

TIMBER SUPPLY AND DEMAND ECONOMIC REPORT
FOR THE DANIEL BOONE NATIONAL FOREST, 1986-1995

DOCUMENT # 9

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

July 1997

L. Amos Stone
Forest Planning Team
Winchester, Kentucky

*Timber Supply & Demand Economic Report
Daniel Boone National Forest, 1986-1995*

CONTENTS

	List of Figures and	
Tables.....	.....	3
.....	.....	4
.....	.....	5
.....	.....	6
.....	.....	8
.....	.....	12
.....	.....	14
.....	.....	18
.....	.....	19
.....	.....	23
.....	.....	25
.....	.....	26
.....	.....	27
.....	.....	31
.....	.....	31

Effect of DBNF Sales on Community
Stability..... 31

References..... 32
.....

- Appendix A - Counties in the Timber Competitive Zone of the DBNF, 1995
- Appendix B - Known Mills in the DBNF Market Area, 1995
- Appendix C - Removal and Consumption of Wood by County, DBNF Market Area
- Appendix D - Hardwood Sawlog Mill Prices, Ohio & Tennessee, 1985-1994

*Timber Supply & Demand Economic Report
Daniel Boone National Forest, 1986-1995*

LIST OF FIGURES & TABLES

- Fig.1 - Competitive Zone for Timber Sales, DBNF
- Fig.2 - Age-class Distribution, DBNF, 1983 & 1995
- Fig.3 - Forest Products Removals, DBNF
- Fig.4 - Acres Harvested, 1986-1995, DBNF
- Fig.5 - Land-use Classification, Oct. 1995, DBNF
- Fig.6 - Percent of Timberland Area, by Forest-type Group, in DBNF Competitive Zone, 1987
- Fig.7 - Percent of Timberland Area, by Site-index Class, in DBNF Competitive Zone, 1987
- Fig.8 - Volume of Growing Stock, DBNF Competitive Zone, 1987
- Fig.9 - Volume of Hardwood Sawtimber, by Tree Grade, E.Ky & DBNF, 1987
- Fig.10 - U.S. Population Growth
- Fig.11 - Roundwood Production from U.S. Timberland
- Fig.12 - Sawtimber Market Prices, Grade 1, Red Oak & White Oak, OH & TN, 1985-1994
- Fig.13 - Average Sawtimber Stumpage Prices Received, DBNF, 1986-1995
- Table 1 - DBNF Sawtimber Stand Condition Classes, by Year
- Table 2 - Increase in Growing Stock Volume, DBNF, 1975-1987
- Table 3 - Timber Volume Offered & Sold, DBNF, 1986-1995
- Table 4 - Average Annual Removals of Growing Stock Volume on Timberland, by Ownership
- Table 5 - Primary Wood Using Facilities in DBNF Counties, 1994
- Table 6 - Kentucky Counties Whose Mills Used Over 500 MCF from DBNF Counties in 1986
- Table 7a - Base Prices for Selected Forest Products, Appalachian Area

Table 7b - Average Prices Received by DBNF for selected Forest Products

Highlights

A thirty-eight county area is considered as the market area for the Daniel Boone National Forest (DBNF) in this report. These 38 counties and an additional 33 counties make up the competitive zone, containing lands that produce timber that is delivered to mills in the market area.

Inventory of the Boone

Acreage of suitable timberland within the sawtimber class increased by 4%, between 1982 and 1994.

Acreage of adequately stocked and good quality sawtimber increased by 6%, between 1982 and 1994.

Between 1974 and 1987, growth of growing stock exceeded mortality by 15.6 million cubic feet.

Approximately 30% of the Forest had stands older than 80 years of age in 1995. The smallest percentage of lands occurred in the 30-50 age-classes.

The sawtimber inventory is expected to increase beyond the next two decades, then stabilize. Competing timberland inventories are expected to decline.

Timber Sales

Volume of sawtimber and small-roundwood sold was an average of 1.9 million cubic feet per year below the expected production level estimated in the LRMP. The highest production occurred in 1988 at 8.5 mmcf, and the lowest occurred in 1995 at 2.2 mmcf.

DBNF sales offered have had an average of only 2.5 bidders each.

Sales have declined as a result of the discovery of additional rare species, concern for sale profitability, procedural appeals and litigation, and harvest deferral due to pending Wild & Scenic classification.

Characteristics of Competing Timberlands

Between 1974 and 1987, 86% of the removals of growing-stock volume in eastern Kentucky occurred on non-industrial private timberland, 13% was from national forests (1-2% from others).

The DBNF has a slightly larger pine component and a slightly larger sugar maple / beech component than surrounding competing timberlands.

Average DBNF land is lower quality (poorer soil, etc.), than competing private timberlands.

On average, the DBNF has a greater percentage of higher quality and larger trees than its competitors.

Demand for DBNF Timber

Demand for DBNF timber is expected to increase. Between 1984 and 1994, approximately 29% more primary wood-using facilities were operating in DBNF counties.

Several counties have mills that have procured roundwood mainly from DBNF counties. It is assumed that these mills are heavily dependant on DBNF timber.

Demand is increased for DBNF timber because of higher volume per acre, larger diameters, and higher quality. Demand is lower for DBNF timber because of more efficient use and recycling of wood fiber. Demand is also reduced due to restrictive federal contracts, and due to logging delays because of litigation and discovery of additional rare species.

Timber Prices

Ohio market prices were generally lower than Tennessee market prices. DBNF stumpage prices generally followed base prices for the Appalachian area, which increased through the period.

DBNF stumpage prices are affected by the national timber market. DBNF timber sales have only a minor cumulative effect on market price. DBNF timber sales are probably not having a significant effect on local community stability.

Timber Supply and Demand Economic Report
Daniel Boone National Forest, 1986-1995

INTRODUCTION

This document is a part of the Analysis of the Management Situation (AMS) for the revision of the Daniel Boone National Forest (DBNF) Land and Resource Management Plan (LRMP). An analysis of the supply and demand situation for commodity resources is required by USDA-FS planning regulations (36 CFR 219.12e).

This report examines the DBNF timber program and its effect on the local, regional, and national economy. It describes the accomplishments of the Forest's timber sales program between 1986 and 1995, as related to the goals and objectives of the LRMP; examines historical supply and demand for timber products in the competitive zone; and considers the supply and demand for timber during the next decade.

Timber is a renewable natural resource commodity whose production makes up a significant segment of the national and regional economy. Due to the historical multiple-use mission of National Forests, it is likely that the DBNF will continue to contribute some portion of timber supply for the expanding global human population. During the formulation of the revised LRMP in the months to come, several alternatives will be developed that will make estimated projections of various levels of timber output during the next decade.

Because shifting consumer preferences in housing, furniture, and packaging are constantly redefining timber demands, and because the majority of the timber supply is held by literally thousands of owners with different values and needs, the supply of, and demand for this resource is dynamic and complex, which makes projections strongly speculative.

ANALYSIS AREA

In the previous AMS, a 22 county area containing DBNF land, as well as the entire state timber situation, was considered in the timber supply and demand analysis (USFS, 1982). For the purposes of this update, a timber market area has been approximated on a county basis, and a competitive zone has been derived for this market area, based partially on a survey done in 1988 by the Northeast Forest Experiment Station, Forest Inventory and Analysis unit (FIA). Thirty-eight counties that were using timber from counties containing DBNF land (including the counties containing DBNF land) will be considered as the DBNF market area.

Market Area:

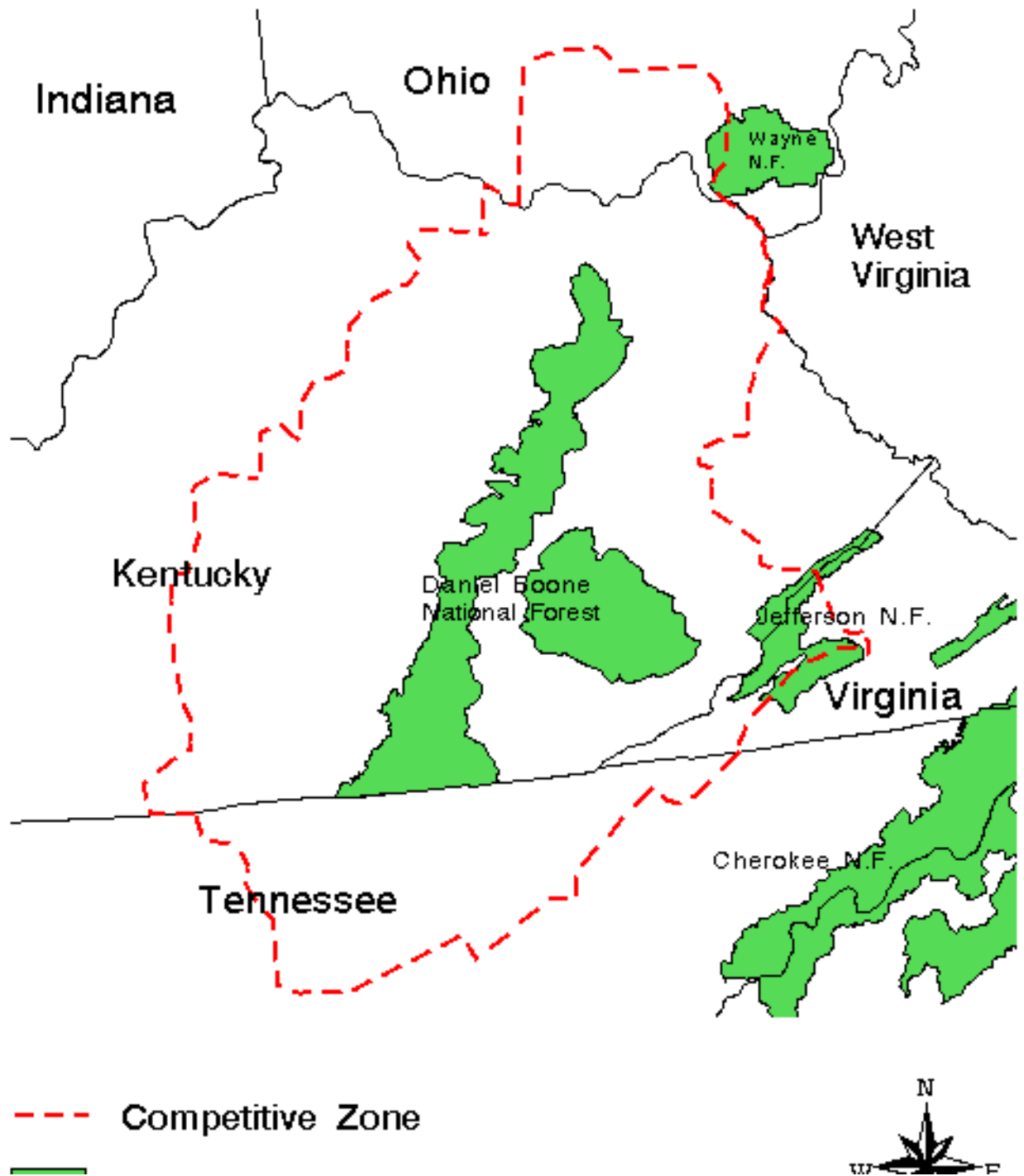
The market area for a specific timber product depends on many factors including species, size, and the amount available. The market area for prime red oak veneer logs is global, while low quality red oak may be only 20-40 miles. Small roundwood may travel to a collection yard, or chip mill, then travel by rail to a mill several hundred miles away. For the purposes of this analysis, only sawmills and yards, which are the primary unloading points for logging contractors, were considered in determining the location of the DBNF market area.

Competitive Zone:

All counties supplying timber to the market area, including the 38 counties in the market area, are considered as the DBNF competitive zone (figure 1). The competitive zone contains 71 counties in Kentucky, Ohio, Virginia, and Tennessee. Appendix A contains a list of counties containing the National Forest (DBNF counties), counties using wood from DBNF counties, and counties in the competitive zone.

Because certain data is most easily available from FIA on a unit basis, some information is presented for the 3 eastern FIA units as "eastern Kentucky". The general economies of the southeastern US, and the US are mentioned as they affect the economy of the DBNF counties as a whole.

**Figure 1 - Competitive Zone for Timber Sales
Daniel Boone National Forest - 1995**



TIMBER SUPPLY

According to Webster's Dictionary (1994), supply is "The amount of a commodity available for meeting a demand or for purchase at a given price." This analysis is concerned with the amount of timber available for purchase at a given stumpage price within the DBNF competitive zone, at various points in time.

Inventory Trends

Private owners own 88% of the commercial forest land (timberland) in the competitive zone; the national forests make up 8% (7% DBNF, 1% other NFs); and 4% is administered by other government, mostly national and state parks (USDA-FS,1990). Other national forest land in this zone consists of the Wayne National Forest in Ohio and Jefferson National Forest in Virginia. Less than 2% of the private lands within this zone are owned by corporations.

Land administered by the Forest Service in the eastern U.S. has increased by 8.3% between 1963 and 1994, mostly as a result of the Land and Water Conservation Fund (Thomas, 1996). Land acquisition by the DBNF and other National Forests in the eastern U.S. will probably continue at a reduced level due to anticipated budget cuts. Since federal ownership within the DBNF administrative boundary increased by approximately 3% in the last decade, a similar or slightly reduced increase is expected in DBNF timberland area in the next decade.

The DBNF land suitable for timber production (regulated forest) has not significantly changed since 1982, with less than 1% decrease (table 1). Within this suitable timberland, 50% of the area was in the sawtimber condition class, in 1982. Of this, 59% was adequately stocked and of good quality. By 1994, the sawtimber condition class occupied 54% of the suitable forest area. Of this, 65% was adequately stocked and of good quality. During the period, stands containing sawtimber on lands classified as suitable increased by 8%.

Table 1 - DBNF Sawtimber Stand Condition Classes, by Year (Suitable Acres)

	Damaged	Sparse	Low Quality	Mature
Immature				
Tot. Sawtimber				

Sept 1982	1,125	45,049	69,998	40,142	130,165
	286,479				
Jan 1988	743	41,671	69,979	46,103	139,120
	297,616				
Jul 1994	1,020	37,990	69,369	48,308	154,229
	310,916				

The overall inventory of timber has increased on the Daniel Boone. FIA data (table 2) indicates that growth has exceeded mortality and removals (logging, site preparation, etc.) for all species during the period between 1975 and 1987. The greatest increases in volume have occurred in the following species (in order of greatest to least): yellow-poplar, black and scarlet oak, white oak, and red maple.

