

FOREST PRODUCTION, INDUSTRY AND FOREST RETENTION ASSESSMENT

**Report to
Maryland Center for Agro-Ecology Inc.,
Queenstown, Maryland**

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EXECUTIVE SUMMARY

Rapid conversion of forest to suburban and other developed uses has been vividly evident in Maryland and nearby areas for a decade. Further, extensive public land acquisitions and regulatory efforts to conserve smaller parcels for Chesapeake Bay protection, open space retention, and farmland preservation are occurring, largely on a piecemeal basis. Large paper companies have sold managed timberlands to public agencies and conservation groups. New forms of “conservation easements” have been developed. Some of these lands will be managed using novel processes of planning and negotiation. Future supplies of wood to industry from those lands are currently uncertain. Also, pressures have arisen to shift away from traditional priorities for management of state lands. For all of these reasons, the future availability of wood supplies supporting rural Maryland wood-using plants has come into question.

The Project and its Approach

Maryland’s economy does not rely heavily on manufacturing, but the state’s wood using industries are a critical element in the economy for many rural counties. The Maryland Center for Agro-Ecology, Inc., identified a need to better understand the implications, for both forestry and agriculture, of all the changes noted above. The concept of “Critical Mass” offers a useful way to describe the concern. This question is simply, “Is there a critical mass of forest land that is needed to support, on a sustained-yield basis, the wood-based manufacturing activity that is so important to parts of rural Maryland?” If so, can we identify that amount of land? In order to answer that question, however, a series of more specific tasks must be completed.

The Maryland Center for Agro-Ecology, Inc., contracted with The Irland Group and its associates, Seneca Economics and Main Street Economics, to perform this work in spring 2002. As background, extensive information was assembled from existing data (chapters 1,2). Detailed case studies of selected counties yielded more specific examples of the forces at work and their effect on the forest. Extensive interviews were conducted.

Why it Matters

We believe a continued available supply of locally grown wood products is important to Maryland, and, especially, to its rural economy. These include:

- Wood based manufacturing is important to many rural counties;
- Timber production provides an additional reason for open space retention;
- Wood production supplies revenue for landowners;
- Working forest infrastructure can support other social purposes.
- Wood processing employment, while small in comparison to the State’s economy, is important to rural areas;
- Retaining commercial forest retains land use options;
- Halting commercial wood production on increasing areas simply moves the effects elsewhere, while having no effect on Maryland consumption;

- Finally, much of the loss of forest acreage and availability results from public actions such as construction of bridges and improved highway links that have enabled leisure lot markets to spill over into formerly remote parts of the state. These improvements have brought many economic benefits, but have also turned extensive rural landscapes into subdivision and sprawl.

Growth Management: Observations from Case Study Counties

We conducted brief case studies of Dorchester, Wicomico, and Worcester Counties on the Eastern Shore, and St. Mary's, Garrett, and Carroll Counties on the Western Shore. In these counties, powerful forces are re-shaping land ownership and use. Land prices in most areas are so high as to render forest management impossible as a primary investment goal. Yet, on many of these acres, owner objectives may be consistent with careful, long-term forest management. Unfortunately, in case after case, we saw large subdivisions in which chances to retain manageable tracts of forest as part of a large development were squandered. Instead of being retained in unified ownership, the open space had been sliced up and attached to individual lots in tiny pieces. These offered little value to the lot owners and no value for management for commercial wood, firewood, recreation, wildlife, or anything else.

There was a great deal of government program activity for regulating riparian buffers, establishing plantings, buying conservation easements, and protecting farmlands. Yet there was little evidence of a coherent approach that led to protecting economically or ecologically meaningful or manageable units. Instead, tracts "protected" by these programs were scattered helter-skelter over the landscape. (The Maryland Department of Planning has studied this issue in another project for the Center.) Maryland has one of the most impressive and well-funded programs for forest and farmland retention in the nation. Our observations suggested that the potential of these programs is still not being realized.

Subdividing and sprawl continue to spread over the landscape, defying declared goals of concentrating development where services can be readily provided. Large subdivisions do have many advantages over traditional scattered development. They offer considerable untapped potential for retaining manageable tracts of forest as well. In all areas, individual lot development along secondary roads proceeds, usually, we suspect, on small existing lots exempted from regulations or grandfathered. Over time, these are creating what geographer John Fraser Hart calls a "Spersopolis" that drives up public service costs, walls off backlands from roads, and incrementally reduces wood availability. Planning goals or not, sprawl continues.

The concept of "shadow conversion" is applicable here. For each acre of roadside that is converted to "Spersopolis," many more acres are compromised for future forest management and harvesting. For example, when road frontage succumbs to strip development, access to backland for cutting is reduced. Neighbors dislike the noise of skidders early in the morning, and the mud brought onto the road by exiting log trucks. They often seek local regulations to control forest practices. There is no good estimate of what the multiplier factor would be that links actual conversion to shadow conversion. But many observers agree that the phenomenon is real.

Maryland's Timber-Based Economy

We reviewed the importance of Maryland-produced wood at three market levels: (a) primary logs and mill residues, (b) lumber, panels and intermediate products used by Maryland wood processors, and (c) the consumer level of the market for finished wood products. (employment and other impacts are noted below)

In Maryland, about 2.2 million green tons of industrial roundwood are harvested annually. About 1.6 million tons of this total are used within the state. Given the geography of the state, interstate movements are complex and move in both directions. The primary wood processing industry depends on net imports for 38% of its wood usage. We conducted a brief mill survey to see how dependent producers of furniture, pallets, millwork, and similar items are on wood produced in Maryland. We found that many of these firms obtain wood from outside the state. One reason is that little dried lumber is produced within Maryland. Also, there is no in-state production of sheet goods such as particleboard and Oriented Strandboard.

Finally, based on national factors, we estimated that Maryland consumers use finished products equivalent to about 5 million cords of wood per year. This is about 5 times current annual removals from the state's forests. There is no need for Maryland to be fully self-sufficient for its wood needs—few states are. But it is worth remembering that Maryland citizens rely each year on the wood grown on an estimated 7.4 million acres of forestland outside the state.

Judging the Maryland industry's competitive position is difficult given the dynamic market changes of recent years in the lumber and paper industries. One way to judge competitiveness is to look at a state's share of national production. From the 1980's to the late 1990's, the Maryland and Delaware share of US lumber production actually increased. From 1980-97, Maryland pulpwood production grew much faster than did national production. Given recent pressures on the US industry, we expect that demand for Maryland wood products is not likely to rise very much in the foreseeable future.

Role of Maryland Wood in Competitive Outlook

For primary producers, Maryland's local wood has the shortest haul distance and lowest transport cost. Wood users could probably replace volume lost to reduced local supplies, but the higher cost might not be sustainable over time. The situation also depends on the species considered and location within the state. The Eastern Shore is essentially its own timber basket isolated by the Chesapeake Bay Bridge to the south and a wall of highways and settlement to the north and west. Mills need not lose 100% of their supply to become financially unsustainable. They need only encounter rising costs for a portion of their logs before they can no longer survive. Precise numbers for this, however, are not obtainable.

Economic Impact and Dependence on Maryland Wood

The economic impact of a manufacturing industry can be viewed in a number of ways. Total worker earnings in all wood processing industries were \$495 million in year 2000, or 6% of the manufacturing total. In the report we discuss detailed county data by industry segments. The economic base concept is one useful way to summarize this. Seven Maryland counties, all of them rural, are more dependent on wood based jobs than the nation as a whole. Given the heavily urban orientation of the state's economy, all of its rural industries are small relative to the state's totals. But they are all important to those local areas, which is the perspective that counts for our purposes.

Judging the dependence of wood industry jobs on Maryland wood is not a simple matter. Maryland's wood using industries employ about 15,000 workers. But only a few of these depend directly on Maryland-produced wood. We estimate that about 2,500 jobs depend either moderately or heavily on Maryland wood, and these jobs probably generate an equal number of additional jobs through the "multiplier" effect.

