was stratified as residents and nonresidents. Unlicensed hunters, under 16 years of age, was added to the number of resident hunters. This information came from the FWS Survey. About 8.7% of the resident hunters in Kentucky are found to use the Daniel Boone N. F. (KDFWR, 1990), or 33,000 hunters. Of the nonresident hunters, 14% use public lands, according to the FWS survey. National Forest represents about 60% of the state and federal public lands in Kentucky (Commonwealth of Kentucky, 1995). Therefore, 3,276 nonresident hunter was estimated to use the Forest, with a total of 35,276 total hunters.

### **Step 2. Determine the number of Wildlife/Fish User Days (WFUDs)**

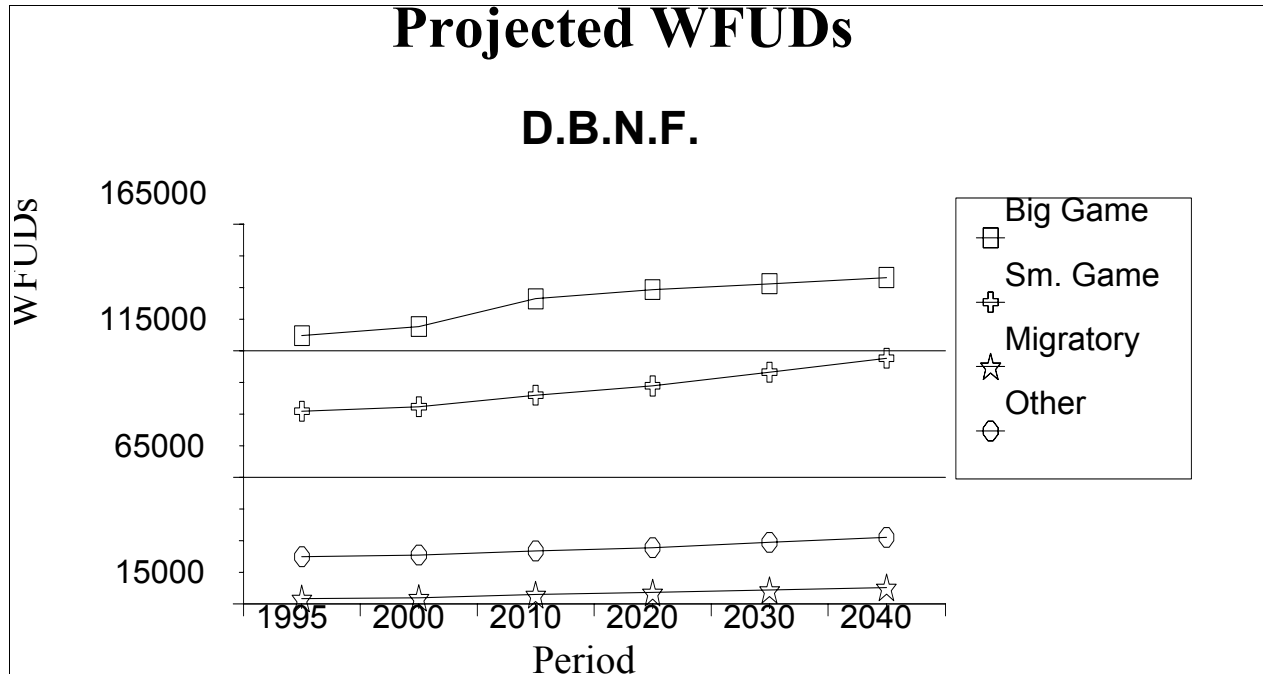
First the number of activity days hunting was determined by multiplying the number of resident and nonresident hunters by the approximate number of days spent afield during the season. This total, 598,818 activity days, was stratified by game category (big game, small game, migratory, and other) using the amount of participation found to be spent in each category during the 1991 Fish and Wildlife survey. Hunter activity days by category was then converted to WFUDs (12 hour days) based on the average number of hours a hunter spends hunting during one day, for a total of 260,286 WFUDs. This level of use represents 1990, and must be adjusted to the mid-1990s for application in the Forest planning process. Adjustments made in each game category align with the 1989-2040 RPA Analysis of Wildlife and Fish Situation Report, totalling 262,466 WFUDs.

### **Step 3. Valuing current demand**

Each WFUD was valued by game category based on the Recommended 1990 RPA Program (USDA, Forest Service, 1990). The resulting values reflect 1990 levels, and was adjusted for inflation to represent the mid-1990s. The total consumptive hunting value is \$7,868,983 dollars.