The table shows that the greatest loss of volume due to mortality has occurred in black and scarlet oak and yellow pine. The highest mortality rate (mortality / standing volume in 1987) has occurred in the following species: yellow-pine (1.1%), black/ scarlet oak (1.0%), hickory (0.9%), and northern red oak (0.7%). The southern pine beetle and oak decline have had a significant influence on these mortality figures.

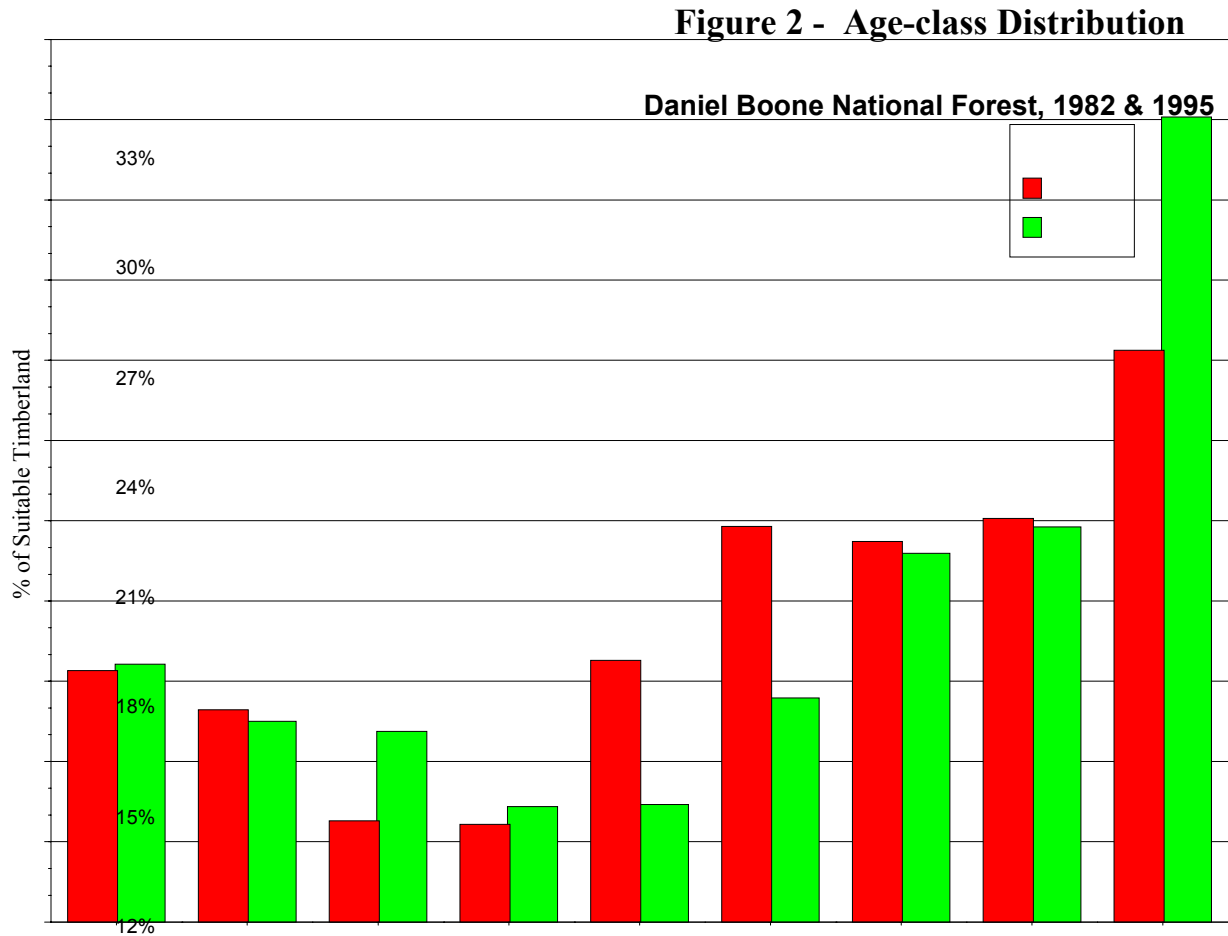
 Table 2 - Increase in Growing Stock Volume, DBNF, 1975-1987

(MMCF)

Net	Gross		Change =			=
	Growth -	Mortality		Growth -	Removals		(Increase)
Yellow-poplar	4.30	0.24	4.06	0.53	3.54	
Black, Scarlet Oak	5.40	1.67	3.73	0.85	2.89	
White Oak	3.63	0.35	3.28	0.52	2.76	
Red Maple	2.56	0.09	2.48	0.12	2.36	
Chestnut Oak	2.45	0.17	2.28	0.78	1.50	
Hickory	1.47	0.69	0.78	0.23	0.56	
Other Hardwoods	1.13	0.18	0.95	0.39	0.56	
Other Softwoods	0.59	0.00	0.59	0.08	0.51	
Northern Red Oak	0.93	0.34	0.59	0.27	0.32	
Yellow Pine	2.40	1.52	0.88	0.61	0.28	
American Beech	0.94	0.32	0.62	0.39	0.23	
Sugar Maple	0.37	0.04	0.33	0.24	0.10	
Black Walnut	0.06	0.04	0.03	0.00	0.03	
Total Softwoods	2.99	1.52	1.47	0.69	0.78	
Total Hardwoods	23.24	4.12	19.12	4.29	14.83	
All Species	26.23	5.64	20.59	4.98	15.61	

(from Alerich, 1988)

Assuming growth, mortality, and removal at levels of the past decade, and no change in timberland suitability classification, mature sawtimber over 100 years of age would be available for harvest for approximately 80 years, then harvesting would have to occur in younger age-classes for about 20 years to maintain an even flow of volume from the Forest. This would be necessary due to the low percentage of stands currently in the 30-50 year age-class (fig. 2).



The above information indicates that the renewable sawtimber supply on the DBNF has been growing faster than removals and mortality during the period, and that a supply would be available in the coming decade, depending on the amount of change in land classified as suitable for timber production. Due to inventory trends, possible shifts toward longer rotations for more old-growth, and growing public sentiment against timber harvesting on public lands (Wood, 1995), the DBNF inventory of sawtimber will most likely continue to increase beyond the next two decades, then

stabilize.

Looking at a larger picture, however, the most recent surveys of forests conducted by the Forest Inventory and Analysis (FIA) research units in the South show that net annual timber growth¹ for softwoods and hardwoods, after rising for decades, has begun to decline (USDA-FS,1988). Softwood removals now exceed net softwood growth, and according to FIA, "net annual hardwood growth is still above removals, but the trends are converging". In many areas of the South, removals are expected to exceed growth, and inventories are expected to begin declining (Cubbage, et.al., 1995).

Eastern Kentucky's timberland containing sawtimber has increased by 28% from 2.9 million acres in 1975, to 3.7 million acres in 1988 (USDA-FS,1990). Since the statewide inventory of Kentucky in 1986-87, there is some speculation by Kentucky Division of Forestry that removals may now be exceeding growth, although a new survey of the state is not expected until 1999 (from Larry Lowe, Chief of Forest Products Removals, at a Society of American Foresters meeting, 2/96). If removals in eastern Kentucky haven't already exceeded growth, there is a high probability that this condition will soon exist. Eastern Kentucky's timber inventory (excluding the DBNF) will most likely follow the trend of other Southern forests, and begin to decline within the decade (even if buffered by state regulation). Even though the National Forest is not allowed to exceed a 10 year allowable sale quantity, it can be assumed that if timber was to become scarce on competing private timberlands in the competitive zone, there would be even more interest in DBNF timber.

A significant inventory of small roundwood exists in the competitive zone. Many stands could use thinnings to concentrate growth on the remaining trees. According to an FIA report (1987 data), 52% of timberland in the competitive zone is overstocked with growing stock. This figure jumps to 75% on the DBNF. This means that these stands contain more than 75 square feet of basal area per acre in trees 5.0 inches in diameter and larger, or the equivalent in trees per acre in seedlings and saplings.

¹ Net Annual Growth (of growing stock volume) = Ingrowth + Incremental Growth - Cull - Mortality

DBNF Timber Sales, 1986-1995

Volume of sawtimber and small-roundwood sold, was an average of 1.9 million cubic feet (MMCF) per year below the expected production level estimated in the LRMP (Table 3). Volume of sawtimber and small-roundwood offered was 63% of the LRMP estimate of average yearly expected production. Since 1986, the DBNF has offered an average of 6.1 MMCF per year, while sales have averaged 5.5 MMCF per year. The quantity of DBNF timber offered for sale exceeded the quantity sold during the 10 year period, by 11.5%.

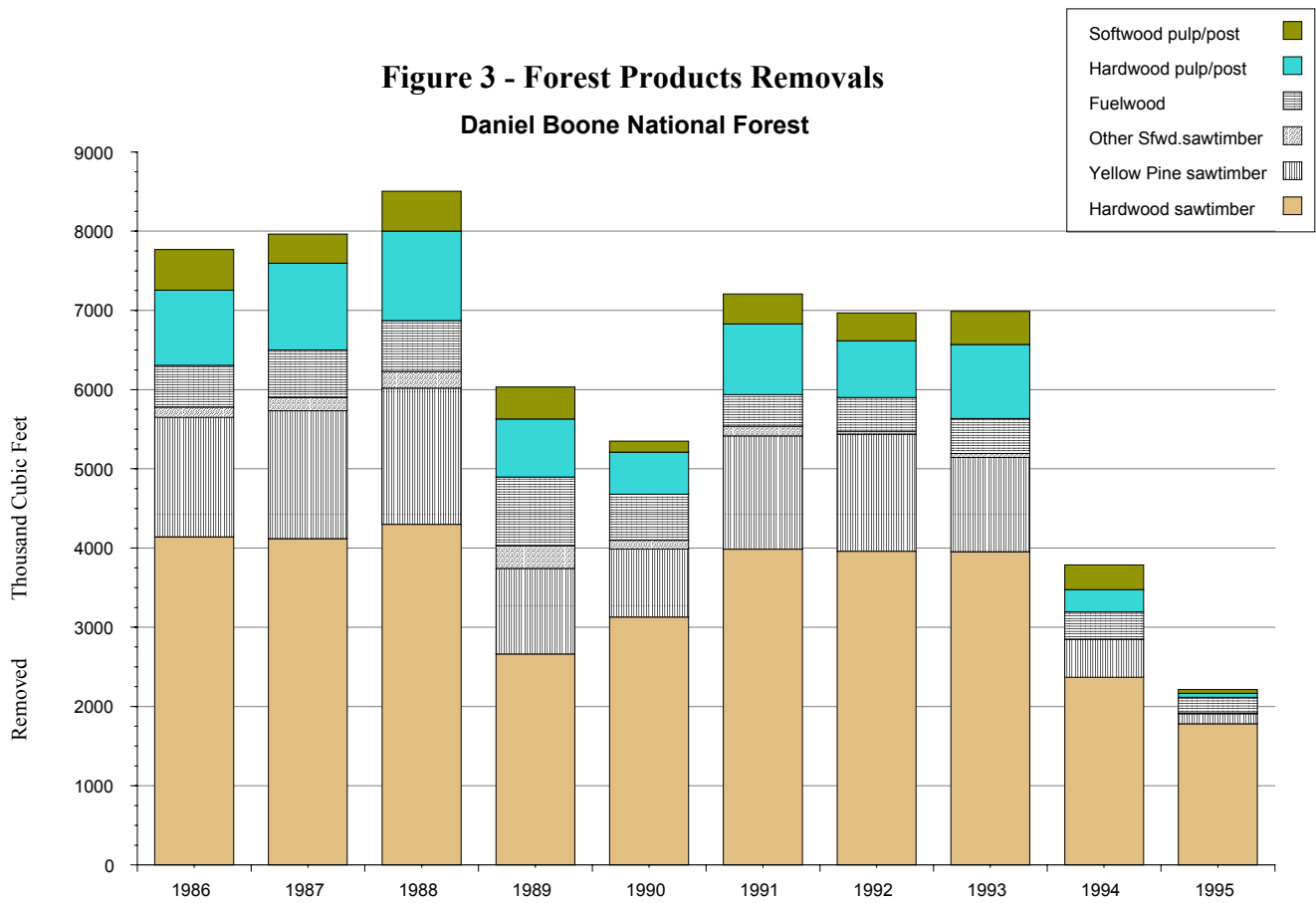
Even though the Forest is currently maintaining a mailing list of over 500 companies and individuals (prospective bidders) who are interested in receiving timber sale prospectuses, DBNF sales offered during the past decade, have had an average of only 2.5 bidders each. Between 1986 and 1994, 24 out of 300 sales (8%) did not receive any bids.

Table 3 - Timber Volume Offered and Sold, DBNF, 1986-1995 (MMCF)

	LRMP *2	Volume Offered	Volume Sold	LRMP *1
1986	8.1	5.3	5.7	7.4
1987	8.7	7.0	6.8	7.4
1988	9.3	7.3	6.8	7.4
1989	9.9	9.2	8.2	7.4
1990	10.5	7.4	6.4	7.4
1991	11.1	6.6	6.1	12.0
1992	11.6	7.4	7.6	12.0
1993	12.2	3.6	3.1	12.0
1994	12.7	2.9	2.2	12.0
1995		<u>4.4</u>	<u>1.9</u>	<u>12.0</u>
Total =	106.8	61.1	54.8	97.0

*1: from p.IV-57 of LRMP, "Average Yearly Expected Production"
 *2: from p.IV-62 of LRMP, "Timber Sale Program Quantity Allowed."
 *3: 1994 figure repeated for 1995.

Removals of forest products on the DBNF, during the decade, peaked in 1988 at 8501 MCF, and were lowest in 1995 at 2211 MCF (fig.3). The majority of roundwood reported as removed during the period was roundwood topwood, which is small roundwood above the sawlog-size material in the tree. Since new small-roundwood markets did not develop in the DBNF market area prior to 1995 as predicted, commercial thinning units have seldom been offered, and commercial thinning volume has been almost nonexistent during the past decade. Small-roundwood has normally been made optional in timber sale contracts, and has typically been removed where pallet markets are available for hardwoods, or where pine posts are marketable. A small amount of small-roundwood has been removed as fuelwood where it is easily accessible following many timber sales.