Forest Condition and Availability

In the late 1940's, only 13% of the state's forest land was classed as "sawtimber", that is, consisting primarily of trees suited for lumber. By 1997, fully 66% was in this category. The total *volume* of wood in the forest has risen substantially: from 1953 to 1997, sawtimber volume in the state more than doubled. This is but one indication of a dramatic improvement in forest stocking, structure, and economic value since that time. Undoubtedly this improvement has benefited wildlife, aesthetic, and other forest values. But as parcel sizes have been fragmented, and additional regulations such as protective buffers along waterways have affected forests, the average *availability* of wood has decreased. We believe that mere acreage of forest is not the key variable affecting the industry today. Instead, the issue is availability.

Today, small parcels (10 acres or less) can be cut for commercial wood. But the costs of buying the wood, organizing harvesting, obtaining permits, and managing trucking are very high on small tracts compared to large ones. As a result, even when wood can be obtained from tiny lots, it is the high cost wood a mill must buy in order to fill its needs.

The fact that loggers report being able to buy wood from one acre tracts is not a good sign – it is the opposite. It indicates a desperate wood supply situation. Additionally, a large body of research shows that as parcel sizes decrease, owner interest in cutting timber declines, and owner interest in any form of active management also declines. Continued availability on such tracts after initial harvest is at risk. A recent DNR analysis showed that only 1.1 million acres (less than half of the total) is likely to be harvested in the near term due to the effects of population density and fragmentation.

In Garrett County, there is considerable interest by the industry in future management of the State Forests. Management on those lands could materially compensate for continued erosion of supply on the smaller private parcels. On the Eastern Shore, continued supply from the former Chesapeake and Glatfelter company lands is considered essential to continued survival of small mills there.

Forest Land Needed

The amount of forest land Maryland needs to support existing industry can be viewed from several different perspectives. It depends on assumptions about availability and about forest growth rates. The following comparisons illustrate the issues.

	Acreage Required, by Growth Rate	
	Recent Growth (.56 cd/a/yr)	Potential Growth (.82 cd/a/yr)
Amount	...million acres.....	
2001 Maryland harvest	1.3	0.9
2001 Maryland Usage	2.1	1.4
Total Acres timberland	2.6 million acres	
Total acres sawtimber	1.1	“
In parcels above 50 A.	0.7	“

Total timberland (forest land growing ¼ cord per year and not legally barred from harvesting) is about 2.6 million acres. Considering that sawtimber stocking is essential for small parcels to be economically harvested, the current supply base is nowhere near as large. In addition, a large area is in tracts smaller than 50 acres. If we look at the acres needed to support Maryland's 2001 harvest, at recent growth rates, we see a need for more acres than are currently in sawtimber stocked condition.

In our opinion, there is no sharp line defining a Critical Mass for wood supply. One reason is that wood can travel long distances. Another is that the industry can adjust for a time to conditions that are really not optimal for its survival. What is important is that economic change is cumulative. It is slowly and steadily decreasing the availability of wood through regulations, public policies, subdivision, fragmentation, and land use conversion. The relative impact of each factor depends on the area and the ownership.

If there did exist a sharp line defining a Critical Mass, however, the comparisons above suggest that Maryland has already crossed that line. This does not mean that it is too late for the rural economy that depends on these manufacturing and logging jobs. But it is time that policymakers, legislators, and concerned citizens in rural areas take notice that future supplies cannot be taken for granted. The industry already understands this situation clearly.

Findings on Maryland Policies

If we accept that it matters whether a working supply of wood is sustained in Maryland, how well have public policies been addressing that issue? To assess this question, we assembled data and conducted extensive interviews to develop a picture of existing policies and how they are addressing forest retention. While there are many policies aimed at retaining land in forest, there are only a few that attempt to retain forests in managed condition as part of a future wood supply. This section highlights our findings and recommendations; more discussion is supplied in Chapter 11 of the full report. Also, in that chapter is a summary of recommended research and information gathering projects.

Highlights of Policy Findings

Maryland has a diverse suite of policies for open space protection at all levels of government. Based on state agency summaries, we estimate that about 24% of Maryland's forest is now protected from conversion to other uses. Additionally, numerous regulations affect management of private forest lands, especially along waterways. It is not clear that land conservation, growth management, and other programs overall have materially changed the amount of land developed, however.

There are also programs of cost sharing, tax modification, and information and education designed to motivate owners to manage private forests. Detailed information on participation, turnover, and effectiveness of these programs is lacking. We do think, however, that existing tax and assistance programs have helped, at least at the margin, in keeping forests under management. But the regulations have focused largely on other issues and not on retaining managed forests.

More effective growth management is a precondition for meaningful forest retention in the future. In our case study counties, however, we could see little evidence that growth management has caused development to be more clustered; instead, it is spreading widely.

Minimum lot sizes and other classic zoning practices are likely to be wasting land by causing more land conversion than might otherwise occur. Forest retention policies as applied to date have left a patchwork of bits of land retained, but rarely have these added up to meaningful ecological units or manageable areas on the ground. We think that better land use can be achieved, to the benefit of future Maryland citizens, without undue interference with property rights. Retaining manageable commercial forest will be an important benefit of such policies.

It is not yet certain that public ownership by itself, or even conservation easements, will be able to maintain the current area of “working forest” given the political polarization over management policies that is not really resolved by these programs.

Highlights of Policy Recommendations

Previous reports summarize many excellent recommendations; we see no need to replace those reports. We focus here on ideas emerging from our own work in this project, and offer nothing concerning federal policies. But we would like to emphasize the following points.

We believe ways need to be developed to offset effects of public policy actions that reduce timber supply to achieve a *No Net Loss of timber availability* so far as public policy effects are concerned. We also suggest that the state review and expand the Forest Legacy program. The Forest Conservation Act needs to be improved to provide incentives to maintain manageable parcels instead of chopping them up. Also, training and outreach is needed on drafting improved working forest conservation easements.

Our analysis argues that parcel fragmentation and ownership changes are more important to future wood supply than actual conversion of land to other uses. Maryland needs to assess innovative options for slowing down parcel fragmentation. Also, it needs to pilot test and evaluate ways to adapt to fragmentation for the industry and for habitat and recreation values. Serious consideration should be given to a trading program designed to block up state holdings, especially on the Eastern Shore, into units more manageable for multiple uses.

Business and economic development programs should give full attention to the wood sector. Even though the sector is under stress at the moment, it is a key part of rural economies and should not be written off simply because it produces a basic product and consists largely of small plants.

We think the Maryland Legislature should commission a major outside evaluation of land use and forest policy and programs every 5-7 years. In particular, forestry incentive programs would benefit from a searching review designed to identify good ideas and improvements. In addition, practices and procedures in the regulatory programs need review to ensure that intended results on the ground are being achieved in a cost-effective way that minimizes compliance costs. Finally, the Legislature should focus on whether programs are working in a way that leads to retention of ecologically meaningful and practically manageable conservation areas, and that retains wood supply from well-managed forests.

INTRODUCTION

In 1963, the authors of the Maryland State Atlas noted that Maryland was roughly one-third forest, and that this forest area was likely to remain stable (p. 33). Today, nearly 40 years later, perceptions have changed markedly. Recently, the State itself projected a 7% decline from the estimated 1997 acreage by the year 2020. A series of developments has raised the question, then, of whether there exists a “critical mass” of available, “working forest” land that is needed to support current employment levels in Maryland’s wood-using industries.

