Public Land Use and Potential Impact on Missouri's Forest Products Industry

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Abstract: Management of public lands impacts Missouri's forest products industry in a significant manner, particularly in rural areas. In 1989, some 1,340 firms were involved in the forest products industry, employing approximately 29,200 workers. Total value-added in 1989 was in excess of $1 billion and the industry's activity generated another $400 million in related industrial activivty. In 1988, the most recent year for which data is available, public lands provided 19.7% of the sawtimber harvested statewide. The Eastern Ozarks is the most heavily forested region in Missouri, has a primarily rural population and contains some 42% of the loggers, 45% of the sawmills and drykilns, 32% of the pallet plants, and 34% of the other primary producers. This region also has the highest amounts of public forestland in the state. It would appear that alteration of current public land forest resource management strategies could have significant impacts on local economies in regions such as the Eastern Ozarks, an area that provides 40% of the state's sawtimber supply.

The forest products industry in Missouri is a valuable contributor to the economic base of the state. Furthermore, public lands impact that industry in a significant manner, particularly in rural areas. A survey of the forest products industry in 1989 (Trokey et al. 1991) and the recently completed USDA Forest Service Forest Survey of Missouri provided us the information from which input may be gained regarding this relationship.

The tangible and intangible benefits that accrue to landowners and the state from hunting and fishing, recreation, or mineral exploitation are real and have economic importance that must not be overlooked although estimation of their values are beyond the scope of this paper. To illustrate the magnitude of these benefits, an editorial in the June, 1991 *Missouri Conservationist* indicated that in 1985, hunters, anglers, hikers, canoers, and other non-consumptive users spent $1.5 billion, supported another $2.8 billion in business activity and provided 57,000 jobs in Missouri.

ECONOMIC CONTRIBUTION

In 1989, some 1,340 firms were involved in the forest products industry, employing approximately 29,200 workers (Trokey et al., 1991). Loggers comprised the largest number of firms, while secondary manufacturing (furniture, millwork, etc.) employed the greatest number of workers. Of the direct manufacturers, the greatest number were sawmills. Total value-added in 1989 by the forest products industry, exclusive of the paper products industry, was $1.06 billion. If information on the paper products industry is included from the 1987 Census of Manufactures, the level of value-added increases to $2.3 billion and the total number of employees increases by some 12,600 to approximately 41,800 employees. This output causes another $400 million in additional business activity in other non-forest sectors of the state's economy.

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The forest products industry in Missouri characterizes many other industries whose production activities generate additional business activity and hence earnings in other sectors of the economy. This is termed the "multiplier effect." Output multipliers—the additional business activity on other sectors due to a $1 increase in sales in a given sector—range from 1.1 to 1.5 for the Missouri forest products industry. These multipliers vary from region to region in the state and from sector to sector in the industry. By their very nature, the smallest multipliers are in logging and charcoal production while the largest are in secondary manufacturing, sawmilling and drying, wood preservation, and pallet production (Devino and Braschler, 1991).

MISSOURI'S TIMBER RESOURCE

Five USDA Forest Service Survey Units have been defined in Missouri based on relative homogeneity of timber resource: Prairie, Riverborder, Northwest Ozarks, Southwest Ozarks, and Eastern Ozarks (Figure 1). Table 1 shows the amounts of commercial timberland in these survey units by ownership class. Commercial timberland is defined as forest land that is producing or is capable of producing in excess of 20 cubic feet per acre per year under natural conditions. In addition, there are some other forested lands which are either (a) not capable of producing 20 cf/A/yr [usually because of site conditions] or (b) forest lands withdrawn from timber utilization through statute, administrative regulation, or designation (Table 2). By like token, not all land classified as commercial timberland is available for harvest either. This is particularly true in the private ownerships where landowner objectives and attitudes vary widely (Trokey 1981).

Table 1.—Commercial Timberland in Missouri by Survey Unit and Ownership Class. (Thousands of acres) (from Hahn and Spencer, 1991)

Survey Unit	Land area	Timber-land	Nat'l Forest	Misc. Federal	State	Other Public	Forest industry	Private[a]
Eastern Ozarks	6,135.5	4,110.0	873.8	41.1	197.1	—	184.3	2,813.7
Northwest Ozarks	4,993.8	2,169.6	135.1	102.0	26.4	2.9	—	1,903.2
Prairie	19,541.2	2,500.3	——	77.6	53.7	25.8	—	2,343.2
Riverborder	8,019.3	2,092.7	18.0	8.9	87.2	8.4	7.7	1,962.5
Southwest Ozarks	5,435.0	2,498.2	294.0	16.7	38.1	5.1	30.4	2,113.9
Total	44,124.9	13,370.8	1,320.9	246.3	402.5	42.5	222.4	11,136.5

[a]This category includes land owned by farmers, miscellaneous private corporations, and miscellaneous private individuals.