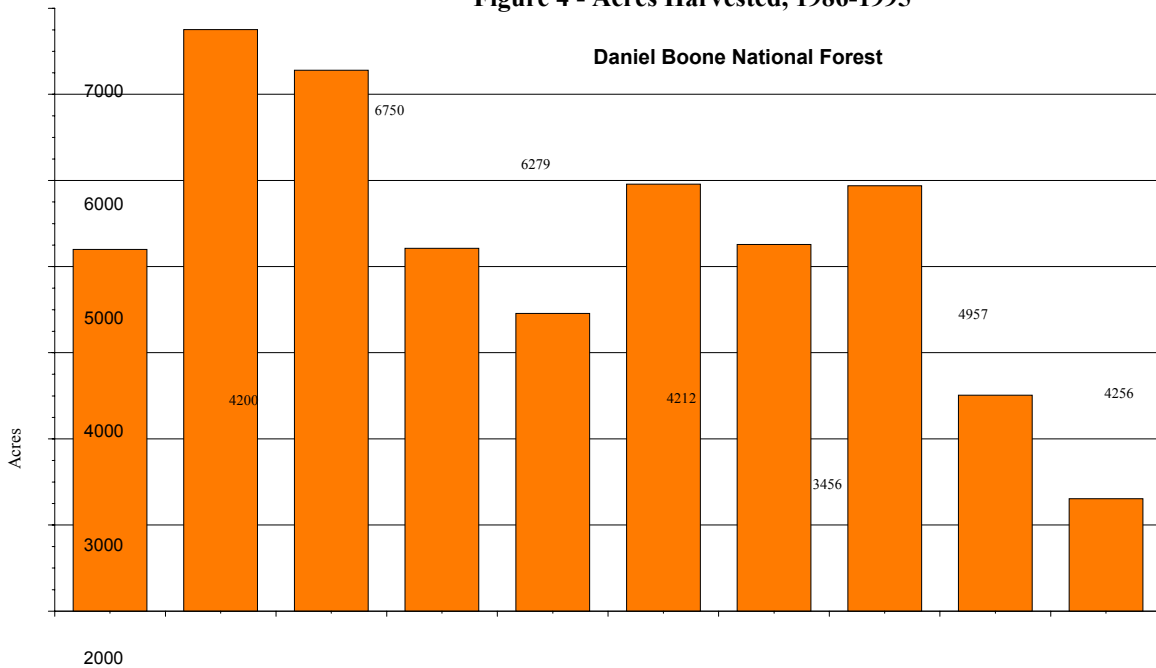


from DBNF, TSAS, Sold & Removed Worksheet

Acres harvested are displayed in figure 4. Note that acres harvested don't exactly follow removals, because average volume/acre fluctuates annually, and the method for tracking and reporting acres harvested improved during the period².

² Acres harvested were not originally tracked in the STARS database. Acres regenerated have always been tracked.

Figure 4 - Acres Harvested, 1986-1995



DBNF Timber Supply Factors

Supply of DBNF timber (volume offered) was lower than estimated in the LRMP for the last decade for several reasons. One reason may be that standing volumes per acre may have been overestimated in the 1985 analysis, since such estimates are roughly made for broad forest type, site index, and condition-class groups. Economic suitability for harvest based on accessibility to some areas of the Forest, may not have been adequately captured in the planning model. Lastly, there has been a decrease (approximately 10%) in both sawtimber and roundwood volumes per acre offered since the Forest has shifted its predominant harvest method from clear-cutting to two-age shelterwood, which was not predicted by the LRMP-EIS.

Supply of National Forest timber is not sensitive to price, as is timber offered for sale by private landowners, except when prices fall below a minimum (base price). National Forest volume offer levels are a function of congressional targets, subject to environmental, legal, and regulatory limitations imposed on project design, which is initiated three years in advance of the sale. Prices can vary widely within the three year period; and sale areas must be marked at least a year before the sale, so that a detailed sale appraisal can be made, even though marking paint must remain fresh enough to be visible. In summary, holding sales until prices are higher would be difficult within the current system. As can be seen, there has been little correlation between price and timber offered by the DBNF during the last decade (table 3 & figure 12).

Supply was reduced (and costs increased) as a result of several project implementation delays, such as the delay for a habitat management decision for the red-cockaded woodpecker (RCW), the implementation of the cliff-line management policy, and new direction resulting from the discovery of additional rare species during biological surveys. Not only did extended decision processes put many projects on hold, but final decisions resulted in the dropping of many previously prepared timber harvest areas, as well as the termination of several active timber sales.

Delays due to the processing of frequent project appeals, have also put the program behind schedule and increased costs. Appeals halted the timber program on the southern three districts for more than a year, reducing supply during the period.

The economic profitability of doing business is one consideration in National Forest management, but it is not the primary basis for making decisions concerning the

maintenance or enhancement of long-term ecosystem health and diversity (stewardship). To accomplish these goals, during the past 10 years the Forest has often conducted timber sales that have produced revenues which were less than the costs of planning, preparation, and administration. Roads built to access timber have also been charged as a cost of the timber sale, even though the road is often to be used for multiple purposes, including recreation and fire protection. During the decade, the costs of FS timber management has generally increased at a rate exceeding the growth of revenues, thereby putting more timber sales into a "revenue-below-cost" situation. Such sales have generally become known to the public as "below-cost sales"³.

The public, both locally and nationally, has expressed concern about the cost of selling timber relative to the funds returned to the treasury. Since the implementation of the LRMP in 1985, several bills have been introduced to limit or eliminate timber programs where costs exceed revenues. Although none have passed to date, each year more members of Congress seem to be in favor of passage of such bills. The current administration at one point in time, proposed to phase out all below-cost timber programs.

This public sentiment against spending more money to sell timber than is returned to the treasury has resulted in a recent DBNF management emphasis to reduce costs and increase revenues. One result has been reduced harvesting on the Forest, causing a reduction in timber supply to the market.

Product waste is now more likely to occur, since DBNF timber management has shifted away from the originally planned emphasis on full utilization of all harvested material (LRMP, IV-2 #18). Currently, more valuable products are removed and other products are generally left behind. Harvest of damaged or low quality stands in order to replace them with higher quality healthier stands, has declined in favor of removing a higher proportion of better quality and higher value stands in order to maintain a higher net return. Since the demand for high quality timber is high, the effect of this new emphasis should be increased demand, and higher stumpage prices for the Forest Service. This shift in emphasis could cause fewer no-bid sales, and an increase in removals, although there could also be a reduction in the overall quality of the standing sawtimber inventory in the long run.

Harvest deferral has also had an effect on the supply of DBNF timber. Timber harvest on the DBNF has often been deferred on certain lands having the "Special" land class, where timber production is secondary to other resource considerations, even though such land is still considered suitable for timber production. Between 6/87 and 10/95, this land class increased by 87%, from 32914 acres to 61,442 acres. Many acres have been added to this land classification for wildlife and recreation emphasis. Such changes were not anticipated in previous projections.

Much of this deferral has occurred in stands containing southern yellow pine. In late summer of 1994, the Forest Supervisor made a decision to remove all pine sawtimber and small roundwood from planned and active timber sales within a proposed RCW habitat management area, and to delay all sales on the southern three districts, due to threatened litigation and pending a decision on the Region 8 plan for management of the red-cockaded woodpecker. A majority of the stands containing southern yellow pine are now being managed on a longer rotation than planned. Until one third of these stands are at least 100 years old, no harvesting will occur in these types. The result of this policy is that approximately 2/3 of the DBNF yellow pine will be off-limits to harvest in the next decade.

This shift in policy has eliminated a majority of the southern yellow pine supply coming off of the DBNF, and has had a major impact on a few local mills that rely heavily on yellow pine from the DBNF. Average annual removals of yellow pine on DBNF, between 1974 and 1987, was 606 MCF (FIA data). Between 1986 and 1993, the

³ As defined here, this term indicates the situation where the costs of planning, preparing, and administering the sale exceed the revenues generated from selling the timber. However, the Society of American Foresters applies the following definition (SAF,1985): "If the net public benefits of a forest following timber harvest are less than if the timber was not harvested, the sale is below cost." The SAF definition uses costs versus benefits as the real measure of the economic efficiency of a timber sale, not costs versus revenues. This means annual comparisons that show costs exceeding receipts are not necessarily unwarranted, and receipts exceeding costs are not necessarily desirable (USFS,1987). The Timber Sales Program Information Reporting System (TSPIRS) Report 1 has been used for public disclosure of the costs and revenues of the Forest Service timber program. TSPIRS Report 2, which displays the additional values of other less tangible resource benefits, has generally been ignored by critics of the timber program.

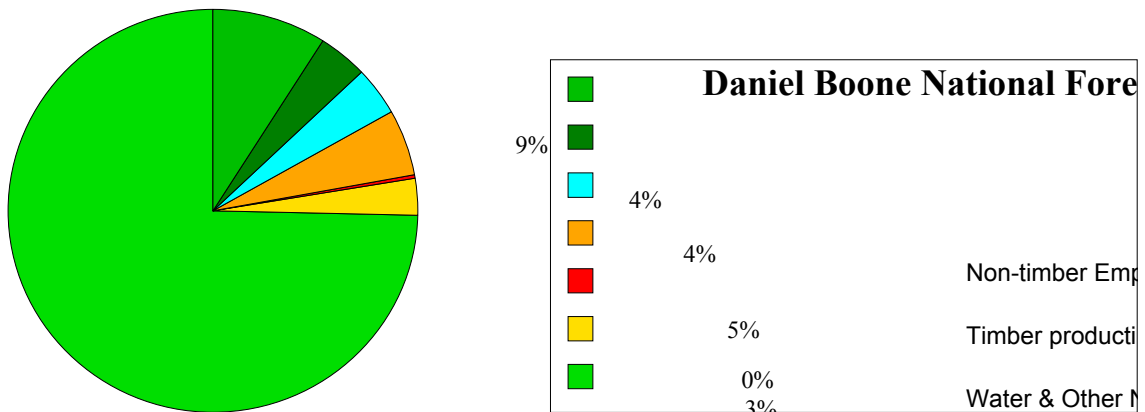
average was 1360 (DBNF data). However, in 1994 and 1995, yellow pine removals were reduced to 478 and 128 MCF, respectively.

Several other management actions over the past decade have resulted in certain lands having timber harvest deferrals. Management of habitat for other threatened and endangered (T&E) species, such as the blackside dace and Virginia big-eared bat, is evolving to give additional protection to known individuals, protection to newly discovered individuals, and to provide room for expansion.

The following is a list of suitable timberland that was not available for harvest during the past 10 years, but was included in the LRMP volume yield estimates and calculations for allowable sale quantity (ASQ) :

	Inventoried Suitable Land Base (1994)		572,000 acres	
100%				
	less RCW-related harvest deferrals	-	48,000 acres	- 8%
	less T&E Bat-related harvest deferrals	-	75,000 acres	- 13%
	less W&S River Study-related deferrals	-	49,000 acres	- 9%
--	-----			-----
70%	Apparent Suitable Land Base		400,000 acres	

Following plan revision, various lands could be reclassified as unsuitable for timber production, including special designations such as Research Natural Areas, Botanical areas, or Zoological Areas. Studies are also continuing for possible inclusion of some lands in the Wild and Scenic River system. Such reclassification would reduce the amount of timber available for market, and would reduce the potential supply of timber from the Forest. Figure 5 shows the current land use classifications on the land administered by the DBNF.



Supply Competitors, the Nonindustrial Private Forest (NIPF)

Since the DBNF sells timber on the open market, such sales are in competition with sales on private timberland within the Forest's competitive zone. The characteristics of these private timberlands and the interests of the private owners determines the nature and amount of competition. How much of this privately owned forest resource will be actually available for market is not easily determined due to the preferences, needs, and management goals of the many different landowners within the competitive zone. In a 1978 statewide survey of the estimated 181,400 private forest landowners in eastern Kentucky, 56% of those who responded say that they "never plan to harvest" (Birch & Powell,1978). The study found that owners of larger tracts are generally more willing to harvest, so actually 65% of private commercial forest land was held by owners planning to eventually harvest. The 35% of private land evidently not available for harvest would effectively increase the proportion of timber supply depended upon from other forest lands, such as DBNF timberland.

Evidently most of Kentucky's NIPF owners are not interested in professional management of their forests since, according to a 1995 poll by the University of Kentucky (Wood,1995), ninety-three percent of Kentucky's NIPF owners have never had a natural resource professional assist them. One reason for this may be that the average NIPF owner (owning > 1 acre of forest), owns 14 acres for only 12 years (Wood, 1995); so there's little opportunity to reap the economic fruits of a silvicultural investment. However, economic pressures on private landowners often override what the owners would prefer for their forests.

Decisions to harvest often occur following the death of a spouse, or near the end of the life of the owner as greater financial needs occur. In most cases when private owners own valuable timber stands, the higher the price, and the greater the economic need of the owner, the more likely these landowners will liquidate their timber resource. In addition, NIPF owners are strongly influenced by financially attractive demands for other land uses, such as development for housing and industry (near the developing Lexington urban area).

The volume of timber that has actually been removed from NIPF timberland is probably a better indication of what future supply will be available from these lands. Even though many NIPF owners say they never plan to cut any trees, 86% of eastern Kentucky's harvest (removals) came from NIPF land, which (as previously mentioned) was 88% of the timberland in the three eastern FIA units (table 4). The rate of removals of forest products from NIPF land within the competitive zone, was actually about the same as the rate of removals from the DBNF's unreserved timberland.