### **Step 4. Determining future trends**

Recreational hunting use trends were projected using the 1989-2040 RPA Analysis of Wildlife and Fish Situation Report projections. Change was calculated for each of the game categories based on the mid-1990 calculated in step 2.



Projected Wildlife and Fish User Days

	<u>mid-1990s</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>
<b>Big Game</b>	120,889	124,516	135,396	139,023	141,440	143,858
<b>Small Game</b>	91,001	92,821	97,371	101,011	106,471	111,931
<b>Migratory</b>	17,064	17,405	18,600	19,453	20,477	21,501
<b>Other</b>	<u>33,512</u>	<u>34,182</u>	<u>35,858</u>	<u>37,198</u>	<u>39,209</u>	<u>41,220</u>
<b>Total</b>	262,466	268,924	287,225	296,685	307,597	318,510

**DEMAND - Fisheries**

**National/Regional/KY.**

The national number of anglers increased by 20% from 1980 to 1990, according to the FWS Survey (USDI, 1994). This indicates a continuing increase, or growing demand, for recreational fishing. Actually, fishing has shown an increase in anglers for each of the 5 year surveys conducted since initially started in 1955. In the East-South-Central Region there was an 18% increase in anglers over the decade of the 1980's. All of the States adjacent to Kentucky, except W. Virginia, experienced an increase in resident fishing activity. Kentucky reported a 12% increase in anglers for 1980 to 1990.

The 1991 Kentucky Angler Survey (KDFWR,1992) reported 515,487 fishing licenses purchased in 1989, of which 26.9% live in east Kentucky. Nearly twice this number of anglers fish in Kentucky according to the FWS survey (USDI, 1993), and as calculated in the Demand Analysis

section. Individuals not required to purchase a license include those under the age of 16, over the age of 65, disabled individuals, military personnel on furlough, and partially disabled veterans.

Kentucky anglers fish about 24 days during the year, 15% more than the national average. Almost half of the anglers have children less than 16 years old and 83% of them fish. Most start fishing at about 10 years of age. Fishing is a sport passed on from generation to generation in many angler households.

Fishing derbies for youths and seniors are hosted on the Forest annually to promote sport fishing. In 1997, 468 youths and seniors participated in 7 events. These were supported by 43 different partners. A total of 11,627 participated in fishing derby events on national forests in the southeastern region.

Fishing from a boat was the most popular method used by anglers, 58 percent, but nonboat fishing is still very popular. Anglers fished large reservoirs, lakes, and farm ponds (under 10 acres) most often, 40% of the time. Of the areas cited in the state as fished most often Cave Run Lake and Laurel River Lake were in the top twelve. Lake Cumberland was identified as number one.

The quality of a fishing trip was mostly measured by "the enjoyment of fishing," although the number of fish caught remains an important consideration, especially in contemplating a return visit. Nearly half think that habitat and water quality are the most important factors affecting fish populations. Fisheries projects that focus on habitat rehabilitation, enhancement, protection, and watershed management receive strong support from the angling public.

### **Eastern Kentucky**

Black bass (largemouth, smallmouth, and spotted bass) are the most popular fishes in Kentucky. Crappie and sunfish species are second and third in popularity among east Kentucky anglers. Muskie and walleye are fished for in higher percentages also in east Kentucky than elsewhere in the state. About 11% of the anglers fishing in the eastern region of the state pursue trout, compared to 2% in the western part of the state and 5% in the central region. According to the 1991 Kentucky Angler Survey (KDFWR, 1992) catfish has declined in popularity among east Kentucky anglers, even though this is one of the heaviest stocked areas.

### **Demand Analysis - Fishing**

The same general concepts and processes used in the demand analysis for hunting were applied here to determine the number of anglers using National Forest, relative use, and fishing values and trends. This analysis is again based primarily on the 1991 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for Kentucky, by the USDI, Fish and Wildlife Service and US Department of Commerce, Bureau of Census (FWS, 1993).

Step 1. Determine the number of anglers on the Forest

The number of resident licensed anglers, unlicensed anglers, and nonresident anglers were taken from the FWS Survey (FWS, 1993), totalling 1,021,700 anglers in Kentucky. Then the total

water on public lands (state, federal, and county) was determined from the Outdoor Recreation in Kentucky, A Five-Year assessment and Policy Plan (Commonwealth of Ky., 1995) to be 206,795 acres. Of this about 9% is on the Daniel Boone National Forest. Assuming about 75% of the anglers in the state use public lands and this use is the same for resident and nonresident users, 69,271 anglers use National Forest.