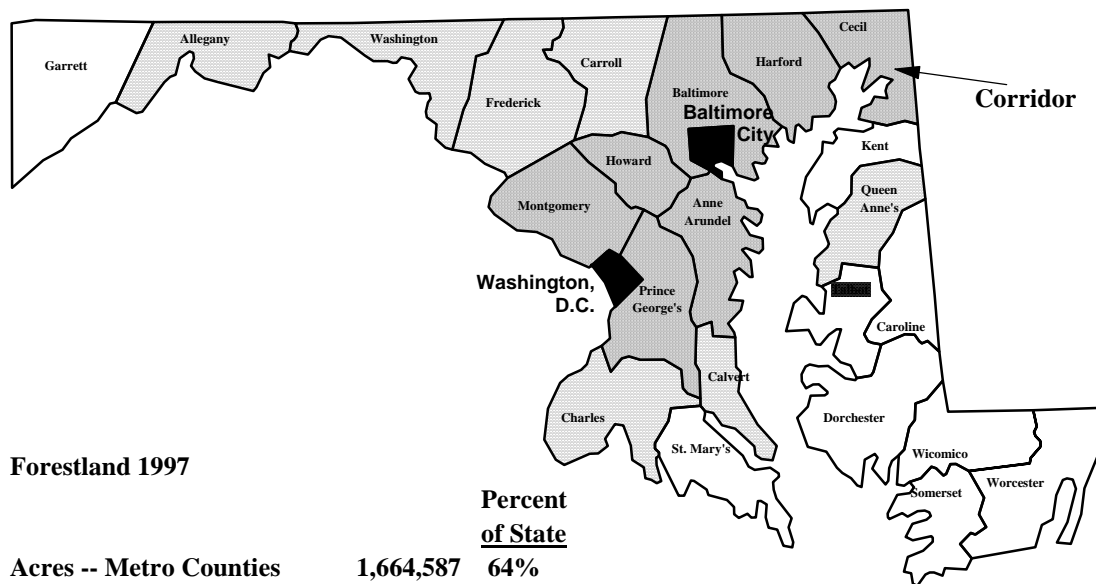
An increased focus on the importance of Maryland’s forest resources is illustrated by a recent report of the Maryland Forestry Task Force (Dec. 2000). The recently issued Southern Forest Resource Assessment by the USDA Forest Service (2002) also emphasizes the importance of land use change in setting the future of the forest South-wide. In a largely metropolitan state (Fig. 1) land use change is clearly an important force. Only nine of Maryland’s counties are outside metropolitan areas. These non-metro counties contain only 36% of the State’s forest land. In this report, we rely on four county case studies to see how land use changes are affecting the forestry resource.

Specific project objectives are listed in Table 1. This project will prove useful to State agencies and others as they pursue implementing the recommendations of the Task Force. This will be an important time for improved analysis to show how programs will work, what the obstacles will be, and which approaches are likely to be most fruitful in retaining forest acreage and wood supply in Maryland. This one report will not be able to answer all the questions but should help supply improved information on at least some of them. For example, we give no attention to federal policies or to urban forest issues. Having a better characterization of the State’s wood supply balance and outlook will enable the State to better respond to proposals made by firms for various forms of government assistance.

Table 1
Specific Project Objectives

1. Document dependence of Maryland wood products industry on Maryland-produced wood. Will include logs, chips, residuals, lumber and wood, secondary industries on a sample basis, and primary paper.
 2. Estimate in-out trade balance in primary wood items.
 3. Determine trends and outlook for competitive position of Maryland wood products firms, by major category.
 4. Determine role of locally produced wood in that outlook, and the acreage of forest required to support the State's primary wood industry.
 5. Assess, through local cases, how land use change is affecting forestry and the forest industry
-
6. Identify and assess *issues/constraints* affecting productivity and availability of Maryland timber, including *policies and regulations, landowner preferences, parcel ownership and fragmentation, and other factors*.
 7. Conduct extended *assessment/problem analysis* of the issue of retention/expansion of land in forest cover, why it matters, and policy options for doing so.
 8. Identify *information needs* and *action recommendations*.

Figure 1
Maryland Metropolitan Counties
as Defined by OMB 1999



Forestland 1997

		<u>Percent of State</u>
Acres -- Metro Counties	1,664,587	64%
Corridor Counties	707,258	27%
Nonmetro Counties	<u>927,551</u>	36%
Total Forest	2,592,138	
(MDP Data)		

The report begins with a brief geographic description of the State's forests, and major

economic forces driving changes in forest area. It then summarizes our four detailed case studies of how land use change is affecting forests in selected areas. Then, an extended presentation is given of the State's roundwood supply balance and end product balance. Additional chapters discuss production potential of the forest. A brief review of policies aimed at forest retention follows. Finally, findings are summarized and policy suggestions offered.

In introducing a recent conference on Maryland Working Landscapes (2002), Dr. Royce Hanson noted:

"A working landscape is one that maintains and works to enhance the responsibility of private land owners, individually, to improve the land for successive generations of those who work it and, collectively, to pass on to each new generation a landscape that is a greater environmental asset than they received. ... a working landscape is an irreplaceable cultural resource. It offers living examples of land-based traditions, rural communities, and the great variety of ways of living on and working land, from communities of Plain People to agribusinesses. The working landscape retains in active use and in their historic settings some of the State's great and small historic homes, church houses, and other architectural and landscape treasures. All of these—food and fiber production, land stewardship, and cultural heritage—are values that cannot be maintained except by a working landscape.

...The fact is that serious policy, financial, and institutional problems and threats to the working landscape remain unresolved. They include the management of growth, particularly at the urban fringe and in counties that are eager for jobs and revenues. As a state, we have some of the best and some of the worst experiences to share.

...Finally, those of us that cherish a working landscape have to realize that its economic and cultural values are not self-evident to those who aspire to live "in the country" even though their 3-acre farmette in Carroll View Estates means doom for the real country, or to those who would rather sacrifice the countryside than increase density in their neighborhood. Developing strategies that connect the working landscape to the quest for environmental quality and amenable cities and suburbs and that advance broad public understanding of those connections will be critical for success." Source: Maryland Center for Agro-Ecology, Inc., 2002.

These remarks aptly summarize the overall philosophy within which we have pursued our research and analysis for this project.

ACKNOWLEDGEMENTS

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PART ONE. LAND USE: OVERVIEW AND SUMMARY OF CASES

- 1. Land Use Changes Statewide**
- 2. Maryland County Land Use Cases**
- 3. Summary of Land Market Cases**

1. LAND USE CHANGES STATEWIDE

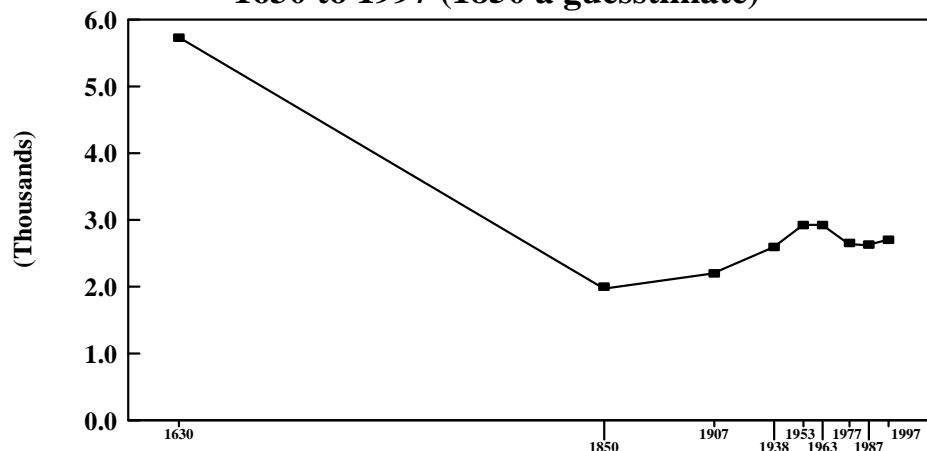
Original explorers remarked on the abundance of large trees near the shores and tidal rivers. These areas were first settled for tobacco farming. The demands for fuel and building material led to the swift demise of the original forests. Tobacco farming systems of the colonial period (on paper at least) hinged on maintaining 5 or 6 times as much land in a 20-year period of fallow as was cropped for tobacco. Soil cropped for three continuous years had to be fallowed for almost 20. In those areas, then, a young secondary forest continued to exist, surrounding the tobacco fields. This pattern largely ceased to exist with the shrinkage of tobacco culture following the Civil War. At some time in the 19th century, the area in forest hit its minimum. As farm productivity rose, and later, as tractors replaced horses, the forest area grew by the happenstance regrowth of one pasture and one “old field” after another. The land use pattern sorted itself out, with the best-drained and more fertile soils remaining in farms.

FOREST AREA

By about 1850, then, about half the forestland of Maryland had been cleared (Figs. 2 and 3). A portion of the 1850 forest was already secondary forest on lands cleared more than once in preceding centuries. A twentieth century peak of forest area was reached in the 1950's and 1960's, from which forest area has since retreated slightly. From 1916 to 1999, total forest area increased, reflecting the extensive areas farmland “going back” that outbalanced development (Table 2). Even within the “corridor,” forests increased in extent, as they did in Western Maryland. Over these years, the Eastern Shore and Southern Maryland remained fairly stable.