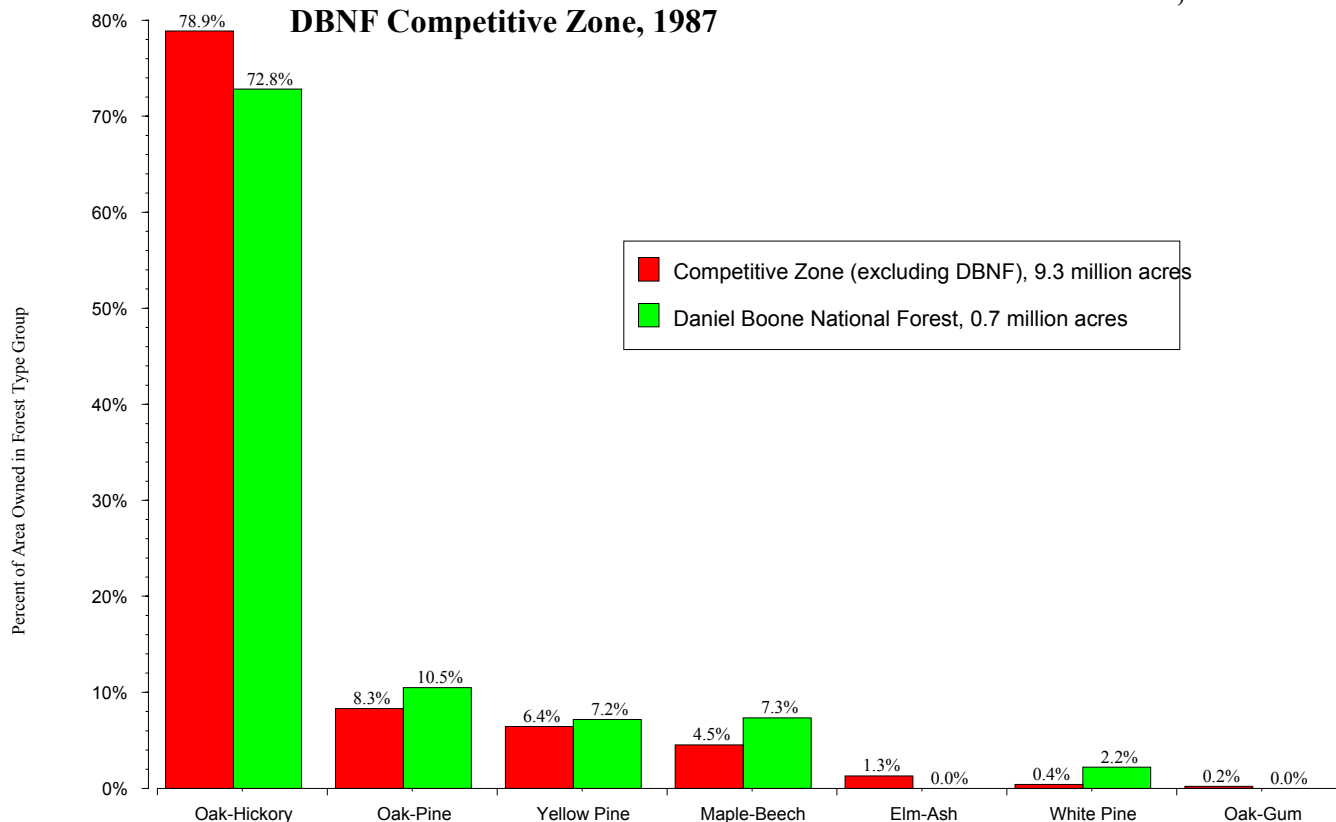
Table 4 - Average Annual Removals of Growing-stock Volume on Timberland by Ownership and Species Group, from the three easternmost FIA Units in KY, 1974-1987, (MCF)*

<u>Ownership</u>	<u>Softwoods</u>	<u>Hardwoods</u>	<u>Total</u>	
National Forest 12.8%	3935	5665	9600	
Other Public 1.0%	627	105	732	
Forest Industry 0.6%	0	474	474	
Other Private	<u>7940</u>	<u>56258</u>	<u>64198</u>	85.6%
Total	12503	62503	75005	

* from Alerich, 1990

Sale of timber from nonindustrial private timberlands is not regulated since there is practically no way for 181,400 landowners to coordinate and communicate their management plans, even if they so desired. According to the Burch & Powell survey, most forest landowners did not understand the concept of "sustained yield". However there is much interest in state governmental controls (e.g. tax incentives) for better forest practices, and more frequent monitoring of the state's timber

F
DBNF Competitive Zone, 1987



from NEFES data run (table 3)

inventory. Such changes could help ensure a sustainable supply of quality timber in Kentucky.

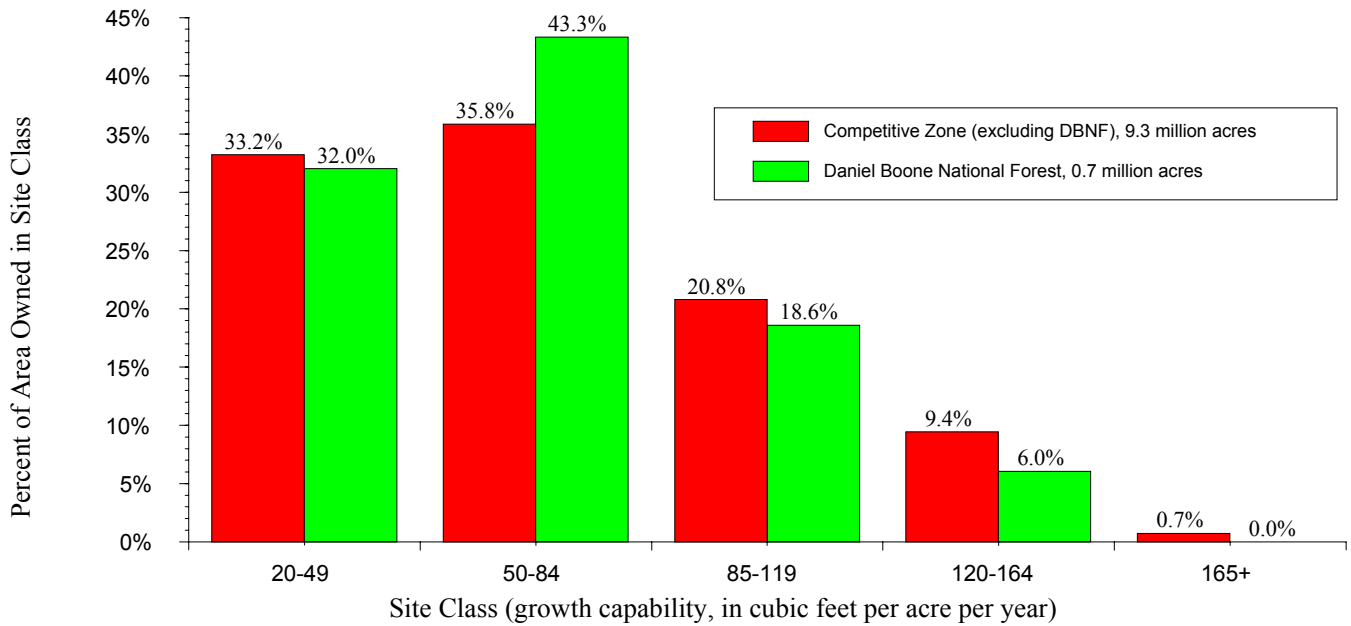
Characteristics of the Timber Supply within the Competitive Zone

The following charts (figures 6-9) display several characteristics of the timber supply as inventoried by Forest Inventory and Analysis in 1987, on timberland within the competitive zone, and on the Daniel Boone National Forest. The vertical axis of these charts are displayed in percent of the ownership total, to give relative differences for comparison, rather than actual differences. Actual differences can be computed from the totals shown in the legend boxes, if desired.

Figure 6 indicates that the DBNF has a slightly larger pine component than surrounding forests. It also shows that the DBNF has a slightly larger percentage of sugar maple - beech stands. Figure 7 indicates that an average timberland site on the DBNF is not as capable of producing as much timber within the same time, as the average private timberland within the competitive zone.

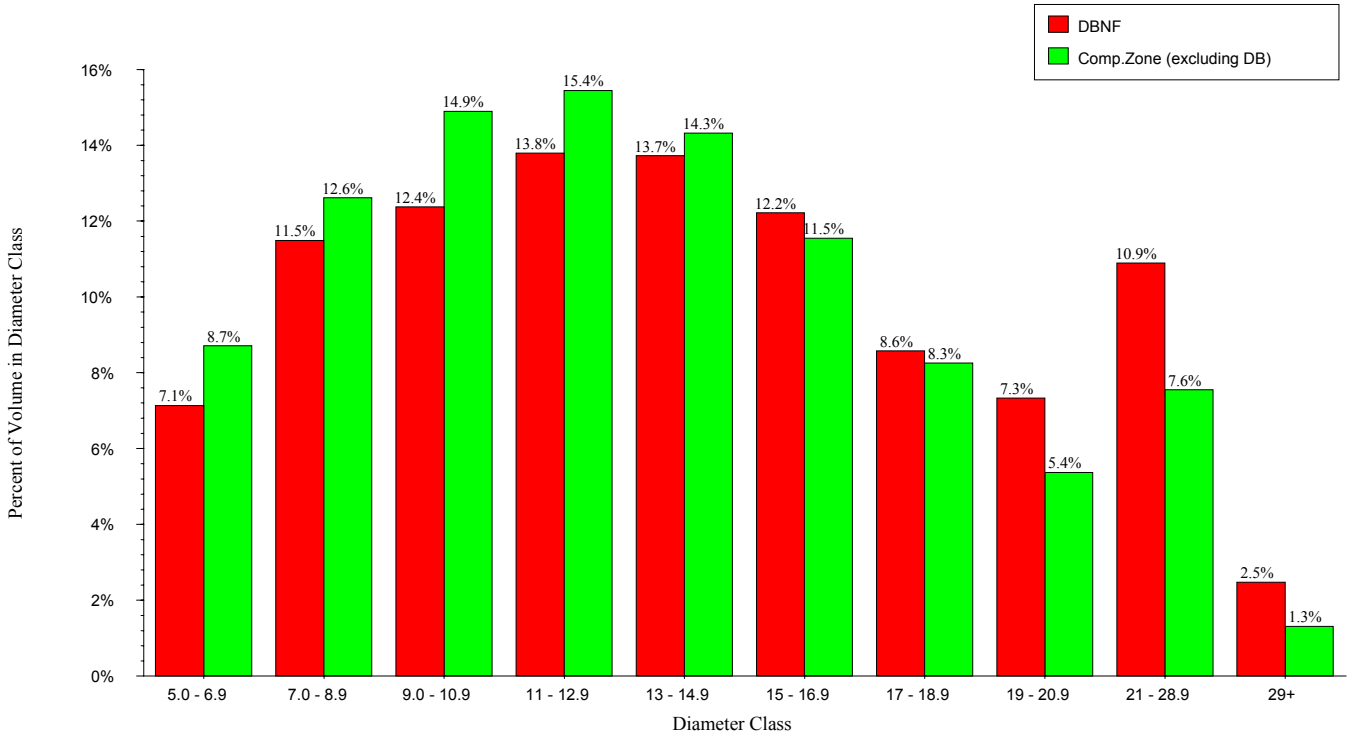
Figures 8 & 9 show that the Forest has a greater percentage of higher quality and larger trees, than surrounding private lands. Figures 8 and 9 are discussed in more detail in the "Factors Which Increase Demand for DBNF Timber" section.

Figure 7 - Percent of Timberland Area, by Site-class, DDBNF Competitive Zone, 1987



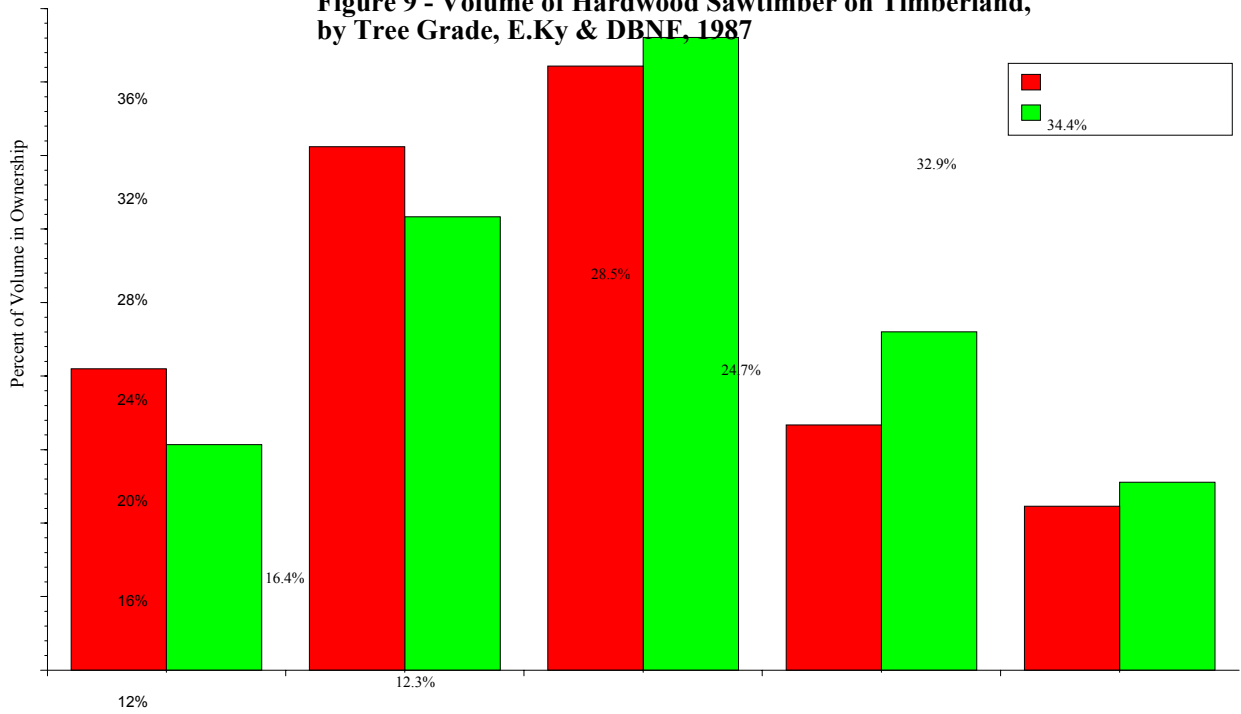
from NEFES data run (table 3)

Figure 8 - Volume of Growing Stock on Timberland, by Diameter Class, D.B.N.F. Competitive Zone, 1987



from FIA Eastwide Data Base

Figure 9 - Volume of Hardwood Sawtimber on Timberland, by Tree Grade, E.Ky & DBNE, 1987



DEMAND IN THE DBNF MARKET AREA

According to the RPA assessment, within the United States, "the demands for all major wood products are projected to increase through 2040" (USFS,1994). A major factor in this increasing demand is the increasing U.S. population (figures 10 & 11). This increasing national demand for wood fiber will undoubtedly be reflected in an increasing local demand for timber from the Daniel Boone National Forest.