Figure 1.—Forest Service Survey Units for Missouri.

Table 2.—Forest land in Missouri. (Thousands of acres) (from Hahn and Spencer 1991)

Survey Unit	Commercial timberland	Other[a]	Reserved[b]	Total forest land
Eastern Ozarks	4,110.0	31.2	159.1	4,300.3
Northwest Ozarks	2,169.6	116.6	27.2	2,313.4
Prairie	2,500.3	15.2	16.9	2,532.5
Riverborder	2,092.7	85.0	60.9	2,238.6
Southwest Ozarks	2,498.2	62.4	52.8	2,613.4
Total	13,370.8	310.5	316.9	13,998.2

[a]Forest land not capable of producing 20 cf/A/yr of industrial wood crops under natural conditions.

[b]Forest land withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production as indicated by annual shearing.

In 1988, the most recent year for which data is available, public lands provided 19.7% of the sawtimber harvested statewide. This amount ranged from 26.8% of the sawtimber harvested in the Southwest Ozarks Unit, 26.7% of the sawtimber in the Eastern Ozarks Unit, 18.3% of the sawtimber in the Riverborder Unit, 7.8% of the sawtimber in the Northwest Ozarks Unit, to only 1.3% of the sawtimber in the Prairie Unit (Table 3). If viewed from another standpoint, the Eastern Ozarks Unit provided 40% of the total sawtimber harvest in the state and the Prairie Unit only provided 15% of the total sawtimber harvest. In contrast, the Prairie Unit contains slightly over 44% of the total land area in the state and the Eastern Ozarks Unit contains only 13% of the total land area in Missouri.

THE EASTERN OZARKS UNIT

The Eastern Ozarks Unit is a 14-county area with the lowest total population of the five survey units. These counties (and their population rankings at the time of the survey) are: Bollinger (86), Butler (20), Carter (110), Crawford (50), Dent (66), Iron (82), Madison (84), Oregon (87), Reynolds (105), Ripley (70), St. Francois (15), Shannon (100), Washington (51), and Wayne (81) Counties. This area has the greatest number of loggers, sawmills, and other primary mills (Table 4). Of the five units in the state, this is far and away the largest wood-producing region. Of more than passing interest is the Nature Conservancy's very recent purchase of some 80,819 A of what was considered forest industry lands in Carter, Shannon and Wayne counties. This land will apparently be managed by the Missouri Department of Conservation. Initial indications are that some of these lands will be removed from commercial timber production.

Since the Eastern Region already has the largest amount of public ownership land (Table 1), we will concentrate our attention on this region. Of the 14 counties in the Eastern Ozarks, only two counties have less than 50% of their total land area classified as commercial timberland: St. Francois County, 49.3%; and Butler County, 29.3% (Table 5).

Table 3.—Sawtimber Removal on Commercial Timberland, 1988 (Thousands of board feet, International 1/4" Rule) (from Hahn and Spencer 1991, and Spencer et al 1992)

Survey Unit	Nat'l Forest	Misc. Federal	State	Other public	Forest industry	Private	Total
Eastern Ozarks	27,028	1,416	3,418	—	7,829	79,602	119,293
Northwest Ozarks	1,178	639	—	—	—	21,618	23,435
Prairie	—	—	598	—	—	44,926	45,524
Riverborder	2,769	—	1,763	5,965	438	46,383	57,318
Southwest Ozarks	10,570	—	2,809	—	274	36,259	49,912
Total	41,545	2,055	8,588	5,965	8,441	228,788	295,482

Table 4.—Estimated Population and Primary Forest Products Industries by Survey Units, 1989 (from Trokey et al 1991)

Survey Unit	Estimated population	Loggers	Pallet sawmills	Other mills	Primary[a]
Eastern Ozarks	217,780	335	182	30	26
Northwestern Ozarks	229,790	51	33	6	13
Prairie	1,913,750	145	66	34	10
Riverborder	2,311,840	129	47	12	5
Southwestern Ozarks	244,370	131	80	12	23
Total	4,917,530	791	408	94	77

[a]This includes veneer mills, cooperage mills, charcoal producers, pole/post/piling mills, and miscellaneous product mills.