Step 2. Determine the number of Wildlife/Fish User Days (WFUDs)

The average Kentucky angler fished about 24 days during the 1990-1991 season. Therefore, the total fishing activity days for the Forest is about 1,662,504 days. The 1990 Recommend RPA Program (USDA, Forest Service, 1990) values a coldwater fishing activity day at \$15 and a WFUD at \$40. A warmwater fishing activity day is valued at \$27 and a WFUD at \$75. Based on these values there would be 4.5 hours in a coldwater activity day and 4.33 hours in a warmwater activity day. Since coldwater fishing is about 11% of the use in east Kentucky the total angling would be 600,734 WFUDs, or about 68,493 coldwater and 532,241 warmwater WFUDs.

Step 3. Valuing current demand

To approximate the value of recreational fishing on the Forest the above dollar values for WFUDs were applied to use. The total calculated value represents year 1989, and was adjusted for inflation to the mid-1990s. This resulted in a value of \$33,713,075 dollars that is applicable in the planning process.

Step 4. Determining future trends

Recreational fishing trends were projected for the Forest using the 1989-2040 RPA Analysis of Wildlife and Fish Situation Report projections. Change was calculated for fishing based on the mid-1990 WFUDs calculated in step 2.

Projected Wildlife and Fish User Days

	<u>mid-1990s</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>
<b>Total Fishing</b>	600,734	612,749	654,800	684,837	726,888	768,940

**DEMAND - Nonconsumptive Wildlife Activities**

**National/Regional/KY.**

Biological diversity is a key element to sustaining humanity and to ensuring the sustainability of the forest ecosystem. Providing for the many inter-related processes and proper function of the forest ecosystem must start with the retention and appropriate restoration of all essential components of the forest. Efforts to conserve rare species and rare communities is a part of providing for the long-term sustainability and health of the Daniel Boone National Forest. Kentucky ranks 12th in the nation for the number of threatened, endangered, and extirpated species. This is a result of several factors including a relatively high level of biological diversity in the State and extensive alteration of some native habitats. Some of the greatest concentrations of rare species in Kentucky are found in the Upper Cumberland River basin, much of which is



located on the south end of the Forest. This may be due to the fact that this region includes the Cumberland River and the cliffs of the Cumberland Plateau, considered to be one of the most biologically diverse areas in the state (EQC, 1997). The Daniel Boone supports 36 federally listed threatened and endangered species, many of which are associated with aquatic ecosystems. Consequently, the Forest plays an important role in maintaining the survival of these populations and a potential biological source for recovery .

Having the opportunity to view and observe wildlife is an integral and important part of many recreational activities such as hiking, hunting, fishing, and other outdoor adventure activities. This factor is often identified as one criteria applied in personally evaluating the success of an outdoor experience.

Of the various types of wildlife associated nonconsumptive activities, viewing (including feeding, observing, photography) while away from one's residence ( $\geq$  one mile) had the largest increase in participation, 63% from 1980 to 1990 (USDI, 1994). The largest regional increase in wildlife watching was in the East-South-Central Region, which more than doubled with a 108% increase from 1980 to 1990. Viewing interest in Kentucky during that period increased by 111%, exceeding the national and regional trend.

In the spring of 1995, the University of Minnesota conducted a survey of forest managers on National Forests throughout the nation to determine the relative importance of Forest ecosystem attributes, outputs, and functions as perceived by Forest managers (Zhi Xu, 1996). Of the 19 Forest attributes identified, respondents ranked timber, wildlife and fish habitats, consumptive recreation, and nonconsumptive recreation as the top 4 in importance, respectively, in the Southeastern Region (R-8). Nationally (all regions) wildlife and fish habitats, consumptive recreation, nonconsumptive recreation, and water were ranked in the top 4, respectively. The relatively high rating of importance assigned to nonconsumptive recreational resources on National Forests is another strong indicator of demand.

Interest in bird watching appears to be increasing in popularity throughout the U. S. Retail sales generated by nonconsumptive bird use exceeded \$57 million dollars in Kentucky in 1991. The National Survey on Recreation and the Environment shows that over the past decade, birdwatching has become one of the fastest growing outdoor recreational activities, exceeding hiking and skiing (American Bird Conservancy, 1997).