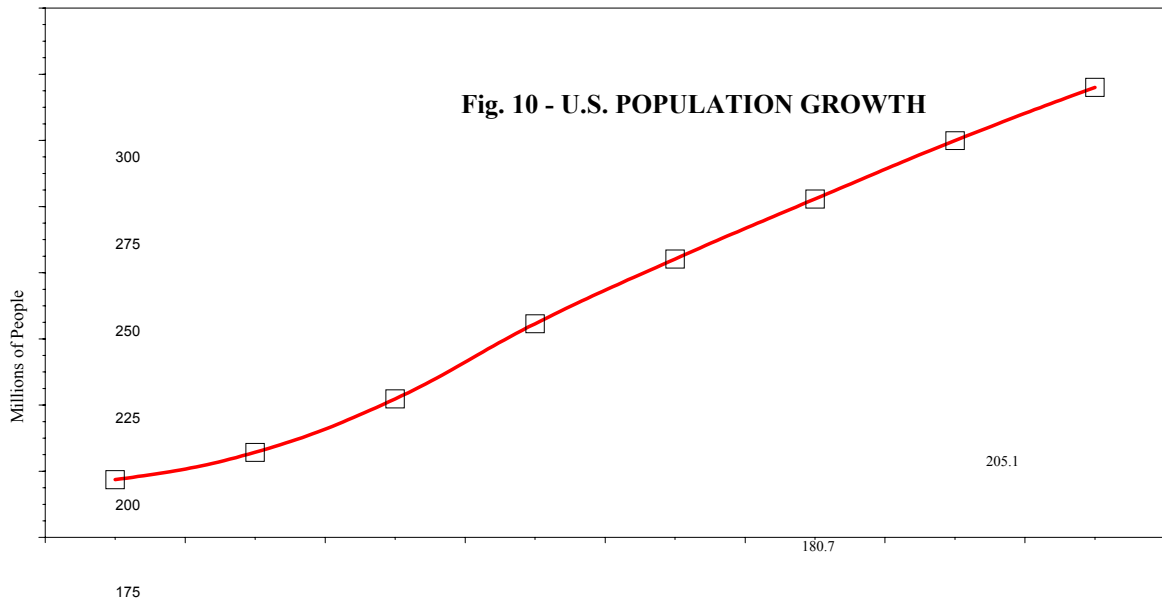
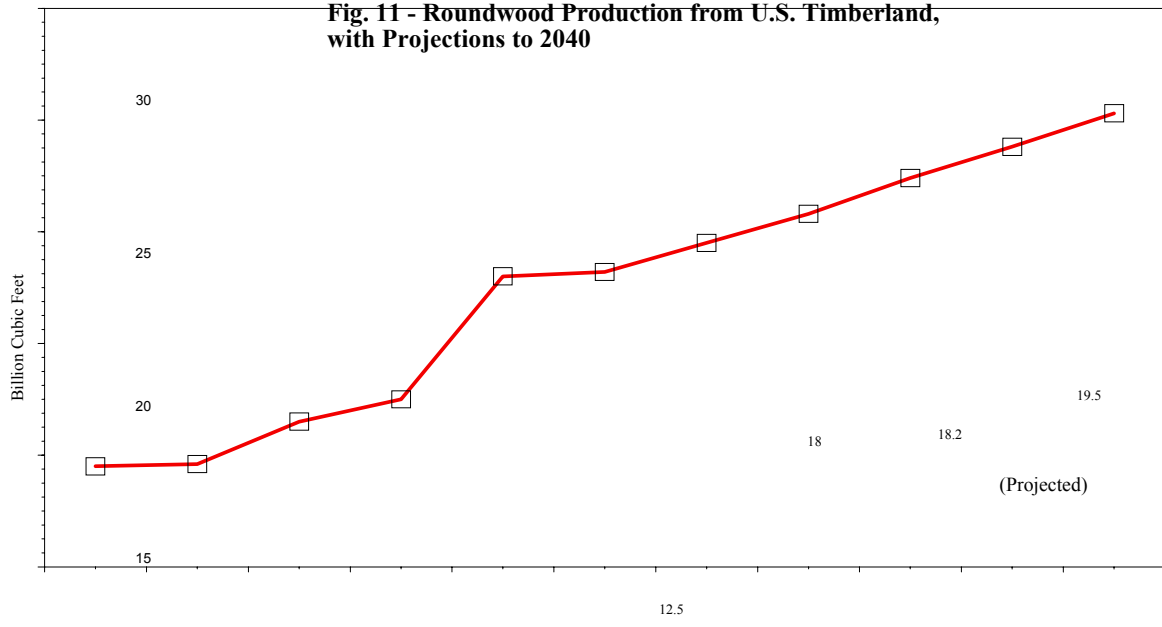


Fig. 11 - Roundwood Production from U.S. Timberland, with Projections to 2040



Timber Production in the DBNF Market Area

One indicator of demand for timber within a market area is the buildup of primary wood-using industries and facilities. As defined here, a single "industry" may have more than one "facility", e.g. both rough lumber, and pallet cants. In 1984 there were 157 primary wood-using facilities in the counties containing the DBNF; as of 1994, there were 203 primary wood-using facilities within this same area (table 5). Within the market area, there are currently 246 known primary wood-using industries (appendix B).

 Table 5 - PRIMARY WOOD-USING FACILITIES IN DBNF COUNTIES, 1994
 (# / MMBF capacity)

Industry*	Commercial Sawmills	Pallet & Container	Peel Post #/M-Pieces	Concentrate Yard	Chips/Res.* #/ M-tons	Other
Bath	2 / 1.1 0 / 0.0	0 / 0.0	1 / 0.0	0 / 0.0		0 / 0.0
Bell	5 / 3 0 / 0.0		1 / 0.0	0 / 0.0	0 / 0.0	
Clay	4 / 4.6 0 / 0.0	1 / 0.0 0 / 0.0		0 / 0.0	0 / 0.0	
Estill	5 / 17.0 0 / 0.0		2 / 8.0	0 / 0.0	0 / 0.0	
Harlan	3 / 15.5 0 / 0.0	2 / 0.0 0 / 0.0		0 / 0.0	0 / 0.0	
Jackson	2 / 6.0 0 / 0.0	1 / 3.0 0 / 0.0		1 / 0.1	0 / 0.0	
Knox	4 / 11.6 0 / 0.0	1 / 7.0 0 / 0.0		0 / 0.0	0 / 0.0	
Laurel	9 / 25.0 2 / 150.0	3 / 3.5 3 / 5.0		3 / 1.5	1 / 1.0	
Lee	3 / 0.1 0 / 0.0	0 / 0.0 0 / 0.0		1 / 0.0	0 / 0.0	
Leslie	3 / 11.0 0 / 0.0	0 / 0.0 0 / 0.0		0 / 0.0	0 / 0.0	
McCreary	9 / 16.3 0 / 0.0	3 / 5.6 0 / 0.0		1 / 1.0	1 / 0.1	

Menifee	4 / 9.5	0 / 0.0	0 / 0.0	0 / 0.0	0 / 0.0
	0 / 0.0	0 / 0.0			
Morgan	3 / 9.0	1 / 0.5	2 / 0.6		0 / 0.0
	0 / 0.0	0 / 0.0			
Owsley	5 / 0.4	0 / 0.0	0 / 0.0		0 / 0.0
	0 / 0.0	0 / 0.0			
Perry	12/ 6.2	0 / 0.0	0 / 0.0		0 / 0.0
	0 / 0.0	0 / 0.0			
Powell	3 / 10.6	0 / 0.0	0 / 0.0		0 / 0.0
	0 / 0.0	0 / 0.0			
Pulaski	17/ 33.5	8 / 23.0	1 / 0.1	0 / 0.0	1 /
500.0	3 / 3.6				
Rockcastle	8 / 5.0	2 / 1.0	1 / 0.5		0 / 0.0
	0 / 0.0	0 / 0.0			
Rowan	10/ 40.7	4 / 18.0	0 / 0.0	2 / 5.0	0 / 0.0
	1 / 0.0				
Wayne	12/ 32.0	2 / 1.5	0 / 0.0	2 / 1.0	0 / 0.0
	3 / 2.0				
Whitley	5 / 10.8	2 / 0.1	0 / 0.0		1 / 0.0
	0 / 0.0	0 / 0.0			
Wolfe	8 / 7.7	2 / 0.5	1 / 0.0		0 / 0.0
	0 / 0.0	0 / 0.0			
	---	---	---	---	---
	---	---	---	---	---
		136/ 276.3	35/ 71.7		12 / 3.8
	7 / 7.1	3 / 650	10 /10.6		

* Wood treatment plant, Handle mill, Stave & Heading mill, Turnery Squares & Blanks, Log & Bolt, Log cabin producer, Veneer & Plywood mill, Charcoal producer, Custom Sawmills. From: KDF, 1994

Paper pulp mills are now beginning to have a greater influence in the DBNF market area, although these mills have not directly purchased DBNF timber sales. However, several concentration yards are located near the Forest that can receive fiber from contractors working on the DBNF. McCreary and Whitley counties (both containing DBNF land) produced the most softwood roundwood pulpwood in the state in 1994, at 20.7 and 16.2 green tons respectively (Johnson,1996). Laurel county produced the state's second highest amount of hardwood roundwood pulpwood in 1994. Of Kentucky's 5 pulp chip producers, only one is located in the DBNF market area (Laurel County). The other hardwood chip producer in the market area is located in Campbell County Tennessee. There is also a residue manufacturer (charcoal briquets) in Pulaski County that uses mostly sawmill by-products (a fair portion of which probably grew on NF). In addition, a new mill has been built near Hazard, that processes hardwood roundwood flakes into construction Material (Laminated Strand Lumber). Some procurement is also expected by several large mills recently opened (or opening soon) nearby in Ohio, W.Va., Virginia, and Tennessee.

A current statewide concern for the sustainability of the Kentucky forest resource may discourage further development of the timber industry within the state, although the new out-of-state mills are beginning to procure from eastern Kentucky (e.g.. Harris, 1995; Strong, 1995; Wolfe, 1995; Learn & Mead, 1996). Kentucky's "Economic Development Secretary...rejected incentives for [a wood-products factory in Pulaski County]...because of concerns that supplying the plant with trees could lead to too

much timber cutting" (Lexington Herald-Leader, 8/8/95). Also, proposed state legislation may incorporate some form of sustainability regulations or guidelines, which could tend to stabilize or mitigate major fluctuations in the inventory on private lands resulting from expected increasing demand for wood fiber.

Since no large industry has purchased directly from the DBNF, since product flows are not tracked beyond the original purchaser, and since timber companies generally prefer to keep their procurement locations confidential for competitive reasons; the primary mills which have actually used DBNF timber have not been specifically identified in this analysis. Primary wood-using industries located within the DBNF market area have been identified in appendix B. Appendix B is based on a directory published by the Kentucky Division of Forestry which contains wood-using industry data for the State. It is estimated that 90+% of the 246 mills listed as being in the market area, have used wood from the DBNF during the past decade.

Appendix C gives some indication of the destination for timber coming from counties containing DBNF land. Appendix C was developed using information from the NEFES-FIA procurement study, done in 1986. In this study, 157 mills were identified that used wood from the 21-county region containing DBNF land. This data was not available for Tennessee. Table 6 is a summary of some of the information in appendix C. This table lists Kentucky counties containing mills most dependant on the DBNF timber supply.

 Table 6 - Kentucky Counties Whose Mills Used Over 500 MCF from DBNF Counties in 1986

County	MCF Used All Sources	MCF Used DBNF Counties	
McCreary	6168	6168	100%
Pulaski	4405	3704	84%
Wayne	2876	2305	80%
Laurel	1896	1896	100%
Harlan	1678	1340	80%
Estill	1328	1309	99%
Rowan	1525	917	60%
Leslie	928	888	96%
Rockcastle	666	666	100%

Source: NEFES Timber Product Output Study, 1986

Factors Which Increase Demand for DBNF Timber

The increasing number of companies in the DBNF market area will eventually result in a greater demand for all timber within the market area. That demand will be directed toward those timberlands that are most likely to bring the logger the highest profit and least risk. Several factors cause an inequity in the demand for timber from the DBNF and its surrounding competitors. Three of these factors are the difference in volume per acre, the difference in size of the timber, and the difference in quality of timber.

There is evidence that the average volume per acre on the DBNF timberland (commercial forest) may be nearly double the average volume per acre on private timberland within the competitive zone as determined from permanent forest inventory data plots (NEFES, data run). More volume per acre generally reduces logging costs, so purchasers are more interested in such areas.

Also, estimates indicate that timber is generally larger on the DBNF than timber on private timberland in the competitive zone. Figure 8 shows that the DBNF has a greater percentage of timber in the 15" and greater diameter classes, than surrounding private timberland.

Another factor giving the DBNF a competitive edge, is the quality of standing timber. Although more than 60% of the hardwood sawtimber trees in eastern Kentucky were tree grade 3 or worse, the DBNF had a significantly greater percentage of volume in grades 1 and 2 than the average for eastern Kentucky timberland (fig.9).

These factors should tend to cause a greater demand for DBNF timber, relative to demand for timber on surrounding private timberland. In the next decade, average quality and size of timber will most likely increase on DBNF. With higher demand and few silvicultural incentives, quality and size of timber will most likely remain constant or even decrease on private lands within the competitive zone. It follows then, that the gap between private & DBNF timber quality would be expected to increase, thereby increasing demand for DBNF timber during the next decade.

Factors Which Decrease Demand for DBNF Timber

Mills in Kentucky (as well as the mills in adjoining states in the DBNF market area) have become very efficient in reducing waste following manufacture of primary forest products. In 1995, the two pulp mills in Kentucky produced 702 M cords of pulpwood, 62% from wood residues (chips) and only 38% from roundwood. Many of these chips were sawmill by-products.

Recycling of wood fiber, especially for paper-pulp has increased tremendously in the last decade. In 1992, the average U.S. paper mill produced paper containing 30% recycled material, and this proportion is expected to increase to 40% by 2000 (USFS,1986). Some paper recycling is occurring in the DBNF area, especially in the larger cities. The greater the consumer recycles, the less demand for wood from timberland, and the greater the opportunity to modify harvest timing for other objectives.

Interest in bidding on DBNF timber sales is often influenced by the skill of the district Timber Management Assistant in preparing an attractive sale package. Sales are designed to allow a reasonable profit for the contractor, while covering FS costs. This is often a difficult assignment (as previously mentioned under "below-cost" sales).

Some purchasers are reluctant to do business with the Forest Service due to the strict requirements of the timber sale contract. Once purchased, contracted timber may not always be readily available for removal. One standard clause in the timber sale contract protects threatened and endangered species discovered during implementation of a contract. Since this clause has been used to delay several logging operations pending the outcome of NEPA decisions, several loggers have become more reluctant to commit to what they perceive as an increasingly unreliable supply. Several of the new mills that have the DBNF potentially within their procurement areas, did not consider the DBNF when looking at their supply projections, due to the unreliability of future NF timber supply (pers.com., Randy Hjetland, KDF, 2/96).