Figure 2

Maryland: Estimated Forest Area 1630 to 1997 (1850 a guesstimate)

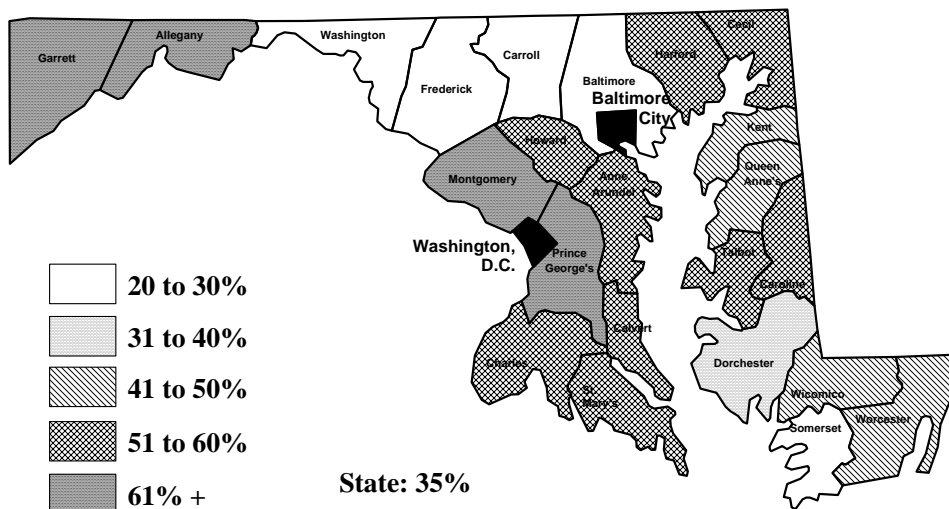


Total Land Area = 6,295,000 A.

% Forest	1630	91%	1963	46%
	1850	32%	1977	42%
	1907	35%	1987	42%
	1938	41%	1997	43%
	1953	46%		

Source: Smith, W. B., et al., 2001.

Figure 3
Maryland Wooded Area,
Acres and Percent, by County, 1916



Source: Besley, 1916.

Table 2
Maryland Forest Area Changes, by Regions, 1916-1999

	<u>1916</u>	<u>1999</u>	<u>% Change</u>
Western Maryland	641	800	24.8
"Corridor"	566	707	24.9
Southern Maryland	353	373	5.7
Upper Eastern Shore	202	218	7.9
Lower Eastern Shore	466	489	4.9
State	2,228	2,592	16.3

Source: Besley, 1916; and USFS-FIA Website.
TIG regions are used in this table.

The net result after 1900 was a rebound of land in forest of roughly 700,000 acres. Table 2 depicts a net change. That is, it shows the net balance between the continued increases in forest area in

some counties, offsetting the loss of forest to development in the urban corridor and in spreading residential areas around smaller towns.

DEVELOPMENT AREA

From 1973 to 1997, the area of developed land increased by 49% statewide, while the State's population grew only by 30% (MDP, 2001, p. iii). This reflects the more land intensive, lower density forms of suburban development common around the nation. In 1999, more than 25% of Maryland's total forest area was in the "urban/suburban corridor" as we define it. Clearly within this area, the traditional concerns of "urban forestry" and rural commercial forestry are blending together in new ways.

Annual rates of land conversion have been highly cyclical:

Early 1980s	8,112 acres/yr
1985-1990	31,733
1990s	14,638

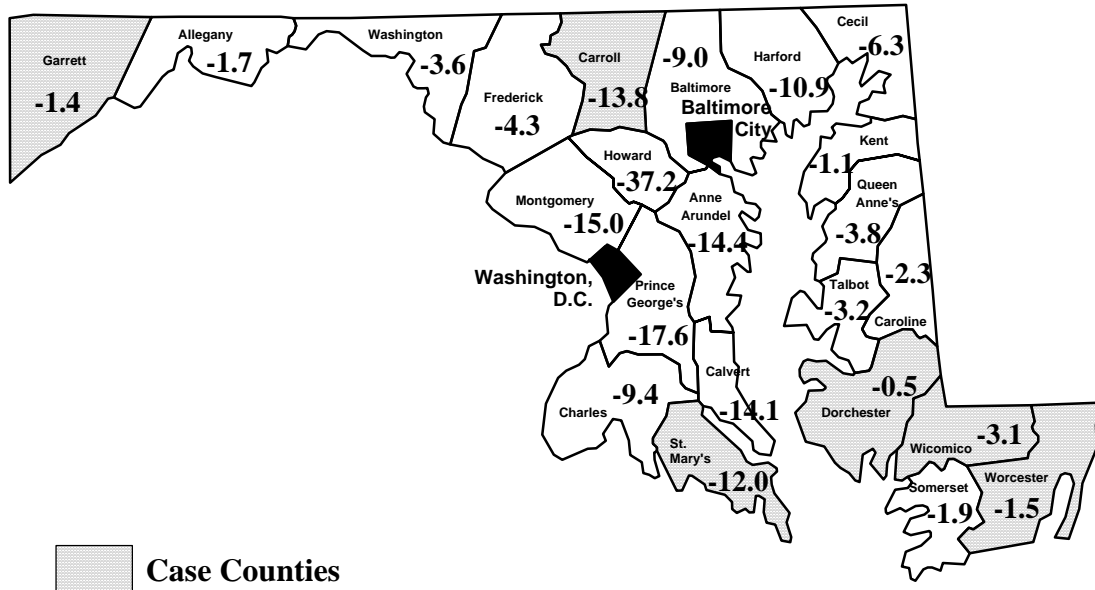
(MDP, 2001, p.7)

The lands converted from forest amounted to 190,000 acres from 1973 to 1997, and an additional 187,000 acres of farmland. Land conversion from 1997 to 2020 is projected to average 13,845 acres per year (Fig. 4), with the largest percentage changes in the urban/suburban corridor, as would be expected. From 1990 to 2000, Maryland population grew by about 10%, and households by 13%. In recent years, real estate price pressures have been extreme. From second quarter 2001 to 2002, the Washington area led the nation in price appreciation at 20.8% over a year (Borta, 2002, p. D2). Baltimore ranked 13th, at 13.4%.

In the recent Brookings Study, the State's three metro areas were shown to be using land at a faster pace from 1982 to 1997 than their populations were growing (Table 3). In 1997, the Baltimore and Washington metro areas had slightly higher population densities than did the US metro areas on average. The relative increase in urbanized land matched the US average in DC but was lower in Baltimore and Hagerstown. For comparison, Atlanta, a widely cited example of rapid growth, has a density of 2.84, well below the Maryland metro areas. But Los Angeles, often considered the nation's leading example of sprawl, actually has a far higher density, at 8.31. Nationally, 25 million acres were urbanized in 1997 according to the data used in this study.

Figure 4

Maryland Forest Land Use in Acres Projected Percent Change, 1997-2020



Source: MDP, 2001.

Table 3
Population Density, Land Use Changes 1982-1997,
U.S. and Selected Maryland Metro Areas

	Baltimore	Hagerstown	Washington D.C.	U.S.
Density 1997	4.81	3.30	5.88	3.55
<u>Percent Change, 1982-1997</u>				
Population	12.7%	14.7%	29.7%	17.0%
Urbanized Land	32.3%	41.3%	47.0%	47.1%
Density	-14.8%	-18.8%	-11.8%	-20.0%

Source: Fulton, et al., 2001. App. B.

Another analysis also suggests that within the metro areas, Maryland, compared to other cities, ranks below the U.S. averages on a number of indexes of sprawl (Table 4).