### **Eastern Kentucky**

Viewing and photographing wildlife is also the greatest nonconsumptive wildlife related activity found on the Forest. About 30% of the people surveyed in the National Survey on Recreation and the Environment (NSRE, 1997) participated in wildlife viewing/photography and slightly fewer, 27%, concentrated on viewing and photographing birds. Participation in these activities is slightly less on the Daniel Boone compared to the responses in the national survey. These activities compare closely to overall participation in fishing at the national level and within the general region of the Forest. In contrast, participation in sport hunting on the Forest was about half of that seen in wildlife viewing and photography and even lower in the national survey responses.

### **Demand Analysis - Nonconsumptive Wildlife Activities**

The same general concepts and processes used in the demand analysis for hunting were applied here to determine the number of nonconsumptive participants using National Forest, relative use, value of nonconsumptive uses, and trends. This analysis is based primarily on the 1991 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for Kentucky, by the USDI, Fish and Wildlife Service and US Department of Commerce, Bureau of Census (FWS, 1993).

**Step 1. Determine the number of participants on the Forest**

The total nonconsumptive wildlife use by residents and nonresidents, on public lands, was Boone represents 60% of the public state and federal lands in Kentucky 273,600 nonconsumptive users were estimated for the Forest.

**Step 2. Determine the number of Wildlife/Fish User Days (WFUDs)**

The average resident participant spends about 9.8 days per year observing and photographing wildlife, which calculate to 1,509,396 activity days. Nonresidents spend about 5.0 days per year participating in nonconsumptive wildlife activities, which is 597,900 activity days. This is a total of 2,107,296 total activity days by participants on the Daniel Boone. A nonconsumptive activity day averages about 4 hours of participation (USDA, Forest Service, R8 memo 2630, 1996), therefore 702,425 total WFUDs are generated by nonconsumptive uses on the Forest.

**Step 3. Valuing current demand**

Each WFUD was valued at \$39.26, based on the Recommended 1990 RPA Program (USDA, Forest Service, 1990). This was adjusted for inflation to bring the values to the mid-1990s for application in the Forest Plan revision. A total value of \$24,130,055 dollars was calculated to represent the current value of nonconsumptive wildlife recreational activities on the Forest.

**Step 4. Determining future trends**

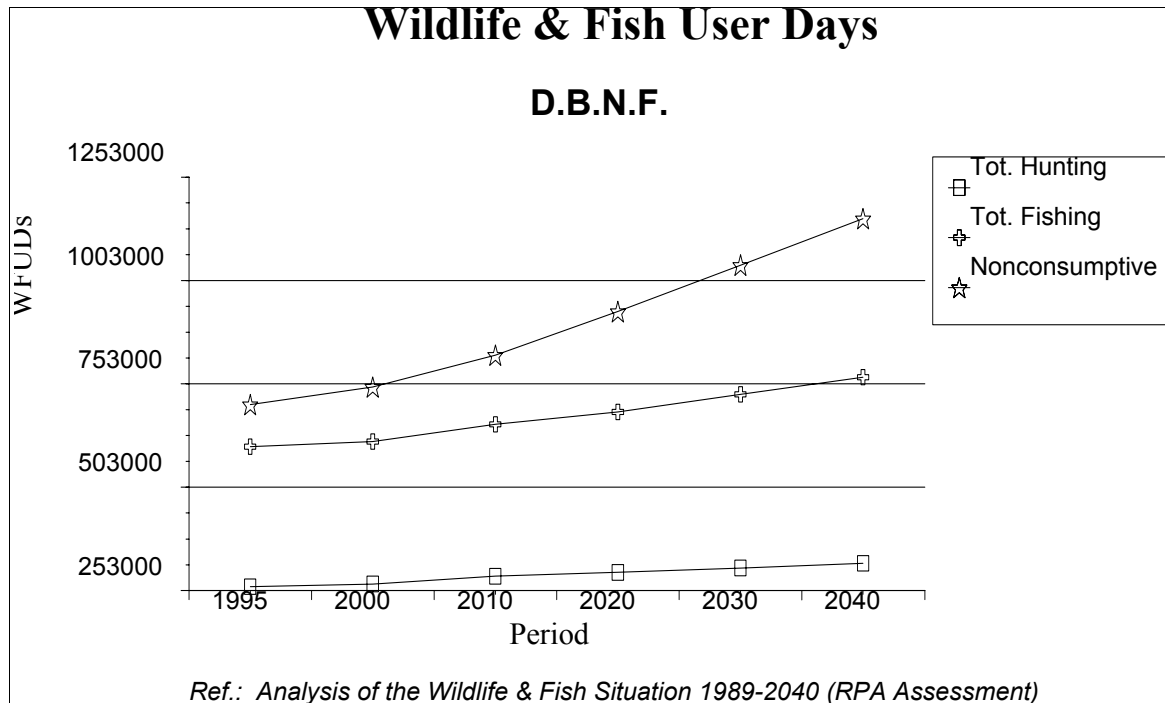
The recreational nonconsumptive wildlife use trend was projected using the 1989-2040 RPA Analysis of Wildlife and Fish Situation Report (USDA, Forest Service, 1989). Change was calculated for each period based on the mid-1990s use determined in step 2.