Table 5.—Eastern Ozarks Region — Population and public lands (in thousands of acres)

County	Rank	Population	Land area	Commercial timberlands		
				All owners	MTNF	Misc. public
Bollinger	86	10,301	397.2	215.5	1.6	—
Butler	20	37,963	446.7	130.7	47.4	3.1
Carter	110	5,428	325.8	266.3	90.2	20.6
Crawford	50	18,300	475.9	321.9	48.3	24.4
Dent	66	14,517	483.1	302.4	67.3	28.3
Iron	82	11,084	353.3	275.9	81.2	3.3
Madison	84	10,725	318.2	239.6	38.8	3.4
Oregon	87	10,328	506.9	292.6	71.0	—
Reynolds	105	7,230	517.4	425.5	85.5	53.8
Ripley	70	12,458	404.2	269.0	94.2	4.7
St. Francois	15	42,600	288.7	142.3	0.9	—
Shannon	100	7,885	533.2	466.5	83.4	61.6
Washington	51	17,893	487.8	375.2	78.1	13.4
Wayne	81	11,277	487.9	386.5	85.9	21.6
			4,110.0	873.8	238.2	

Table 6.—Estimated Direct Economic Impact of Forest Products Industry in the Eastern Ozarks, 1989

Sector	Wood	Other materials	Labor	Business expenses	Employees
	(millions of dollars)				
Logging	53.3	0	17.9	24.1	1,482
Sawmills and drying	71.0	0	25.8	29.0	1,918
Pallets	17.4	10.4	11.4	8.2	955
Other primary	19.6	1.6	2.4	2.5	159
Secondary mfgtrs	13.8	9.9	16.5	5.4	1,100
Total	174.9	21.9	74.1	69.3	5,614

This region contains some 42% of the firms engaged in logging, 45% of the sawmills and drykilns, 32% of the pallet plants, 34% of the other primary producers, but only 10% of the secondary manufacturers. The monies that are spent by these industry groups are shown in Table 6. The sum total of these expenses for wood and other raw materials, labor, and business expenses is some $340 million. While we have separated these groups into discrete sectors, they are very much interconnected and interdependent.

While some of the purchases by these various groups are made outside the region, many are made locally. An estimated $25 million annually in additional business in other non-forest sectors results from such activity.

Payments for Schools and Roads

If the timber available from public lands in the region, some 26.7% of the 1988 statewide harvest, were withdrawn from the market, the results potentially would be devastating to individuals and to the small, rural communities. Among other losses would be the payments from the federal government to local governments based on the harvest of timber from the Mark Twain National Forest lands in their jurisdictions. This payment amounts to 25% of all monies received (based on all income) and is to be expended as the state legislature may provide for the benefit of public schools and public roads of the counties in which the National Forest is situated in proportion to the land contained in each county. In the case of timber sales, the payment is based on stumpage prices. As an example, in 1988, some 41,545 Mbf of sawtimber were harvested from the Mark Twain National Forest in Missouri. If we assume an average statewide stumpage price of $95/Mbf, this amounts to some $985,980 that would have been divided proportionately among the 29 counties. With the recent concerns over reductions in primary and secondary school funding in Missouri, withdrawal of these monies could have significant impacts on the financial health and/or continued existence of some school districts.

A prime example would be Carter County which ranks 110th of 114 counties in terms of population in the state (5,428 residents) and contains 90,200 acres of National Forest (and another 20,600 acres of state-owned land) out of a total land area of ca. 266,400 acres. Slightly over 6.8% of the Mark Twain National Forest lands in Missouri are found in Carter County. Assuming a proportionate sharing of revenues, in 1988 Carter County schools and roads would have received about $67,340 from timber sales on the Mark Twain National Forest. In the case of schools, this would be the equivalent of 3 or 4 teachers. As a matter of historical record, the average annual harvest from the Mark Twain National Forest for the period 1977-1989 is 57,354 Mbf (Kingsley and Law 1991). This equates to a decrease of some 28% in sawtimber harvest from the annual harvest with a corresponding decrease in real dollar income at the county level. In the case of Carter County, this would amount to an annual loss of $25,690. Much of this probably comes from the increase in what is termed "Reserved Forest Land" (Table 2). This has increased statewide from 256,100 A in 1972 to the 1989 level of 316,900 A. On the National Forest, this is largely accounted for by increases in designated wilderness areas.[2]