Table 4
Sprawl Indexes, Relevant Metro Areas

	<u>Sprawl Index</u>	<u>Rank by Sprawl Index</u>	<u>Density Index</u>	<u>Density Rank</u>
Baltimore MSA	115.86	64	104.28	64
Washington, DC	90.83	26	106.88	67

Source: Ewing, Pendall, and Chen, n.d., App. 3

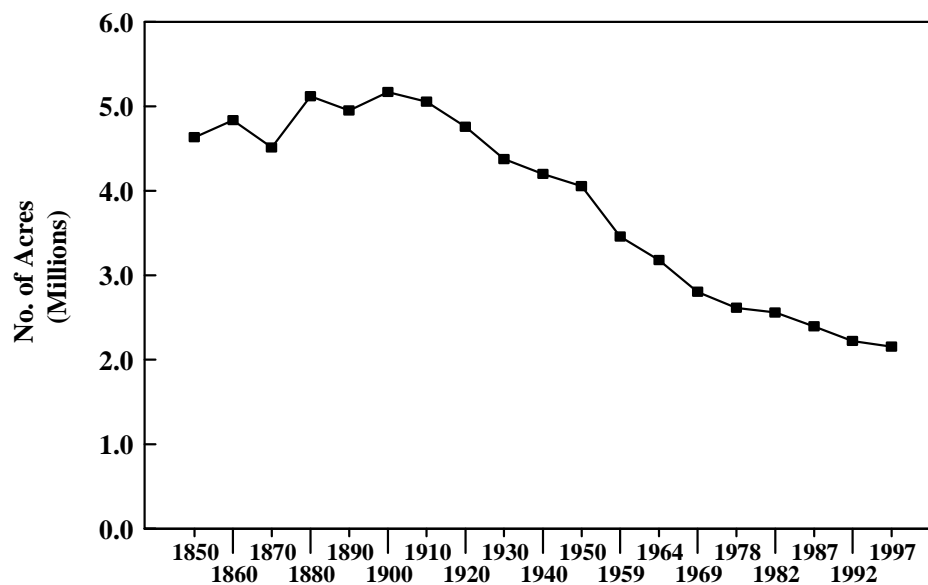
For the indexes, the average of 83 metro areas = 100. Higher scores are less sprawling than lower scores. Consult source for details on construction of the indexes.

FARMLAND TRENDS

Since the 1880's, land ownership by Maryland farms has steadily fallen, to reach less than half of its late-18th century level. Thus, in little over a century, almost half the entire area of the State shifted from farm ownership to other owners. The land in farms includes woods, wetlands, and other land in addition to pasture and cropland.

Figure 5

Maryland Acres of Land in Farms 1850-1997



Source: Census of Agriculture.

2. COUNTY LAND USE CASES: METHOD AND BACKGROUND

GENERAL APPROACH TO THE CASES

In order to understand the future of timber supply in Maryland, we need to understand the current pattern of land ownership, and how it is changing. Development, subdividing, and parcel fragmentation are occurring everywhere at different rates, in different ways, and with different implications. Our research approach relies on a series of local case studies to get a detailed feel for how forestland ownership patterns vary around the State and what the local dynamics of land use look like. This approach has been found fruitful in the past (The Irland Group, 1990).

This chapter outlines our general approach. Our objective is to document and describe existing land ownership patterns in more detail, by extensive personal interviews with local planners and Realtors as well as people from the forestry community. We also seek data on the nature of land use change in the area, which usually comes down to analyzing patterns of subdividing. In these interviews, we can gain insight into the driving forces affecting the market for forested lands in the area. A research assistant handled document search and many of the personal interviews. Project principal investigators conducted many of the personal interviews in several case study areas. This approach will not yield quantitative results or a basis for numerical predictions, though it may supply background research useful for such studies. But we felt this approach is a useful complement to statistical analysis such as reported by Carpenter and Lynch (2002).

The USFS survey units are built around divisions of the State based largely on forest conditions. These regions are useful for many purposes, but in light of different land use conditions, it seems useful to develop a new set of regions. For this project, we have defined a modified set of regions (Table 5). The two westernmost counties are the most heavily forested, at above 60% (Fig. 6). Due to including the three next counties to the east, the *Western Maryland* region's average is lower. There is no clear line for the *Urban Corridor* region, but we can define the corridor as the seven counties from Cecil to the Virginia line that roughly define the I-95 corridor. Interestingly, this Urban Corridor does *not* coincide with the counties having the lowest percent forest. *Southern Maryland* and the *Lower Eastern Shore* are the same as the Forest Service Survey Units. Interestingly, Charles County in southern Maryland is one of only 3 counties with more than 60% forest. For our purposes, we have created the *Upper Eastern Shore* as a new region, split off from the USFS's Central Unit. This area has some distinctive characteristics from the Lower Eastern Shore, with differences in farming patterns and ownership, and less land use pressure from the Route 50 corridor to Ocean City.

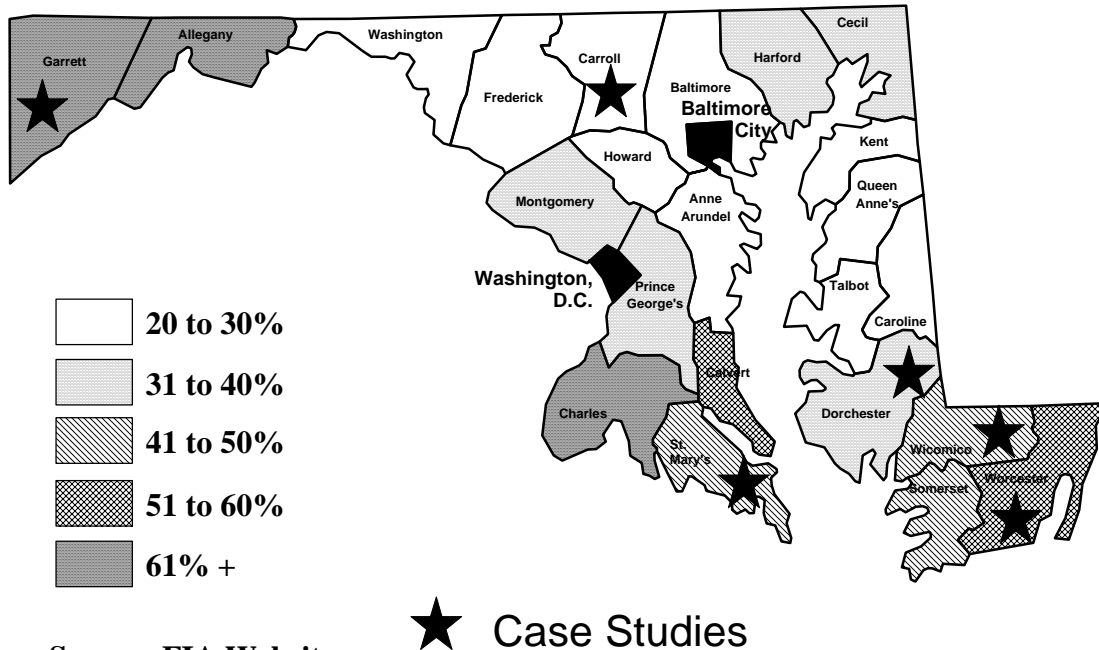
Table 5
Addendum: Total Land, Timberland, and Forest Land by County and Region, 1999
(in thousands of acres)

	<u>1999 Total Land Area</u>	<u>1999 Timberland</u>	<u>1999 All Forest Land</u>	<u>Timberland as % of Total Land</u>	<u>Forest Land as % of Total Land</u>
Total Maryland	6,255.8	2,371.9	2565.8	37.9%	41.0%
Western Maryland					
Allegany	272.2	175.2	211.4	64.4%	77.7%
Carroll	287.5	63.2	63.2	22.0%	22.0%
Frederick	424.3	93.7	127.3	22.1%	30.0%
Garrett	414.8	285.4	297.8	68.8%	71.8%
Washington	<u>293.2</u>	<u>86.1</u>	<u>107.5</u>	<u>29.4%</u>	<u>36.7%</u>
Subtotal	1,692.0	703.6	807.2	41.6%	47.7%
Urban/Suburban-Corridor					
Anne Arundel/Howard	427.6	122.6	142.1	28.7%	33.2%
Baltimore	434.8	98.7	117.3	22.7%	27.0%
Cecil/Harford	504.7	174.2	176.0	34.5%	34.9%
Montgomery/Prince George's	<u>627.8</u>	<u>189.5</u>	<u>235.2</u>	<u>30.2%</u>	<u>37.5%</u>
Subtotal	1,994.9	585.0	670.6	29.3%	33.6%
Southern Maryland					
Calvert	137.7	75.8	75.8	55.0%	55.0%
Charles	295.1	197.0	197.0	66.8%	66.8%
St. Mary's	<u>231.2</u>	<u>108.5</u>	<u>108.5</u>	<u>46.9%</u>	<u>46.9%</u>
Subtotal	664.0	381.3	381.3	57.4%	57.4%
Eastern Shore -- Upper					
Caroline/Talbot	377.2	107.3	107.3	28.4%	28.4%
Kent/Queen Anne's	<u>417.1</u>	<u>101.8</u>	<u>101.8</u>	<u>24.4%</u>	<u>24.4%</u>
Subtotal	794.3	209.1	209.1	26.3%	26.3%
Eastern Shore -- Lower					
Dorchester	356.9	132.8	137.6	37.2%	38.6%
Somerset	209.4	87.8	87.8	41.9%	41.9%
Wicomico	241.4	115.4	115.4	47.8%	47.8%
Worcester	<u>302.9</u>	<u>156.7</u>	<u>156.7</u>	<u>51.7%</u>	<u>51.7%</u>
Subtotal	1,110.6	492.7	497.5	44.4%	44.8%

Source: 1999 FIA.