Projected Wildlife and Fish User Days

	<u>mid-1990s</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>
<b>Participants</b>	702,425	744,571	821,837	927,201	1,039,589	1,151,977

**Summary of Wildlife and Fish Use Trends**

The following projected change in use was compiled in the Demand Analysis of each preceding section. Trends reflect the change displayed in the Analysis of the Wildlife and Fish Situation in the United States: 1989-2040, prepared as part of the 1989 RPA Assessment.



Projected Wildlife and Fish User Days

	<u>mid-1990s</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>	<u>2030</u>	<u>2040</u>
<b>Total Hunting</b>	262,466	268,924	287,225	296,685	307,597	318,510
<b>Total Fishing</b>	600,734	612,749	654,800	684,837	726,888	768,940
<b>Nonconsumptive</b>	702,425	744,571	821,837	927,201	1,039,589	1,151,977

In looking more closely at demand trends expected over the next Plan period (2000-2010), wildlife and fish use on the Forest will most likely out pace the National RPA projections.

	<b>RPA Projections*</b>		<b>1991 USF&amp;W Survey - KY.**</b>
	<u>1990-2000</u>	<u>2000-2010</u>	<u>1980-1990</u>
Hunting	5%	6%	23%
Fishing	5%	7%	12%
Nonconsumptive	13%	11%	111%

\* percent change in public participation projected by activity for each time period.  
 \*\*percent change in the number of participants by activity for the 1980 to 1990 period.

Increases in hunting will be primarily for deer and turkey. Populations of both big game species are increasing on the Forest and hunting interests will most likely follow suit. Turkey have only recently been re-established in huntable numbers and hunting interests have increased dramatically. Fishing interests are increasing at a rate greater than the RPA projects. This will probably continue through the Plan period (2000-2010) due to the quality of fishing opportunities available and the variety of sport fishing resources on the Forest. Nonconsumptive wildlife use, primarily viewing and photography, has more than doubled in Kentucky, far exceeding RPA projections. This use is expected to continue with a similar trend through the Plan period.

## Supply Analysis

### SUPPLY - Game Populations

Of the many game species on the Forest, deer and turkey are of great interest due to increasing demand trends and increasing populations. Hunting interest in other forest game appears to be relatively level. Deer populations in east Kentucky have increased more in the past 10 years than anywhere else in the state.

#### Regional Deer Population Trends

	<b>1995 Population</b>	<b>1995 Density (acres/deer)</b>	<b>1995 Harvest</b>	<b>Change since 1986</b>
<b>West KY.</b>	209,354	35	35,658	51%
<b>East KY.</b>	147,721	64	21,338	276%
<b>Central KY.</b>	38,003	50	4,973	77%
<b>Louisville area</b>	23,735	31	4,963	46%
<b>North KY.</b>	28,773	27	5,456	37%

This may be partially due to the stocking efforts of the Ky. Dept. of Fish and Wildlife Resources (KDFWR) in re-establishing a huntable deer herd in east KY. Large numbers (hundreds) of deer were relocated to some eastern counties during this period. The saturation stocking effort was intended to overcome mortality factors and provide a population base from which to sustain huntable numbers. The deer herd on the Daniel Boone is presently estimated at 9,600 deer. Suitable habitat for deer was estimated at 662,000 acres on the Forest in the 1997 Wildlife, Fish, and Rare Plant report (WFRP, 1997). If fully occupied, at an average density of 35 acres per deer, potential exists to increase the supply to 18,900 deer. If deer population increases on the Forest continue as demonstrated over the past 10 years (19.8% increase per year), potential capacity will be reached in five years. However, with the anticipated increase in deer hunting and the intrinsic population control mechanisms within the deer herd, increases will decline over time and carrying capacity will most like not be reached until about the end of the Plan period (year 2010). This assumes that habitat quality is maintained and socio-economic factors do not adversely effect population growth of the deer herd.