The attractiveness of a timber sale is not only determined by the value of the material harvested, but by the costs of logging the sale, including the difficulty of getting the product to market. Logging costs for DBNF products are generally higher than on other lands within the competitive zone, because of stricter contract requirements and more difficult terrain and accessibility (AMS, p.109). Some DBNF sales may include a significant amount of lower quality timber, which is not normally attractive to purchasers, which results in lower bid prices. On private lands within the competitive zone, this material has typically been left in the woods or left to be bucked for firewood where accessible. Timber sales are most likely to sell when high-quality timber is included, which is not plentiful in the competitive zone, and is becoming more scarce within the State⁴.

TIMBER PRICES

Timber prices are a result of the interaction of several supply and demand factors, one of which is the scarcity of supply. According to economic theory as described in Randall's text, "...increasing scarcity induces price increases, which establish incentives that tend to mitigate the scarcity. That is, prices are a signaling and incentive system that provides feedback that tends to stabilize the resource economy and correct any aberrations therein. The price system does not operate painlessly..." (Randall,1987,p.29).

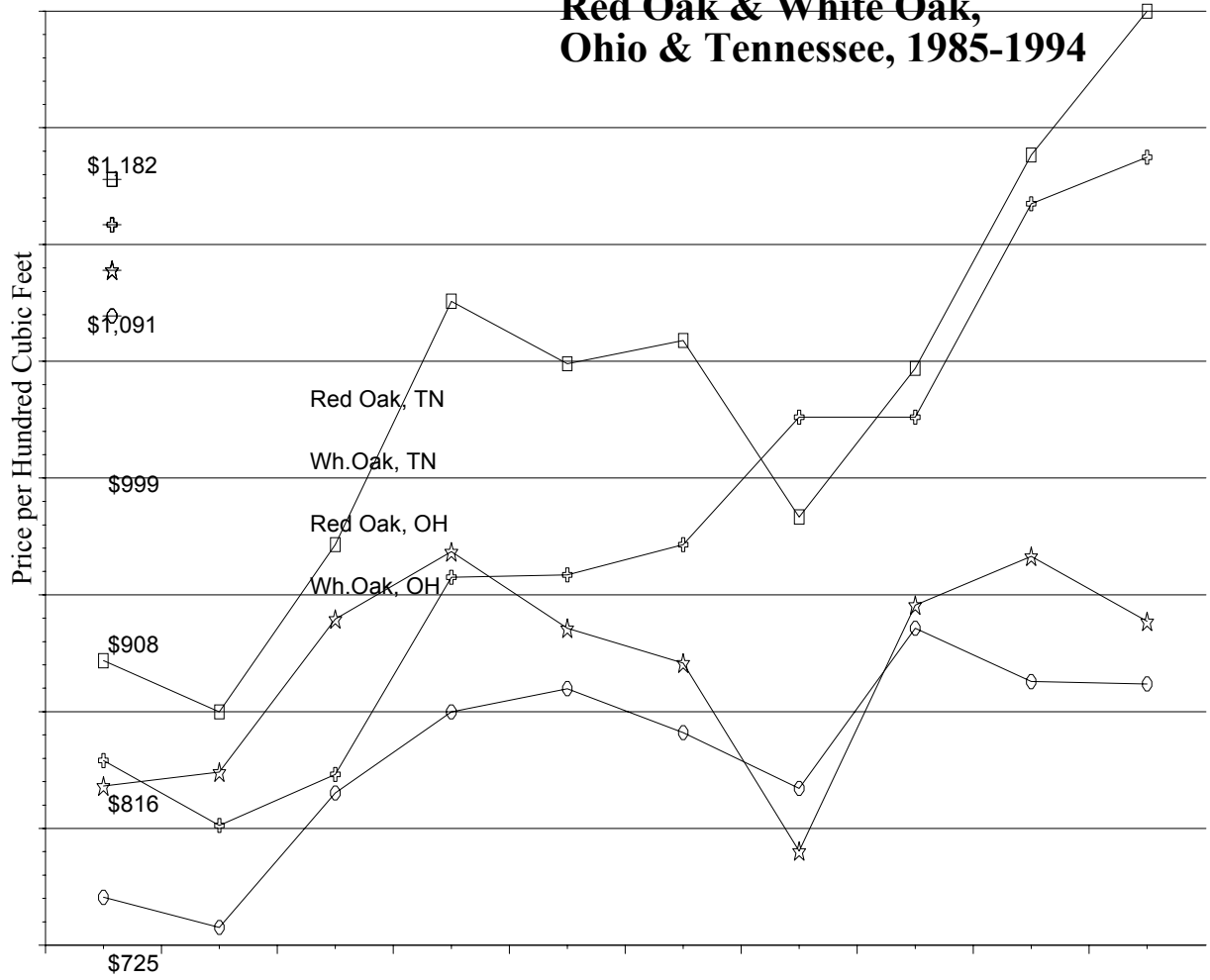
Stumpage Price Determination on the DBNF

The price that the DBNF receives for harvested trees (the stumpage price) is determined by several factors, one of which is the price received by the logger for the raw logs delivered to the mill or concentration yard. A sample of regional prices that have been paid for logs delivered to the mill, adjusted by a Producer Price Index with a base year of 1987, is shown in figure 12. A more detailed table showing other grades is located in appendix D. Prices for grade one logs have generally been greater in Tennessee during the period, with the greatest real price increase having occurred in Tennessee for red oak to \$1182/ccf. Real market prices for grade one yellow-poplar have generally remained between \$300 and \$500 per ccf, with a peak in Tennessee in 1994 at \$496/ccf (appendix D).

⁴ Grade 1 sawtimber declined from 17% to 14% between 1975 to 1988 in Kentucky (Alerich,1990).

In comparison, only 12% of all DBNF sawtimber trees were grade 1 in 1988 (Alerich,1991).

Red Oak & White Oak, Ohio & Tennessee, 1985-1994



In order to determine what stumpage price is acceptable prior to a timber sale, the DBNF calculates a base price based on market prices. Base prices are calculated as either a percentage of market prices of delivered logs, or based on averages of several years of sale transactions. These prices are designed to approximate average prices that are being paid for stumpage within our market area, and include average forest-wide logging and hauling costs. These prices are then adjusted based on site-specific sale conditions, to determine the estimated (appraised) value and a minimum acceptable bid price. A sample of base prices used by the DBNF during the past decade is shown in table 7A.

If accepted, the highest bid received for each timber sale becomes the stumpage price. Stumpage prices received by the DBNF for certain species and products are shown in table 7B. A comparison of tables 7A and 7B shows that DBNF stumpage prices have generally followed base prices for the area.

Table 7A - BASE PRICES FOR SELECTED FOREST PRODUCTS, APPALACHIAN AREA (\$/CCF)*

	Yellow Pine Sawtimber	Red Oak Sawtimber	Yellow- poplar Sawtimber	Other Hrdwd Sawtimber	Hardwd.Small l Roundwood 1.83	Pine Small Roundwood 3.64
Jan.198 5	66.44	57.29	40.35	29.84		
Jan.198 7	67.17 70.32	64.22	50.17	43.41	4.99	5.39
Jan.198 9	70.32	91.65	59.86	52.13	1.73	2.93
Jan.199 1	81.13	155.11	22.75	26.47	3.44	3.97
Jan.199 3	83.81	231.93	26.06	28.95	3.13	2.20
Jan.199 5	98.06	291.00	57.44	52.59	5.91	5.91

* '85-89 from previous 4 yr. transaction evidence, '91-95 from the Weekly Hardwood Review trade journal (% of lumber price).

Table 7B - AVERAGE PRICES RECEIVED BY DBNF FOR SELECTED PRODUCTS (\$/CCF)

	Yellow Pine Sawtimber	Red Oak Sawtimber	Yellow- poplar Sawtimber	Low grade Sawtimber	Pulpwood	Fuelwood
1986	104.52	107.12	69.58	---	10.17	7.21
1987	106.15	172.53	94.18	26.88	8.63	5.96
1988	105.46	207.03	123.53	40.31	6.31	7.19
1989	126.14	201.59	116.43	65.75	8.21	6.75
1990	115.56	210.31	121.68	58.23	7.71	10.75
1991	115.44	206.25	83.04	27.10	4.10	13.48
1992	142.09	299.57	103.38	14.99	1.90	10.57
1993	165.50	426.01	152.19	72.68	2.31	11.70
1994	119.14	490.64	151.96	64.96	12.85	14.21
1995	71.36	452.31	143.34	60.58	10.84	16.17

Average⁵ annual stumpage prices received are shown in figure 13. Average sawtimber stumpage prices received by the DBNF tripled from \$46/MBF in 1986 to \$138/MBF in 1994, as recorded in the Automated Timber Sales Accounting System.



Since "willingness" to sell timber in the region has been fairly stable (see pg. 17, Supply Competitors), and since statewide timber inventories have been steady to slowly increasing over the past several decades, and assuming logging costs have increased at a rate no greater than inflation, price should be a relatively good indicator of demand. Given these assumptions, based on the above market prices and stumpage prices received by the DBNF, demand for forest products has evidently increased for all forest products and species within the DBNF competitive zone.

⁵ Total value of product sold during the year divided by total volume of the product sold during the year.

Effect of Market Conditions on DBNF Stumpage Price

As indicated in figure 12, regional prices increased sharply in 1992, possibly in response to a reduction in supply from the northwest U.S. This is fairly good evidence that no single timber producing source is immune to the effects of the national and international timber economy. The price the DBNF receives for its timber is affected by the condition of timber industry in Oregon, in Maine, and even remotely by timber industry in Brazil. Even though each individual source is insignificant, conditions affecting large areas with many owners can significantly affect price. Such fluctuations in price can occur at any time, resulting in a change in the price the DBNF receives for its forest products (stumpage).

Effect of DBNF Sales on Market Price

As previously mentioned, the DBNF contains only 7% of the timberland in the 71-county competitive zone. Less than one percent of this 7% (0.07%) is harvested each year. Only 13% of the average annual removals of timber in eastern Kentucky came from National Forest land between 1974-1987 (table 4). Since the DBNF supplies only a minor portion of the forest products in this area, the DBNF probably has only a minor cumulative effect on the market price. This same determination was made during a recent analysis on a nearby National Forest⁶.

DBNF Timber Supply and Community Stability

Two goals of the LRMP were to promote economic stability by strengthening the local timber industry, and to encourage developing markets for low grade and small timber (LRMP goals #17 & 18). The strategy used to achieve these goals was to provide a stable annual supply (even flow, sustained yield) as indicated in the LRMP. One measure of stability is provided by the Forest Monitoring Plan which includes a "+15% change from the 5-year base harvest schedule" as "variability requiring some action". By this definition, both table 3 and figure 3 clearly show that a stable supply from the DBNF was not achieved during the 1991-1995 period. Even so, local general economies did not decline during this period (see analysis of local economies in separate Human Dimension paper).

However, there is some indication that local economic stability may not necessarily rely on sustained yield from the National Forests. The economy might be better served if national forest timber sales could more closely follow price (demand). At least one study has shown that while a stable supply can be provided, stable demand is highly unlikely because it is often dominated by business cycles and changes in preferences that are outside the control of local resource managers (Wear, et.al., 1989). When the market declines, an even flow can only be provided by reducing sale prices for timber and therefore incurring losses to the federal treasury, flooding the market, and unfairly competing with private timberland owners. Wear's study concludes that "the slight help [even-flow harvesting] would provide local communities, would come however, at a high cost to the public at large" and "that efficiency might be gained by considering market signals when preparing timber sale schedules at the local level. A possible strategy is to develop an annual portfolio of potential sale offerings ... and to select sales for final preparation and offering based on local market demand [prices]."

REFERENCES:

Alerich, Carol L. 1990. Forest Statistics for Kentucky -- 1975 and 1988. USFS-NEFES, Res.Bul.NE-117. 36 pp. & 204 tables.

Alerich, Carol L. 1991. Forest Statistics for the Daniel Boone National Forest, 1988. USFS-NEFES custom report. 21pp. & 28 tables.

Cubbage, Frederick W., Thomas G. Harris Jr., David N. Wear, Robert C. Abt, and Gerardo Pacheco. 1995. Timber Supply in the South: Where is all the Wood? JOF, Vol.93, No.7. p.16-20.

Harris, Gardiner. 8/22/95. Logging practices suggest to some rules are needed. Louisville (KY) Courier-Journal. (newspaper)

⁶ Final Environmental Impact Statement for the Revised Land & Resource Management Plan, George Washington National Forest; appendix A, p.A-10 (USDA-FS, 1993).

Johnson, Tony G. & Michael Howell. 1996. Southern Pulpwood Production, 1994. Resour. Bull. SRS-1. Asheville, NC: USDA, FS, S.Research Sta. 32 p.

Kentucky Division of Forestry. 1994. Primary Wood Industries of Kentucky 1994, A Directory. Nat.Res.& Env.Protect.Cabinet., Frankfort KY. 156 pp.

Learn, Scott & Andy Mead. 2/4/96. Forecasters predicting boom in Eastern Kentucky logging. Lexington (KY) Herald-Leader.

Lexington (KY) Herald-Leader. 8/11/95. Forests ahead of jobs. (newspaper)

Randall, Alan. 1987. Resource Economics, An Economic Approach to Natural Resource and Environmental Policy. 2nd Ed. John Wylie & Sons. New York. 434 p.

Society of American Foresters (SAF). 1985. Below-cost timber sales on the National Forests: a position statement of the Society of American Foresters. Bethesda, MD: SAF. 9 p.

Thomas, Jack W. 2/6/96. Statement of Jack Ward Thomas, Chief, F.S., U.S.D.A., Before the Subcommittee on Oversight and Investigation, Committee on Energy and Natural Resources, U.S.S., Concerning Federal Land Ownership by Public Land Management Agencies, 2/6/96.

USDA-FS. 1987. Timber Sale Program Information Reporting System, Final Report to Congress. Wash.DC. p.5.

USDA-FS. 1988. The South's Fourth Forest: Alternatives for the Future. FRR#24. Washington, DC. p.3.

USDA-FS. 1993. Final Environmental Impact Statement for the Revised Land and Resource Management Plan, George Washington National Forest. Wash.,D.C. 294 pp. & apdx.