Figure 6

Maryland Timberland, 1999 Percent of Total Land Area



Source: FIA Website.

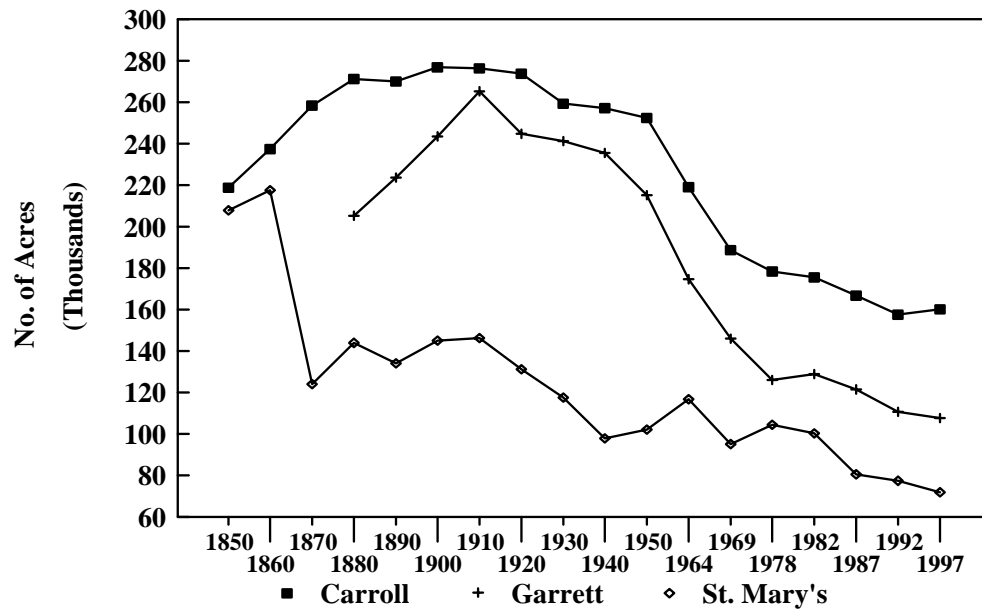
One reason for defining regions in this way is as a sampling frame for choosing case study counties (Figure 1 above). We have chosen sample counties from all but the Upper Eastern Shore. We believe that this selection will adequately cover the range of variations needed for this study. Our cases omit the corridor counties where use pressures and land prices are high and remaining forest is already parcelized. While these forests will continue produce commercial wood, it will increasingly be from land clearing and salvage, and will not result from conscious timber management.

Not surprisingly, the *Corridor* as we define it has a low proportion of forest in relation to its area, but the very lowest is the Upper Eastern Shore, at only 26.3% forested (Table 5 above). By contrast, the Lower Eastern Shore is far more heavily forested (44%). As to individual counties, Carroll, Frederick, and Baltimore have the very lowest proportions of forestland. The region that is most heavily forested, on these definitions, is Southern Maryland, at 57%.

Maryland farmland area shrank dramatically after the 1920's, for a variety of reasons. Patterns varied among the case study counties, however. St. Mary's county experienced a dramatic decline after the Civil War and then declined to a very low level (Fig. 7). Garrett and Carroll peaked from 1890 to 1920 and then declined markedly. These differences have undoubtedly left subtle traces in land ownership and in forest conditions. The Eastern Shore counties rebounded after a severe post-Civil War depression and then declined steadily after 1900 (Fig. 8).

Figure 7

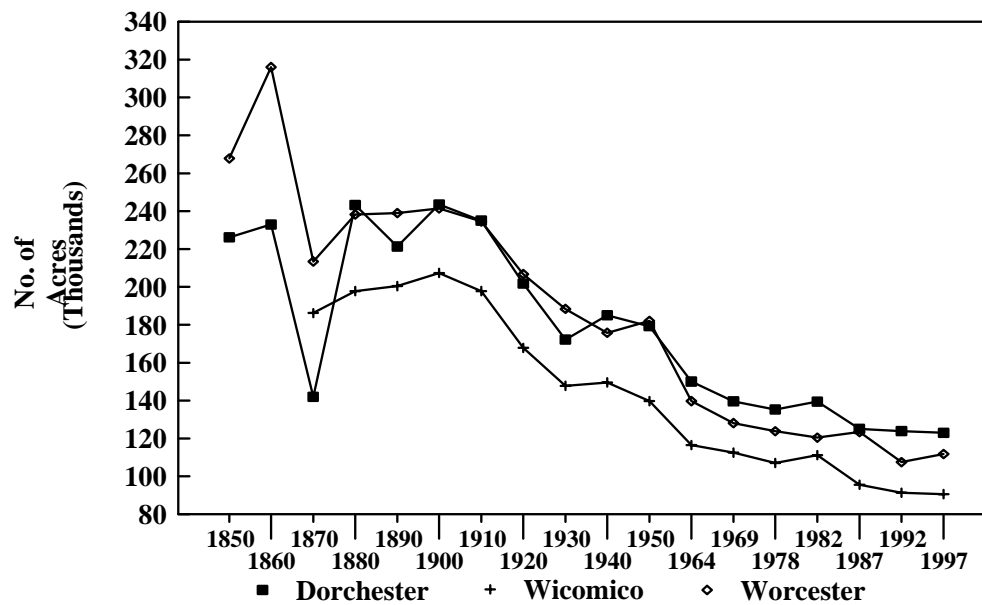
Maryland Acres of Land in Farms by Selected Counties, 1850-1997



Source: Census of Agriculture.

Figure 8

Maryland Acres of Land in Farms: Eastern Shore Counties, 1850-1997



Source: Census of Agriculture.

The MDP has analyzed 1973-1997 forest area change and made projections of loss of forest (Table 6). Patterns of past change are about what would be expected. Almost half the net loss of forest occurred in the corridor counties (86,000 acres). The projections accounted for a number of variables, including expected population growth. Generally, the Western counties, and the Lower Eastern Shore are expected to experience minimal forest loss, while Anne Arundel/Howard, Carroll, and Montgomery/Prince George's will see high rates of forest loss. Southern Maryland is also expected to lose more than 10% of its forest. In Table 7, more detail is supplied on 1973-1997 comparisons.

It does appear that due to higher land prices, growth management laws and better local subdivision regulation, the acreage consumed per additional residence is declining. Other assessments of development pressures are found in Save the Bay (n.d.); American Farmland Trust (n.d.); and Lynch (2003).

This is a valuable forecast, but 20-years is short relative to a meaningful time span for forest policy. Current land use data cited throughout the cases are from MDP, 2001.

Our final list of case study counties is:

Dorchester, Wicomico, and Worcester Counties on the Lower Eastern Shore. These counties are fairly heavily forested at present. They contain much of the Chesapeake lands. This area is a separate timbershed from the rest of the State. According to the MDP projections, land use pressures are not expected to be extreme over the coming 20 years. Growth is moving southward from Talbot County, is sprouting along Route 13, and is coming westward from Ocean City.

Garrett County in Western Maryland. Literally at the opposite end of the spectrum, this county is heavily forested and hilly. But it is not so remote from population centers as to be immune from land use pressures – the center of the county is two hours from Pittsburgh and just over three hours from Baltimore suburbs. The major node of growth is Deep Creek Lake.

Carroll County is adjacent to the Corridor, as we have defined it. It has less forestland than the other case study counties and that land is more fragmented. Heavy land use pressures are evident as development moves away from the corridor.