Possible Consequences of Reduction of Public Land Base

For argument's sake, let us consider what the effect would be of removing the Mark Twain National Forest lands completely from timber harvest. As a point of information, remember that most forecasts for wood consumption in the United States for the foreseeable future project an increase

[2]The Mark Twain National Forest Annual Report for FY 1991 indicates that total 25% payments were $1,999,913.90 and FY 90 PILT payments were $630,070. For Carter County, these numbers were $124,453.27 and $37,574 repectively. Timber harvest in 1990 amounted to 50.506 MMbf.

in demand. These forecasts also predict at best no change in available commercial timberland and most forecast a decrease in land available for timber harvest. The eastern hardwoods region, which includes Missouri, is projected to supply a greater share of wood and wood products than they do now.

The majority (83.3%) of the commercial timberland in Missouri is considered to be non-industrial private forest. Much of this land is in relatively small holdings (less than 500 A). Trokey and Kurtz (1982) suggested that approximately 60% of the land is currently being used for timber harvest. Further, that at best, only another 20% of the land might become available for timber harvest. This assumes two things: (1) landowner education programs and technology transfer carried out by state agencies and/or forest industry, and (2) stumpage price increases. In either event, additional professional personnel would be required to conduct landowner education and assistance programs. These programs would cover not only the desirability of timber harvest, but environmentally and silviculturally appropriate ways to do the harvest so that damage to residual stands is minimized if not eliminated. Such programs are in place in other states at this time.

In the Eastern Ozarks Unit, the overall average harvest per acre in 1988 was 29 bf/A. This ranges from an average of 17 bf/A on state-owned lands to 42 bf/A on forest industry-owned lands. On the Mark Twain National Forest, the average was 31 bf/A. To continue the same level of production in the Eastern Ozarks Unit would require that production from private lands increase from the current 28 bf/A to an average of 39 bf/A. Since our earlier suggestion that only 60% of the NIPF land was being used, this suggests that actual harvests are in the range of 47 bf/A and would increase to 63 bf/A. If the education and motivation process discussed earlier were effective, the required harvest would still be 47 bf/A from 80% of NIPF lands. The most recent data indicates that statewide sawtimber growth averages 75 bf/A while sawtimber removals are averaging 31 bf/A so the capacity exists to provide the additional sawtimber without exceeding the resource.

While there are some 197,100 A of state-owned land in the Eastern Ozarks, the needed timber supply could not be realistically filled by increasing sawtimber removals. This would require state lands to produce 154 bf/A, a figure that exceeds annual growth and would lead to depletion of the resource. The latter is an unacceptable consequence.

In addition to the change in production from public to the private sector, there would also be the loss of the monies resulting from timber harvest on the National Forest lands. While there might be increased recerational activity on these lands, it is doubtful whether the loss in designated school or road income would be overcome. In FY 1991, recreation provided less than 1% of the total income on the Mark Twain National Forest.

Under Subtitle G of the 1990 Farm Bill — Title XXIII (Rural Development), a chapter entitled "National Forest-Dependent Rural Communities Economic Diversification Act of 1990", deals with the economic ramifications of removing the National Forest lands from commercial timber (or mineral) production. One of the purposes of Subtitle G is:

> "to provide assistance to rural communities that are located in or near national forests and that are economically dependent upon forest resources or are likely to be economically disadvantaged by Federal or private sector land management practices;"

This act in essence, directs the Forest Service to provide assistance to rural communities (less than 10,000 population) or counties (less than 22,500 population) "in which at least 15% of the total primary and secondary labor and proprietor income is derived from forestry, wood products, and forest-related industries such as recreation and tourism, that is located within the boundary, or within 100 miles of the boundary, of a national forest."