USDA-FS. 1994. RPA Assessment of the Forest and Rangeland Situation in the United States - 1993 Update. Forest Resource Rpt # 27. 75 pp.

USDA-FS-DBNF. 1994. 1992 & 1993 Monitoring and Evaluation Report. 185 pp.

Wear, David N., W.F.Hyde, S.E.Daniels. 1989. Even-Flow Timber Harvests and Community Stability, an analysis of short-run timber sale policies. JOF, Vol.87, No.9. p.24-28.

Wharton, Eric H. 1986. The Timber Industries of Kentucky, 1986; USDA-FS Resource Bulletin NE-120, NEFES, Radner, PA.

Wolfe, Charles. 9/12/95. Kentucky timber demand spurs fear for environment. Associated Press; Lexington Herald-Leader.

Appendix A - Counties in the Timber Competitive Zone * of the Daniel Boone National Forest, 1995

OH, Adams	3	Jackson	1
OH, Scioto	3	Jessamine	3
TN, Anderson	3	Johnson	3
TN, Campbell	2	Knott	3
TN, Claiborne	3	Knox	1
TN, Clay	3	Laurel	1
TN, Cumberland	3	Lawrence	3
TN, Fentress	2	Lee	1
TN, Morgan	3	Leslie	1
TN, Overton	3	Letcher	3
TN, Pickett	2	Lewis	2
TN, Scott	2	Lincoln	2
TN, Union	3	Madison	3
VA, Lee	3	Magoffin	3
VA, Wise	3	Marion	3
Adair	2	Mason	3

Bath	1	McCreary	1
Bell	2	Menifee	1
Bourbon	3	Metcalfe	3
Boyd	3	Monroe	3
Boyle	3	Montgomery	2
Breathitt	3	Morgan	1
Carter	2	Nicholas	3
Casey	2	Owsley	1
Clark	2	Perry	1
Clay	1	Powell	1
Clinton	2	Pulaski	1
Cumberland	3	Robertson	3
Elliott	2	Rockcastle	1
Estill	1	Rowan	1
Fayette	3	Russell	2
Fleming	2	Taylor	3
Garrard	2	Wayne	1
Green	3	Whitley	1
Greenup	3	Wolfe	1
Harlan	1		

* based on data from Forest Inventory and Analysis (NEFES, 1987)

key:

1 = County contains DBNF (in market area & competitive zone)

2 = Non-DBNF county containing facility receiving logs from DBNF county (mkt. area & comp. zone)

3 = Other County supplying logs to facility receiving logs from DBNF county (competitive zone only)

Appendix B - Known Mills in the Daniel Boone National Forest Market Area, 1994

<u>County</u>	<u>Mill Name</u>	<u>Town</u>	<u>Spp</u>	<u>MCF Annual Capacity</u>	<u>Product(s)</u>
Adair	Billy Joe Turner	Cane Valley	h	16.5	l r
Adair	Bryant Brothers Lbr	Columbia	h	110.0	l p t r
Adair	Christine Lumber	Columbia	h	2.8	l p
Adair	Cool Springs Sawmill	Gradyville	h	2.8	l
Adair	Dry Creek Lbr	Casey Creek	h	2.8	l t r
Adair	Gaskins Lbr	Columbia	h	41.3	l p
Adair	Henry Detweiler	Gradyville	h	44.0	o
Adair	Highway 61 Sawmills	Breeding	h	110.0	p r
Adair	Holmes & White Lbr	Columbia	h	110.0	l t p r
Adair	J. Downey & Son Lbr	Columbia	h	220.0	l t p r o
Adair	Kentucky Tie & Lbr	Columbia	h	330.0	l p c r
Adair	McInteer Handle Mill	Columbia	h	1.7	o
Adair	Rex Bennett	Edmonton	h	1.7	l
Adair	Vernon Nissley & Sons	Columbia	h	2.8	p
Adair	W.H. Sandusky & Son	Columbia	h	220.0	l p c r
Bath	Gemes Montgomery	Owingsville	h	2.8	l t
Bath	McArthur Lmbr. & Post	Olympia	p	41.3	l t o
Bell	Brock Lumber	Stoney Fork	h	41.3	l t o r
Bell	Carolina-Pacific Ind.	Middlesboro		0.0	
Bell	Dean Enterprises	Pineville	h	0.0	l t p
Bell	J & S Sawmill	Arjay	h p	41.3	l t
Bell	Paul Elliott	Pineville	h p	41.3	l t o
Carter	C & E Rayburn Lumber	Olive Hill	h	220.0	l t p r
Carter	C & K Pallets	Olive Hill	h p	220.0	p
Carter	Clear Creek Hwds.	Grayson	h	220.0	l t p
Carter	Davis Lbr.	Grayson	h p	41.3	t p
Carter	Donald Sloan	Olive Hill	h	41.3	l t
Carter	Eugene Rayburn & Sons	Emerson	h p	110.0	l t p r
Carter	Jack Hall	Grayson	h p	16.5	l p
Carter	McGlove Logging	Olive Hill	h p	110.0	l t o
Carter	Mullens & Sexton	Hitchens	h	110.0	p
Carter	R & B Lbr.	Olive Hill	h p	110.0	l t p
Carter	Ruben Stamper	Olive Hill	h p	2.8	l
Carter	Stone Lbr.	Olive Hill		0.0	
Carter	Utley Bros.	Grayson	h	16.5	l t
Casey	Barron pallet	Waynesburg	h	110.0	p
Casey	Earl Buis	Liberty	h	1.7	l
Casey	Emerson Lbr	Liberty	h	11.0	o
Casey	Hamilton Lbr & Hdware	Kings Mt	h	110.0	l c r
Casey	Hays Wd Prod	Liberty	h	16.5	o
Casey	John Silver mill	Elkhorn	h	1.7	l
Casey	Mason Sawmill	Liberty	h	41.3	o
Casey	Murphy sawmill	Liberty	h	110.0	l p c r
Casey	Roger Gabeheart mill	Liberty	h	16.5	l r
Casey	Southern Ind. Lbr	Liberty	h	110.0	o
Casey	Tarter Gate Co.	Dunnville	h	220.0	l p c r
Casey	Watson Lbr	Liberty	h p	928.6	cl p t r
Casey	Welby Pennington	Liberty	h	110.0	o
Casey	Wolford & Wethington	Hustonville	h	110.0	p t l c r
Casey	Wolford & Wethington	Liberty	h	236.5	p t l c o
Clark	The Freeman Corporation	Winchester	h	220.0	l v
Clay	Bowling's Log & Lbr	Manchester	h	110.0	l p t
Clay	C & S Lbr	Manchester	h	2.8	p
Clay	Robert Hacker Lbr	Manchester	h	16.5	l
Clay	Wade Hacker mill	Manchester	h	41.3	l p t c r
Clinton	Carl Cowan	Byrdstown	o	0.2	o
Clinton	J.W. Pallet	Albany	h	16.5	l p
Clinton	Neal Lbr	Albany	h	110.0	l t p c r
Clinton	Pyles Lbr	Albany	h	16.5	l p c r
Clinton	Shelton Bros	Albany	h	0.4	l
Clinton	South Ky. Veneer	Albany	h	27.5	v

Clinton	Stewart Sawmill	Albany	h	16.5	l r
Elliott	Charles Fraley posts	Sandy Hook	p	2.8	s
Elliott	P & B Posting	Sandy Hook	p	16.5	s
Estill	Estill Wood Prod	Ravenna	hp	220.0	l p c
Estill	Isaacs Lbr	Ravenna	h	220.0	l c p r
Estill	Jerry Kelly mill	Irvine	h	2.8	l
Estill	Smyth Lumber	Ravenna	hp	110.0	l s r o
Estill	Wallace Lumber	Irvine	hp	110.0	l s o
Fleming	Chuck Hurst Lbr	Muses Mills		0.0	
Fleming	Daniel Boone Lbr	Morehead	h	110.0	p
Fleming	E & R Weaver Lbr	Walling Ford	h	110.0	l p
Fleming	Fox Valley Wd. Pr.	Walling Ford	h	126.5	l p o
Fleming	Greentree For. Prod.	Walling Ford	hp	220.0	l p c r
Fleming	Weaver Logging	Walling Ford	h	16.5	l p t
Garrard	Feldman Lumber	Lancaster	hp	110.0	l t c r
Garrard	H & K Frams	Berea			
Garrard	John Leigh mill	Berea	hp	27.5	l
Harlan	Forest Products	Evarts	hp	550.0	l t p c
Harlan	Gaines Lbr	Harlan	hp	220.0	l t p c
Harlan	Wilder Lbr	Bledsoe	hp	16.5	l t p c
Jackson	Jackson County Lbr	Annville	h	220.0	l t c
Jackson	McQueen Bros.Wd.Pr.	Bond	h	2.8	l s
Jackson	Melvin Marks mill	McKee	hp	41.3	l p t r
Knox	Cammie Elliott	Barbourville	hp	41.3	l t c r
Knox	Forest Products	Corbin	h p o	550.0	l p c r
Knox	Hobbs Lumber	Scalf	h	16.5	l t
Knox	Johnny Calleb	Hynkle	h	2.8	t
Laurel	4-Way Lbr	London	h p o	126.5	l t c r s
Laurel	Begley Lbr	London	h p o	550.0	l p c r
Laurel	Binder & Wilson Lbr	London	h p o	110.0	l t
Laurel	Bruner Ivory Handle	London	h	41.3	o
Laurel	Clell Turner Lbr	London	h p o	41.3	l
Laurel	Cumberland For Prod	London	h	110.0	v
Laurel	Hibbard Lbr	London	h	41.3	l t p
Laurel	Kentucky Forest Prod	E.Bernstadt	p	5.5	s
Laurel	Patterson Chip Co	Barbourville	h p o	1.7	c
Laurel	Pioneer Pallet	E.Bernstadt	h	110.0	p
Laurel	Richard Vaughn Lbr	London	hp	110.0	l
Laurel	Robinson Stave	E.Bernstadt	h p o	71.5	l t c r o
Laurel	Sailfish Pallets	London	h p o	16.5	p
Laurel	Stanford Tbr.Prod.	E.Bernstadt	h p o	0.0	c
Laurel	Tri-County Wd.Pres.	London	p	5.5	s
Lee	Gary King mill	Zoe		0.0	
Lee	Bedford McIntosh mill	Beattyville	hp	0.0	l t
Lee	L.C. Moore sawmill	Beattyville	h p o	2.8	l t p
Lee	T&T Post	Zoe	p	0.0	s
Leslie	Begley Lbr	Hyden	h p o	0.1	l t p c r
Leslie	Roberts Lbr	Stinnett	h	16.5	l t p
Leslie	Turner Lbr	Hyden	h p o	16.5	l t p
Lewis	Bolander Lbr	Garrison	h	110.0	l p
Lewis	C.J. Thomas & Sons	Vanceburg	h	220.0	l p c r
Lewis	Camp Dix Wood Pr.	Camp Dix	h	220.0	l t p c
Lewis	Clear Creek #2	Vanceburg	h	220.0	l p
Lewis	Curtis Fannin sawmill	Camp Dix	h p	2.8	l t
Lewis	Evans & Farley mill	Vanceburg	h	16.5	t p
Lewis	Everman Lbr	Garrison	hp	110.0	l t
Lewis	Goodwin Lbr	Vanceburg	hp	220.0	l t p o
Lewis	Moore & White Lbr	Vanceburg	h	220.0	l t c o
Lewis	R&S Salvage	Tollesboro	hp	41.3	p
Lewis	Riffe's sawmill	Garrison	h	220.0	p
Lewis	Clear Creek Hdws	Vanceburg	h	110.0	l p r
Lincoln	Benny Dennis mill	Stanford	h	2.8	l t p
Lincoln	Fields Bros.Lbr.	Waynesburg	h	41.3	p
Lincoln	Gary Dowell mill	Crab Orchard	h	2.8	l
Lincoln	Lincoln County mill	Waynesburg	h	41.3	l p
Lincoln	Monroe Pallet Co.	Eubank	h	110.0	p c r
Lincoln	R.M. Baston Lbr	Eubank	h	110.0	l t p c r
McCreary	Bryant Bros.Lbr.	Whitley City	hp	41.3	l t c r