St. Mary's County forms the southernmost tip of Southern Maryland and is also fairly heavily forested at present. Future land use pressures are expected to be low by MDP forecasts.

COMPARISON OF DATA SOURCES

Just for curiosity, we compared the estimates of forest areas in the MDP report (2001), and the USFS FIA report (Table 8). Very generally, the estimates appear to be the same within the statistical accuracies given in the USFS report. The difference in the totals statewide is trivial. For the Eastern Shore, an independent estimate based on dot grid counts led to a very similar area estimate (Parker Forestry Services, n.d.).

For the record, we also reproduce Besley's 1916 estimates for all Maryland countries, since the original source is difficult to find (Table 9).

Table 6
Maryland Forestland Acreage by County and Region, 1973, 1997 and Projected to 2020
(TIG Regions)

	Acres		Projected	Proj. % Ch.
	<u>1973</u>	<u>1997</u>	<u>2020</u>	<u>1997-2020</u>
Total Maryland	2,781,454	2,592,138	2,409,542	-7.0%
Western Maryland				
Allegany	206,737	205,083	201,543	-1.7%
Carroll	71,525	67,994	58,637	-13.8%
Frederick	133,745	127,189	121,734	-4.3%
Garrett	299,826	292,582	288,606	-1.4%
Washington	<u>112,033</u>	<u>107,423</u>	<u>103,579</u>	<u>-3.6%</u>
Subtotal	823,866	800,271	774,099	-3.3%
Urban/Suburban-Corridor				
Anne Arundel/Howard	189,491	163,788	128,296	-21.7%
Baltimore	149,436	133,424	121,476	-9.0%
Cecil/Harford	194,974	184,227	168,173	-8.7%
Montgomery/Prince George's	<u>259,734</u>	<u>225,819</u>	<u>188,527</u>	<u>-16.5%</u>
Subtotal	793,635	707,258	606,472	-14.3%
Southern Maryland				
Calvert	86,508	69,795	59,933	-14.1%
Charles	196,609	177,855	161,084	-9.4%
St. Mary's	<u>136,002</u>	<u>125,705</u>	<u>110,631</u>	<u>-12.0%</u>
Subtotal	419,119	373,355	331,648	-11.2%
Eastern Shore -- Upper				
Caroline/Talbot	114,993	107,626	104,768	-2.7%
Kent/Queen Anne's	<u>116,864</u>	<u>110,536</u>	<u>107,592</u>	<u>-2.7%</u>
Subtotal	231,857	218,162	212,360	-2.7%
Eastern Shore -- Lower				
Dorchester	132,036	127,751	127,076	-0.5%
Somerset	88,930	87,101	85,440	-1.9%
Wicomico	113,251	107,060	103,784	-3.1%
Worcester	<u>174,027</u>	<u>166,974</u>	<u>164,457</u>	<u>-1.5%</u>
Subtotal	508,244	488,886	480,757	-1.7%

Source:

Maryland MDP, Dec. 2001, pp. 27ff. Regions are USFS For. Survey Units.

Table 7
Maryland Forestland Use in Acres, 1973, 1997, and Changes by County and Region
(TIG Regions)

	<u>1973</u>	<u>1997</u>	<u>Absolute Change 1973-1997</u>	<u>Percent Change 1973-1997</u>
Total Maryland	2,781,454	2,592,138	(189,316)	-6.81%
Western Maryland				
Allegany	206,737	205,083	(1,654)	-0.80%
Carroll	71,525	67,994	(3,531)	-4.94%
Frederick	133,745	127,189	(6,556)	-4.90%
Garrett	299,826	292,582	(7,244)	-2.42%
Washington	<u>112,033</u>	<u>107,423</u>	(4,610)	-4.11%
Subtotal	823,866	800,271	(23,595)	-2.86%
Urban/Suburban-Corridor				
Anne Arundel	129,453	111,660	(17,793)	-13.74%
Baltimore	149,436	133,424	(16,012)	-10.71%
Cecil	89,993	86,939	(3,054)	-3.39%
Harford	104,981	97,288	(7,693)	-7.33%
Howard	60,038	52,128	(7,910)	-13.17%
Montgomery	108,959	95,295	(13,664)	-12.54%
Prince George's	<u>150,775</u>	<u>130,524</u>	(20,251)	-13.43%
Subtotal	793,635	707,258	(86,377)	-10.88%
Southern Maryland				
Calvert	86,508	69,795	(16,713)	-19.32%
Charles	196,609	177,855	(18,754)	-9.54%
St. Mary's	<u>136,002</u>	<u>125,705</u>	(10,297)	-7.57%
Subtotal	419,119	373,355	(45,764)	-10.92%
Eastern Shore -- Upper				
Caroline	71,029	65,695	(5,334)	-7.51%
Kent	49,856	46,872	(2,984)	-5.99%
Queen Anne's	67,008	63,664	(3,344)	-4.99%
Talbot	<u>43,964</u>	<u>41,931</u>	(2,033)	-4.62%
Subtotal	231,857	218,162	(13,695)	-5.91%
Eastern Shore -- Lower				
Dorchester	132,036	127,751	(4,285)	-3.25%
Somerset	88,930	87,101	(1,829)	-2.06%
Wicomico	113,251	107,060	(6,191)	-5.47%
Worcester	<u>174,027</u>	<u>166,974</u>	(7,053)	-4.05%
Subtotal	508,244	488,886	(19,358)	-3.81%

Source: Maryland MDP, Dec. 2001, pp. 27ff. Regions designated by TIG.

Table 8
Comparison of Sources: Area of All Forestland by County, Maryland, 1999
MDP vs. FIA (Acres)

	1997 <u>MDP</u>	1999 <u>FIA</u>	Difference <u>MDP-FIA</u>
Total Maryland	2,592,138	2,565,800	26,338
Western Maryland			
Allegany	205,083	211,400	(6,317)
Carroll	67,994	63,200 **	4,794
Frederick	127,189	127,300 *	(111)
Garrett	292,582	297,800	(5,218)
Washington	<u>107,423</u>	<u>107,500</u> *	<u>(77)</u>
Subtotal	800,271	807,200	(6,929)
Urban/Suburban-Corridor			
Anne Arundel/Howard	163,788	142,100 *	21,688
Baltimore	133,424	117,300 *	16,124
Cecil/Harford	184,227	176,000 *	8,227
Montgomery/Prince George's	<u>225,819</u>	<u>235,200</u> *	<u>(9,381)</u>
Subtotal	707,258	670,600	36,658
Southern Maryland			
Calvert	69,795	75,800 *	(6,005)
Charles	177,855	197,000	(19,145)
St. Mary's	<u>125,705</u>	<u>108,500</u> *	<u>17,205</u>
Subtotal	373,355	381,300	(7,945)
Eastern Shore -- Upper			
Caroline/Talbot	107,626	107,300 *	326
Kent/Queen Anne's	<u>110,536</u>	<u>101,800</u> *	<u>8,736</u>
Subtotal	218,162	209,100	9,062
Eastern Shore -- Lower			
Dorchester	127,751	137,600 *	(9,849)
Somerset	87,101	87,800 *	(699)
Wicomico	107,060	115,400	(8,340)
Worcester	<u>166,974</u>	<u>156,700</u> *	<u>10,274</u>
Subtotal	488,886	497,500	(8,614)

* = 5% > S.E. > 10%

** = SE > 10%

Source:

Maryland MDP, Dec. 2001, pp. 27ff., and FIA Website, Table 94. Regions designated by TIG.