Turkey populations are also increasing, much more dramatically than deer, and hunting interest continues to reflect this change. Until recently turkey was found in relatively isolated pockets of the Forest and hunting was allowed only in specific counties or portions of particular counties. In 1986, spring turkey hunting was only open in 4 of the 21 counties containing national forest land, about 28% of the Daniel Boone. Restocking activities by the KDFWR over the past 10 years and a significant population expansion over the past 6 years has expanded turkeys to all national forest counties. In 1996, all counties statewide were opened to turkey hunting. Hunter success has risen from the 12-15% range to over 30%. The current estimated population on the Forest is 3,200 turkeys.

The 1997 Wildlife, Fish, and Rare Plant report estimated suitable turkey habitat on the Forest to be 550,000 acres. At a population density of 15 birds per square mile (USDA, Forest Service Handbook 2609.24R, 1980) the Forest could potentially support 12,890 turkeys, or about a four-fold increase. At the current average growth rate (51% increase per year) the turkey range on the Daniel Boone would be fully occupied by about 2000. Considering mortality factors, potential adverse climatic conditions, and the increase in hunter interests a reduced annual growth rate is probably more realistic. Suitable habitat will probably be fully occupied by the end of the planning period (year 2010).

**SUPPLY - Fisheries Resources**

The Forest has lands in three major river systems: the Licking River, the Kentucky River and the Upper Cumberland River. Each of these river systems are part of the Ohio River Basin. Collectively these river systems cover 40 percent of the State (10.3 million acres) and more than one million people inhabit this area, depending on and using surface and groundwater resources to meet their needs. The Forest manages 6% of each the Licking and Kentucky River systems and 10% of the Cumberland River drainage. Kentucky contains more stream and river miles than any other state, except Alaska.

Sport fishing on the Forest is fairly good and a wide variety of opportunities exists. Black bass species are the most popular, pursued primarily in the larger lakes on the Forest. Many of the bigger rivers and streams also provide good bass fishing opportunities. Crappie, muskie, walleye, and trout are other favored species by many anglers on the Daniel Boone. The majority of the trout fishing opportunities in Kentucky are found on the Forest. A cooperative trout stocking program involving 12 streams and Laurel River Lake maintains this high interest resource primarily through annual releases.

Stream & Lake Inventory (GIS)

District	Area	Perennial Streams		1 - 10 ac. Lakes		10+ ac. Lakes	
		Number of Segments	Total Miles	Number	Acres	Number	Acres
Morehead	D.B.N.F.*	3,198	479	7	29	8	8,424
	Proclamation	6,007	1,026	27	80	10	8,482

Technical and Agency Review Draft

Stanton	D.B.N.F.*	1,468	250	2	8	3	225
	Proclamation	3,714	769	38	113	8	688
Berea	D.B.N.F.*	1,582	229	0	0	1	13
	Proclamation	4,427	843	18	241	4	676
London	D.B.N.F.*	1,997	370	3	13	3	7,103
	Proclamation	3,960	811	16	53	4	7,534
Somerset	D.B.N.F.*	1,462	285	7	11	2	2,731
	Proclamation	2,473	522	46	101	3	2,766
Stearns	D.B.N.F.*	2,398	403	2	3	4	1,824
	Proclamation	5,161	1,062	61	155	6	1,857
Redbird	D.B.N.F.*	4,265	446	3	16	2	2,996
	Proclamation	13,465	2,309	34	91	5	3,151
TOTAL	D.B.N.F.*	16,370	2,462	24	80	23	23,316
	Proclamation	39,207	7,342	240	834	40	25,154

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 \*D.B.N.F.- perennial streams are primarily "blue line" streams mapped in the GIS stream layer within national forest; lakes on or intersecting national forest.

Many land use changes on or in the vicinity of the Forest over the past ten years have contributed to improvements in water quality and fish populations. Land acquisition has resulted in a 25,000 acre net gain in national forest, of which a significant portion was along major drainages such as Horselick Creek, Rockcastle River, Cumberland River, and Rock Creek. Economic interest in coal mining has declined, reducing activity both on the Forest and adjacent lands. In 17 of the 21 national forest counties there is about 7,000 acres of abandon mine lands and 17,000 acres that have been reclaimed. Resident population densities within 15 national forest counties has declined, potentially reducing ground disturbance activities are associated with residential development and potential for adverse effects on water quality. Due to poor on-site wastewater treatment at some of these private residences, a few Forest streams are being impacted by organic enrichment. Changes in agricultural activities in eastern Kentucky from 1982 to 1992, show an increase in pasture land, +41%, and a decrease in cropland, -34% (EQC, 1997).