McCreary	Doyle's Lumber mill	Stearns	h p o	2.8	l t
McCreary	Gregory Lbr.	Coopersville	h	110.0	l t p c o
McCreary	Hiwassee (Bowater)	Pine Knot	h p	818.6	y
McCreary	Kenneth Dolan Lbr.	Beulah Heights	h p	41.3	l p
McCreary	McCreary Co. Hwds.	Pine Knot	h	220.0	l t r
McCreary	Monroe Mills	Whitley City	h	220.0	p
McCreary	Pine Knot Lbr.	Pine Knot	h p o	41.3	l t
McCreary	Ward Logging & Mill	Somerset	h	2.8	l t p o
McCreary	Winchester Lbr.	Stearns	h o	2.8	l p r
McCreary	Bill Shook Pallets	Rattlesnake Rdg.	h	2.8	p
Menifee	Bobby Yocum mill	Mariba	h p o	110.0	l p
Menifee	Ferrell's Logging & Lbr.	Frenchburg	h	110.0	l t p
Menifee	Jones Lbr.	Mariba	h	16.5	l
Menifee	Smallwood Lbr.	Frenchburg	h p	110.0	l p
Montgomery	Maloney Lbr.	Jeffersonville	h	16.5	l
Montgomery	Roy Strange mill	Jeffersonville	h p	16.5	l t
Morgan	Fredrick & May Lbr.	West Liberty	h p o	330.0	l t p c
Morgan	McKenzie Lbr. & Post	Morehead	p	41.3	l s
Morgan	Peck Bros.	Campton	p	2.8	s
Morgan	Walter Fannin	West Liberty	h p o	41.3	l t
Owsley	Charles Roberts	Booneville	h p	2.8	l t
Owsley	Thomas sawmill	Booneville	h p	2.8	l m
Owsley	Jerry Wilson mill	Booneville	h p	2.8	l
Perry	Abner Bros. Wood Prod.	Buckhorn		0.0	l t
Perry	Beecher Collins mill	Dice	h p	2.8	l t
Perry	Combs Logging	Vicco		0.0	l t o
Perry	D & S Lbr.	Hazard	h	220.0	l t o
Perry	Samuel Fugate	Dwarf	h p	2.8	l t f
Perry	Gay Sawmill	Buckhorn	h	2.8	l
Perry	Freddy Grigsby	Hazard	h p	2.8	l f
Perry	Trus-Joist MacMillan	hazard	h	8512.9	m
Perry	Johnson's Logging	Busy	h p	2.8	l s f
Perry	Earl Johnson	Krypton	h p	16.5	l t s o
Perry	Irving Napier	Hazard		0.0	
Perry	Nobel Sawmill	Rowdy	h	2.8	l
Perry	Virgil Smith	Ary	h p	2.8	l
Powell	Marcum Sawmill	Clay City	h p	16.5	l t f
Powell	Miller Post & Lbr.	Stanton	h o	440.0	l s h t
Powell	Smallwood Lbr.	Stanton	h p	2.8	l t
Pulaski	Barron Pallet	Waynesburg	h	110.0	p c r
Pulaski	Collins Enterprises	Eubank	h	110.0	p r
Pulaski	Cumberland Handle Mill	Nancy	h	110.0	l p c r
Pulaski	Everett Skaggs	Somerset	h	2.8	l
Pulaski	Virdon Floyd	Eubank	h	2.8	l r
Pulaski	Frye Lbr	Burnside	h p	110.0	l p c r
Pulaski	H & M Pallet	Somerset	h	110.0	l p c r
Pulaski	Elsey Jasper mill	Bethelridge	h	2.8	l t p
Pulaski	Keith's Pallet Mill	Eubank	h	16.5	p r
Pulaski	Kentucky Hwd. Lbr.	Somerset	h	220.0	p t l c r
Pulaski	Larry Hamilton Excavating	Somerset	h o	2.8	l p s r
Pulaski	Modern Pallet	Somerset	h	41.3	p c r
Pulaski	Perdue Lbr.	Eubank	h p	110.0	p t l c r
Pulaski	Russell Hines	Somerset	h	2.8	l
Pulaski	Toby's Inc.	Somerset	h p	110.0	l p s
Pulaski	Vaught Bros.	Science Hill	p	16.5	l
Pulaski	Woodmont Woodwork	Somerset	h	16.5	p
Pulaski	Woodstock Pallet	Eubank	h	220.0	p c r
Pulaski	Cedar City	Mount Olivet	h	41.3	l s t
Pulaski	Louis Sutton mill	Mount Olivet	h	2.8	l
Rockcastle	Doug Burdette	Wildie	h	2.8	l f
Rockcastle	Evert Overbay	Livingston	h p	2.8	l t f
Rockcastle	Hudson Wood Prod.	Orlando	o	16.5	p
Rockcastle	Marvin Ponder sawmill	Mount Vernon	h	2.8	l f
Rockcastle	Mink Bros. Lbr.	Mount Vernon	h p	16.5	l t
Rockcastle	Mount Vernon Hwds.	Mount Vernon	h	110.0	l p
Rockcastle	Phillip C. Backus	Mount Vernon	h	2.8	l f
Rockcastle	Richard Rucker mill	Berea	h p	2.8	l
Rockcastle	Roscoe Himes	Orlando	h p	41.3	l p t f

Rowan	Cecil Baldridge mill	Clearfield	hp	2.8	lt
Rowan	Eugene White Lbr.	Morehead	hp	110.0	lc
Rowan	Fannin Industries	Morehead	hpo	330.0	lcpo
Rowan	Harold White Lbr.	Morehead	hp	550.0	lcp
Rowan	Homer Gregory Lbr.	Morehead	hpo	110.0	lpc
Rowan	J.C. Wells & Sons	Morehead	hpo	440.0	locp
Rowan	Kentucky Dry Kiln & Lbr.	Morehead		0.0	l
Rowan	Leo Williams	Farmers	h	0.0	o
Rowan	Ray L. White & Sons	Morehead	hp	330.0	lpc
Rowan	Richard White Wd Prod.	Morehead	h	55.0	v
Rowan	Tony Petit	Morehead	h	16.5	lt
Rowan	Walter Rybka	Morehead	hp	2.8	lt
Russell	Aubrey Kilpatrick	Jamestown	h	2.8	l
Russell	W.H. Sandusky & Son	Russell Springs	h	220.0	lpcr
Wayne	B & B Lbr.	Monticello	h	110.0	p
Wayne	Bear Hollow Wood Prod.	Mill Springs	h	16.5	o
Wayne	Bertram Lbr.	Monticello	h	41.3	lpt
Wayne	Coffee Mt. Squares	Monticello	h	16.5	o
Wayne	Don Richardson Lbr.	Monticello	h	126.5	lpcrv
Wayne	Foster Lbr.	Coopersville	h	110.0	ltp
Wayne	Hicks Lbr.	Windy	h	16.5	lt
Wayne	K & M Lbr.	Monticello	h	110.0	lcr
Wayne	Kay Koger Lbr.	Monticello	h	41.3	lptr
Wayne	M & P Lbr.	Monticello	h	110.0	lr
Wayne	Monticello Hwds.	Monticello	h	126.5	lpcr
Wayne	O. P. Link Handle	Monticello	h	41.3	or
Wayne	Specialty Wood Prod.	Monticello	h	41.3	ltp
Wayne	Upchurch Lbr.	Steubenville	h	16.5	lptr
Wayne	Wayne Lbr.	Monticello	h	440.0	lpcr
Whitley	Arnold Morgan sawmill	Corbin	hpo	2.8	l
Whitley	Flem Rose, Jr. mill	Williamsburg	hpo	2.8	lt
Whitley	Forest Products	Williamsburg	hpo	550.0	ltcf
Whitley	Roy Rowe	Jellico, TN	h	2.8	l
Whitley	Tommy Petry	Williamsburg	hpo	16.5	l
Wolfe	Eugene Brewer	Hazel Green	hp	16.5	ltp
Wolfe	Gilbert sawmill	Campton		0.0	lp
Wolfe	Steve Lumpkins mill	Campton	hp	16.5	lt
Wolfe	Kendall Lykins	Campton	hp	2.8	ltp
Wolfe	Peck Bros.	Campton		0.0	s
Wolfe	Ratliffe & Spencer	Pine Ridge	hp	110.0	ltpo
Wolfe	S & S Lbr.	Pine Ridge	h	16.5	ltpf
Wolfe	Sparks sawmill	Rogers	hp	2.8	lt
Wolfe	Spencer sawmill	Pine Ridge	hp	110.0	ltof
TN, Campbell	Champion International	Caryville, TN	h	6821.3	c
TN, Campbell	K.B. Stave & Lumber	Speedwell, TN	h	0.0	l
TN, Fentress	Hall & Norris Sawmill	Deer Lodge, TN	ho	82.5	ltpo
TN, Pickett	Cook & Cook Logging	Byrdstown, TN	h	2.8	ltp
TN, Scott	Barna-Danner Co.	Oneida, TN	hpo	137.5	lcof
TN, Scott	Charles D. Roberts Co.	Helenwood, TN	h	192.5	or
				Pulp & Chip Mills	15,334.2
				(2)	
				Total	36,483.3

Product Codes

l	Lumber
t	Tie/ Timber
c	Chips
p	Pallet
f	Firewood
r	Residue
s	Posts
v	Veneer mill or yard
m	Composite
o	Other
y	pulp/chip yard

Species Codes

h	Hardwood
p	Yellow Pine
o	Other Softwood

Appendix C - Removal & Consumption of Wood by County,
Daniel Boone National Forest Market Area

	Wood Consumed by Mills			Wood Removed from Lands			Timberland Area		
	---1986, MCF--- total	% of DBNF*	% of mkt	--1975-1986, MCF-- total	% of DBNF	% of supply	----- M acres tot. tmblnd.	% of cnty timberla nd	
TN, Campbell	n/a	n/a	0.0%	2600		0.0%	250.2	0.0	0.0%
TN, Fentress	n/a	n/a	0.0%	3700		0.0%	244.1	0.0	0.0%
TN, Pickett	n/a	n/a	0.0%	200		0.0%	68.4	0.0	0.0%
TN, Scott	n/a	n/a	0.0%	5600		0.0%	300.3	0.0	0.0%
Adair	460	115	25.0%	1000		0.0%	139.2	0.0	0.0%
Bath	148	126	85.1%	2000	1300	65.0%	78.4	18.5	23.6%
Bell	425	220	51.8%	2200		0.0%	203.3	0.0	0.0%
Carter	309	71	23.0%	1500		0.0%	184.0	0.0	0.0%
Casey	789	433	54.9%	3000		0.0%	148.0	0.0	0.0%
Clark	0	0	0.0%	0		0.0%	27.3	0.0	0.0%
Clay	281	281	100.0%	2800	600	21.4%	254.1	76.9	30.3%
Clinton	448	225	50.2%	500		0.0%	70.7	0.0	0.0%
Elliott	292	142	48.6%	1400		0.0%	124.4	0.0	0.0%
Estill	1328	1309	98.6%	1600	0	0.0%	122.7	5.6	4.6%
Fleming	810	314	38.8%	100		0.0%	109.9	0.0	0.0%
Garrard	0	0	0.0%	0		0.0%	33.8	0.0	0.0%
Harlan	1678	1340	79.9%	3300	0	0.0%	271.8	0.8	0.3%
Jackson	1134	1134	100.0%	2900	0	0.0%	176.3	58.2	33.0%
Knox	247	247	100.0%	2000	0	0.0%	180.9	0.1	0.1%
Laurel	1896	1896	100.0%	2100	1200	57.1%	168.5	61.4	36.4%
Lee	50	50	100.0%	2000	300	15.0%	116.0	8.6	7.4%
Leslie	928	888	95.7%	6300	400	6.3%	232.5	52.2	22.5%
Lewis	1923	311	16.2%	2600		0.0%	229.2	0.0	0.0%
Lincoln	1280	175	13.7%	300		0.0%	67.4	0.0	0.0%
McCreary	6168	6168	100.0%	4000	1100	27.5%	202.9	140.9	69.4%
Menifee	431	431	100.0%	400	100	25.0%	108.6	45.8	42.2%
Montgomery	302	222	73.5%	0		0.0%	29.7	0.0	0.0%
Morgan	408	355	87.0%	700	0	0.0%	189.9	12.9	6.8%
Owsley	0	0	0.0%	100	0	0.0%	101.9	16.2	15.9%
Perry	293	63	21.5%	3400	0	0.0%	179.7	2.2	1.2%
Powell	95	95	100.0%	1200	0	0.0%	81.3	14.2	17.5%
Pulaski	4405	3704	84.1%	4400	100	2.3%	197.9	36.3	18.3%
Rockcastle	666	666	100.0%	2100	0	0.0%	139.8	14.0	10.0%
Rowan	1525	917	60.1%	1400	1300	92.9%	133.9	62.5	46.7%
Russell	740	185	25.0%	4400		0.0%	62.5	0.0	0.0%
Wayne	2876	2305	80.1%	3500	0	0.0%	195.1	0.6	0.3%
Whitley	72	72	100.0%	3600	600	16.7%	207.3	43.6	21.0%
Wolfe	437	437	100.0%	5000	3500	70.0%	107.0	16.2	15.1%

Source: Forest Inventory and Analysis (NEFES, 1987)

* Wood supplied from counties containing DBNF land. "Wood Consumed by Mills" is based on TPO data. No mill data was reported

for Clark, Garrard, & Owsley counties in 1986, however mill owners indicated that they occasionally procure from the DB area.

Wood Removed from Lands" is based on inventory plots within each county and on the DBNF. Such data is not expected to be highly accurate within each county. Therefore county information about the DBNF is presented for general comparison only.

Appendix D - Hardwood Sawlog Mill Prices*, 1985-1994
 (\$/ CCF)

<u>IIO</u>	RDO-p	RDO-1	RDO-2	RDO-3	WHO-1	WHO-2	WHO-3	YPO-p	YPO-1	YPO-2	YPO-3
1985	\$787	\$575	\$324	\$204	\$487	\$298	\$205	\$349	\$304	\$235	\$191
1986	\$849	\$585	\$355	\$215	\$464	\$320	\$211	\$371	\$316	\$255	\$202
1987	\$989	\$705	\$411	\$218	\$569	\$355	\$211	\$387	\$307	\$255	\$202
1988	\$1,065	\$758	\$485	\$211	\$633	\$391	\$213	\$355	\$293	\$235	\$196
1989	\$1,036	\$698	\$402	\$202	\$651	\$369	\$200	\$373	\$296	\$224	\$185
1990	\$1,040	\$671	\$391	\$213	\$616	\$373	\$211	\$478	\$335	\$264	\$198
1991	\$876	\$524	\$311	\$180	\$573	\$335	\$180	\$375	\$284	\$215	\$173
1992	\$1,055	\$716	\$411	\$209	\$698	\$393	\$200	\$444	\$322	\$236	\$193
1993	\$1,151	\$755	\$407	\$213	\$656	\$382	\$224	\$549	\$371	\$258	\$198
1994	\$1,115	\$704	\$418	\$229	\$655	\$429	\$229	\$593	\$373	\$256	\$213

<u>ENN.</u>	RDO-1	RDO-2	RDO-3	WHO-1	WHO-2	WHO-3	YPO-1	YPO-2	YPO-3
1985	\$673	\$440	\$193	\$595	\$375	\$193	\$378	\$264	\$124
1986	\$633	\$407	\$182	\$544	\$362	\$182	\$325	\$198	\$127
1987	\$764	\$471	\$180	\$584	\$382	\$180	\$345	\$244	\$125
1988	\$955	\$564	\$175	\$738	\$455	\$175	\$347	\$260	\$175
1989	\$905	\$535	\$164	\$740	\$453	\$164	\$329	\$247	\$164
1990	\$924	\$549	\$176	\$764	\$469	\$176	\$402	\$282	\$160
1991	\$785	\$569	\$156	\$864	\$511	\$156	\$393	\$251	\$111
1992	\$902	\$529	\$156	\$864	\$509	\$156	\$393	\$251	\$109
1993	\$1,069	\$611	\$153	\$1,031	\$591	\$153	\$382	\$244	\$107
1994	\$1,182	\$705	\$229	\$1,067	\$649	\$229	\$496	\$351	\$205

* Real Prices paid during the 1st 3 months of the year. Real Prices are nominal prices adjusted by Producer Price Index to the 1987 base year. (\$/MBF (Doyle) calculated by the Southern Research Station Economics Work Unit. Conversion: \$/MBF x 1.81818... = \$/CCF)

Key:

- RDO - Northern Red Oak, Black Oak
- WHO - White Oak
- YPO - Yellow-poplar (tuliptree)
- p - prime logs
- 1 - grade one
- 2 - grade two
- 3 - grade three