A quick look at the Mark Twain National Forest in Missouri indicates that most of the Eastern Ozarks region fits quite nicely in the geographic guidelines, and (we suspect) the economic guidelines as well. The two counties which exceed the population guidelines (Butler and St. Francois) also have the lowest percentage of commercial timberland in the region (Table 5). Butler County lies at the junction between the forested Ozarks and the largely agricultural Bootheel area of Missouri. St. Francois County is just south of the Riverborder and metropolitan St. Louis area and was the birthplace of lead mining in Missouri.

The other major source of income for the region is lead mining. The majority of Missouri's active lead mines lie within the Eastern Ozarks region and contribute between 1/2 and 2/3 of the 25% payments from the Mark Twain National Forest. These percentages vary directly with the production of the lead mines. There has been spirited and often acrimonious debate about whether additional exploration and mining should be permitted on the public lands in Missouri.

Industry Change Consequences

There always exists the possibility that the industry itself will undergo realignment as a result of either market pressures or government regulation. At present, Missouri is still a leading producer of wood charcoal. Recent estimates indicate that the charcoal industry contributes some $36.6 million to the Eastern Ozarks economy and some $117 million to the statewide economy. Most, if not all, of the wood is converted to charcoal by pyrolysis in "Missouri charcoal kilns" before going to briquetting plants for grinding and forming. In the past, these kilns have come under scrutiny for the large amounts of smoke and particulate that are emitted during the firing process. Missouri's recently-passed 1992 Clean Air Act imposes a "tax" of some $25 per ton of pollutants released on all industries in the state. The legislation is expected to cost Missouri's charcoal industry some $1.2 million annually. Should these kilns be forced to close, there would be a significant impact on local economies. The raw material for these kilns is primarily slabwood from sawmills, although a small amount of lowgrade roundwood is still used.

On the other hand, positive impacts cannot be ruled out either. There is a large amount of sawtimber in the Eastern Ozarks that, while lowgrade for most of today's solid wood uses, could be used for feedstock for chip-based, fiber-based, or chemical-derived products. The first two groups includes products such as structural flakeboard, medium-density fiberboard and a variety of paper products while the last group includes methanol and ethanol. Placement of any of these type of plants in or near the Eastern Ozarks would have a positive benefit to the economics of the region. At the same time, the supporting infrastructure might need to be upgraded which would have an initial short-term thrust for selected areas of the economy.

Scenarios can be constructed for a wide variety of plant sizes and types located in areas where the transportation system is sufficient. For example, Poplar Bluff is a town of some 25,000 people located at the junction of US 60 and US 67 with a major rail line (Union Pacific) running through town. A hypothetical 112.5 million square feet (MMSF) capacity 1/2" structural flakeboard plant using a mixture of chips and roundwood would cost some $139.5 million dollars (USDA Forest Service 1978, data adjusted for 1990 prices). These monies include the cost of the building and equipment, raw materials, manufacturing, etc. Much of these monies would remain in the local area although obviously much of the manufacturing equipment would need to be purchased outside the region. This plant would require some 8 to 9 million cubic feet of raw material as a mixture of 60% roundwood and 40% chips per year. The plant would employ between 70 and 80 people in addition another 100 to 120 engaged in procuring and supplying the raw materials and supporting services to the mill.

While out of necessity, plants such as this are located nearer population centers and have good access to markets, they will have an impact on small, rural communities such as exist in much of the Eastern Ozarks. It is in these areas where the raw materials are growing and will continue to grow. For the hypothetical flakeboard mill, some 5 million cubic feet per year or 30 MMbf per year of roundwood (assuming a 60% roundwood mix) would need to be obtained. At a removal rate of 30 bf/A, this means some 1,000,000 acres per year would need to be harvested. Current removals are occurring from over 4.1 million acres. It is highly likely that some of the raw material would be imported from other areas such as Arkansas and Illinois so that the impact would be distributed across a wider region. The increased demand for roundwood would probably drive the price of stumpage up and more land might become available for harvest.

CONCLUSIONS

The forest products industry in Missouri contributes in excess of $2.5 billion per year to the economy and provides direct employment for some 41,800 people. Many of these people are employed in the primary production end—logging and sawmilling—of the industry and are from less populated areas of Missouri. These are more labor-intensive jobs that utilize the available human capital in the region in a most efficient manner. About 19.7% of Missouri's annual sawtimber harvest comes from public lands, which are also located in rural areas. It would appear that alteration of current public land forest resource management strategies could have significant impacts on local economies in regions such as the Eastern Ozarks, an area that provides 40% of the state's sawtimber supply.

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