There is one federally designated wild and scenic river on the Forest and five river segments that have been nominated for classification. In addition, five rivers on the Forest currently have state wild and scenic river designations. Fishing is second to trail use as the most frequent activity in these river corridors (DBNF, 1994).

Water quality improvement potential exists on the Forest with corresponding improvements in primarily stream fisheries. About 85 stream miles have been identified as either partially

supporting or not supporting designated beneficial uses, based on the: 1996 Kentucky Report to Congress on Water Quality." This is 7 percent of the Forest's perennial streams. Stream sedimentation and acid mine drainage from abandoned surface and underground coal mines, private wastewater systems (septic), agriculture, and oil production dominate the list of water quality problems the Forest perceives as the most serious (DBNF, 1997).

**SUPPLY - Nonconsumptive Wildlife Resources**

**Biological Diversity**

Maintaining a biologically diverse forest ecosystem and restoring degraded or diminished habitat conditions is essential to provide for the long-term habitat needs of forest dependant and associated flora and fauna. This is a fundamental concept of forest sustainability and the maintenance of forest health.

The following minimum management requirements (MMRs) in the Forest Plan S&Gs are intended to help ensure that a diverse and heterogeneous condition is preserved.

Minimum Management Requirements

<u>(M.M.R.)</u>	<u>March, 1986</u>	<u>Sept., 1994</u>
0-10 stand age ( $\geq 6.25\%$ )	8.1%	10.3%
0-20 stand age ( $\leq 33\%$ )	15.8%	17.7%
50+ stand age ( $\geq 9.38\%$ )	70.8%	66.5%
50+ yrs. oak types ( $\geq 5.63\%$ )	50.8%	64.8%
100+ yrs. upland hd. ( $\geq 3.44\%$ )	3.9%	6.9%
80+ yrs. cove hd. ( $\geq 3.44\%$ )	25.7%	21.8%

Within assumptions, this table partially demonstrates maintenance of a diverse forest environment essential to sustain a variety of indigenous wildlife resources and efforts to meet the interests of nonconsumptive users.

New information continually evolves concerning wildlife resources, habitat requirements, and management techniques. As need occurs provisions are implemented to ensure that forest resources are perpetuated on the Daniel Boone. Some of the provisions implemented, or in process of implementation, during the period include cliffline management direction, Indiana bat management provisions, red-cockaded woodpecker management direction, two-aged shelterwood regeneration methods, and old growth management direction.

**Rare Fauna and Flora**

Species that are dependant on specific forest habitat conditions, or particular communities, are referred to as habitat specialists such as the yellow-breasted chat, in contrast to habitat generalists such as the American robin or raccoon.

Forest habitat specialists are less commonly observed, and therefore, are of greater interest to many wildlife viewers. Some species are very rare, including plants, and may hold a challenge of discovery for individuals with the expertise to identify them. In addition, these very rare species such as federally listed endangered and threatened species, provide opportunities for study and research within a relatively natural environment. Little is known about many of our rarest species.

The number of proposed, endangered, threatened, and sensitive (PETS) found on or near the Forest, and known suitable habitat, has increased dramatically. Total PETS species have more than doubled (137% increase) since 1985. The total inventory of site occurrences is presently estimated at 3,000 records, an approximate 6-fold increase since 1985.

PETS Species, DBNF

<u>(year)</u>	<u>Endangered</u>	<u>Threatened</u>	<u>Sensitive</u>	<u>Total</u>
1997	31	6	65	102
1986*	8	0	35	43

\*1986 - Re: DBNF Land and Resource Management Plan.

These increases are primarily a result of inventory and survey efforts over the past 10 years. It is typical to find a disproportionate number of forest associated rare species occurrences on national forest lands.

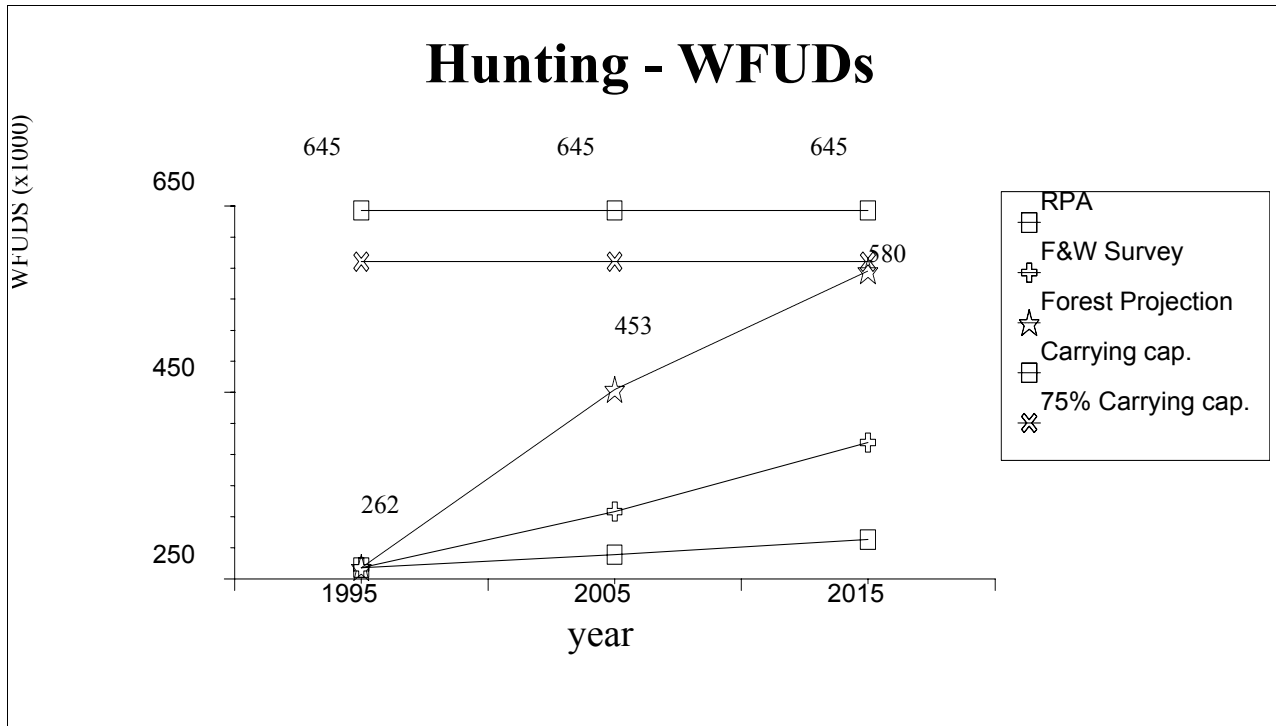
In addition, a category of "Conservation Species" was applied on the Forest in 1995, to differentiate and help in monitoring species that may be locally rare, unique, isolated, or otherwise considered to be of special interest for their relative role in maintaining the biological diversity of the Forest. At present 145 plants and animals are included in this list. Many of these species had previously been erroneously included in the sensitive species list. Even though the loss of these species on the Daniel Boone would not effect their range-wide survival, it would reduce species richness and overall diversity of the forest ecosystem.

**SUPPLY AND DEMAND**

Trends and projections indicate significant increases in deer and turkey populations and hunter interest, especially in the recently re-established turkey flock. Hunting supply and demand on the Daniel Boone is expected to primarily reflect changes in deer and turkey populations and increasing hunter interest. Changes in small game are expected to be relatively minimal over the Plan period.

Although the demand for big game will most likely reach and even exceed supply, this is not likely over the next 10-15 years. At carrying capacity deer and turkey on the Forest will potentially support 645,000 WFUDs, or about 2.5 times 1995 levels.





As described earlier, the 1989-2040 RPA Assessment predicts about a 5-6% increase over the Plan period. The 1991 U.S. Fish and Wildlife Service survey for Kentucky shows a 23% increase in hunting over the past 10 years. However, local population trends for big game are much greater with deer increasing at a rate over 15% annually and turkey doubling every two years. If these trends continue and hunting interest on the Forest follows population changes, big game will begin to approach habitat capabilities by the end of the Plan period and hunter use will begin to plateau as it reaches 580,000 WFUDs, about three quarters of the big game carrying capacity on the Forest.

Sport fishing is popular on the Forest and modest increases in demand are projected over the Plan period. Opportunities exist to make some improvements in game fish resources through habitat improvement and water quality reclamation. The scope of potential stream enhancement opportunities is relatively small overall and site specific, limited to a large extent by the influence of activities on adjacent private lands. The supply of lake fisheries may be increased through the development of small ponds and lakes (1-10 acres) to help in addressing a significant interest in bank fishing opportunities.

Interest in wildlife viewing will continue to grow as a recreational pursuit and as an important component of most outdoor recreational activities. The variety of wildlife viewing, photography, and study opportunities will be sustained through the Plan period only to the extent that habitat diversity is maintained. Public lands of the Daniel Boone National Forest will play an ever increasing role in meeting the needs of outdoors enthusiasts.

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