Table 9
Area and Percent Wooded in Maryland, by County, 1916

	Wooded Area	
	(Acres)	(%)
Total Maryland	2,228,046	
Western Maryland		
Allegany	163,832	62%
Carroll	39,292	13%
Frederick	91,117	21%
Garrett	274,483	63%
Washington	<u>72,274</u>	24%
Subtotal	640,998	
Urban/Suburban-Corridor		
Anne Arundel/Howard	130,910	59%
Baltimore	103,515	24%
Cecil/Harford	135,415	53%
Montgomery/Prince George's	<u>196,021</u>	63%
Subtotal	565,861	
Southern Maryland		
Calvert	62,390	45%
Charles	171,547	59%
St. Mary's	<u>119,080</u>	51%
Subtotal	353,017	
Eastern Shore -- Upper		
Caroline/Talbot	108,656	59%
Kent/Queen Anne's	<u>93,046</u>	45%
Subtotal	201,702	
Eastern Shore -- Lower		
Dorchester	138,291	37%
Somerset	68,387	25%
Wicomico	111,608	46%
Worcester	<u>148,182</u>	47%
Subtotal	466,468	

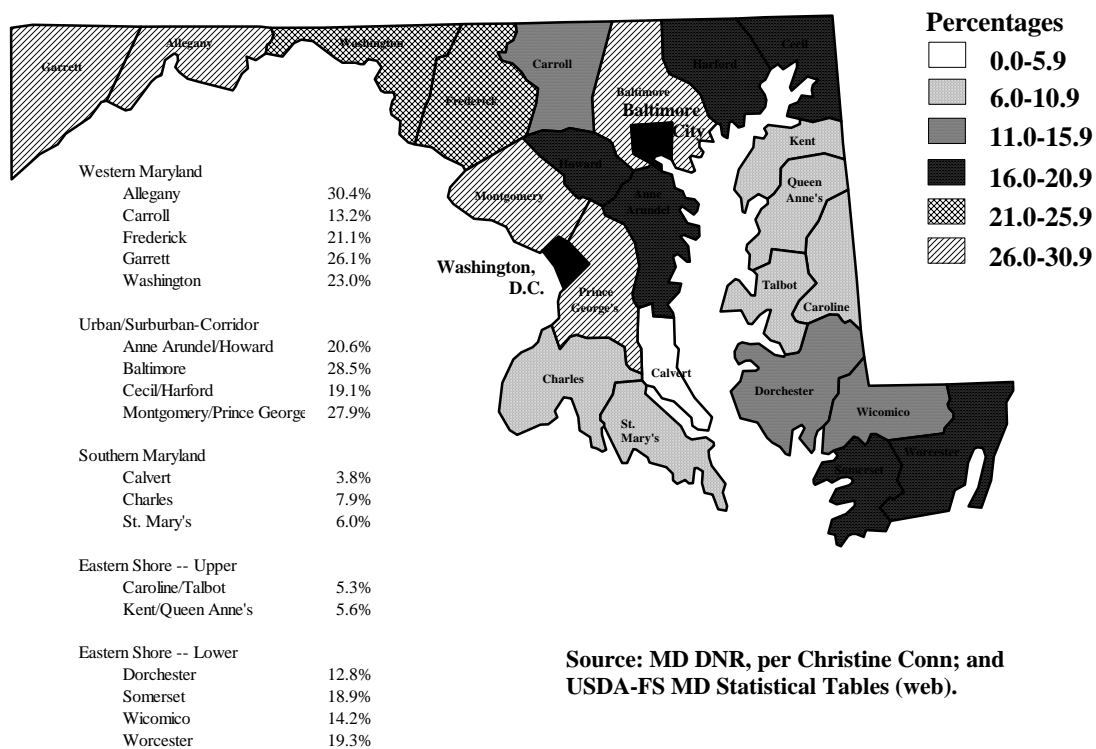
Source: Besley, 1916.

PUBLIC FOREST OWNERSHIP

From the DNR, we obtained a summary of public forest ownership by county from their GIS (Fig. 9, Table 10). The table does not distinguish between total forest and timberland, nor does it reflect total public ownership of all forms of land.

Figure 9

Percent of Forest Land in Public Ownership, Late 1990's



Source: MD DNR, per Christine Conn; and
USDA-FS MD Statistical Tables (web).

Table 10
Maryland Public Forest Ownerships, Counties and Regions, Late 1990's

<u>County</u>	Public Forest Acres (1000 A)	County as % of MD Total	Total Forest (1000 A)	County, Percent Public	Addendum: FIA Data	Difference MDP est. minus FIA est.
Western Maryland						
Allegany	63.6	13.4%	211.4	30.1%	65.0	-1.4
Carroll	7.6	1.6%	63.2	12.1%	4.4	3.2
Frederick	27.1	5.7%	127.3	21.3%	11.4	15.7
Garrett	74.3	15.7%	297.8	25.0%	106.8	-32.5
Washington	25.2	5.3%	107.5	23.5%	12.2	13.0
SUBTOTAL	197.9	41.7%	807.2	24.5%	199.8	-1.9
Urban/Surburban-Corridor						
Anne Arundel/Howard	27.2	5.7%	142.1	19.1%	14.1	13.1
Baltimore	32.3	6.8%	117.3	27.6%	22.5	9.8
Cecil/Harford	33.8	7.1%	176.0	19.2%	26.5	7.3
Montgomery/Prince George's	64.9	13.7%	235.2	27.6%	52.6	12.3
SUBTOTAL	158.2	33.4%	670.6	23.6%	115.7	42.5
Southern Maryland						
Calvert	3.6	0.8%	75.8	4.8%	0.0	3.6
Charles	18.0	3.8%	197.0	9.1%	33.5	-15.5
St. Mary's	6.6	1.4%	108.5	6.1%	22.4	-15.8
SUBTOTAL	28.2	5.9%	381.3	7.4%	55.9	-27.7
Eastern Shore -- Upper						
Caroline/Talbot	5.8	1.2%	107.3	5.4%	0.0	5.8
Kent/Queen Anne's	5.7	1.2%	101.8	5.6%	9.7	-4.0
SUBTOTAL	11.5	2.4%	209.1	5.5%	9.7	1.8
Eastern Shore -- Lower						
Dorchester	18.4	3.9%	137.6	13.4%	7.9	10.5
Somerset	15.1	3.2%	87.8	17.1%	8.3	6.8
Wicomico	15.3	3.2%	115.4	13.2%	10.8	4.5
Worcester	29.8	6.3%	156.7	19.0%	13.4	16.4
SUBTOTAL	78.5	16.5%	497.5	15.8%	40.4	38.1
Total	474.2	100.0%	2,565.8	18.5%	421.6	52.6

Source:
MD DNR per Christine Conn; and USDA Forest Service, MD Statistical Tables (web).

DIFFERENCES IN ECONOMIC STRUCTURE

The case study counties differ, at times markedly, from the State as a whole, in economic structure (Tables 11 and 12). This is to be expected given their rural character. Also the case study areas differ significantly from one to another. The tables depict the comparisons by using location quotients (LQ's). The LQ is the ratio of a county's percent dependence on a sector (for jobs in this case) compared to the dependence of the State as a whole. Thus, an LQ above 100% shows a county that is more concentrated in a given sector than the State as a whole. In Tables 11 and 12, the sectors have been aggregated to show general areas that indicate the broad outlines of a State's economy. Manufacturing is directly relevant for this study, and Accommodation/Food Services supplies a proxy for tourism. Tables 11 and 12 are to simplify comparisons; further comment on the data is given in each detailed chapter (Part 5).

Table 11
Case Study Counties: Location Quotients for Sectors (Percentage in County divided by Percent Statewide)

		<u>Carroll</u>	<u>St. Mary's</u>	<u>Garrett</u>	<u>Dorchester</u>	<u>Wicomico</u>	<u>Worcester</u>
Total		100%	100%	100%	100%	100%	100%
23	Construction	187%	103%	108%	72%	80%	105%
31-33	Manufacturing	123%	39%	173%	456%	182%	137%
42	Wholesale trade	80%	15%	73%	78%	92%	147%
44-45	Retail Trade	<u>123%</u>	<u>122%</u>	<u>110%</u>	<u>84%</u>	<u>136%</u>	<u>133%</u>
Subtotal		112%	95%	101%	83%	125%	136%
48-49	Transportation & warehousing	73%	72%	114%	168%	115%	21%
51	Information	57%	37%	88%	34%	98%	29%
52	Finance & insurance	60%	37%	65%	49%	61%	48%
53	Real estate & rental & leasing	<u>41%</u>	<u>53%</u>	<u>76%</u>	<u>58%</u>	<u>66%</u>	<u>106%</u>
Subtotal		55%	40%	75%	46%	74%	54%
54	Professional, scientific & technical services	44%	309%	20%	21%	32%	24%
55	Management of companies & enterprises	36%	0%	0%	0%	88%	0%
56	Admin, support, waste mgt, remediation services	<u>56%</u>	<u>70%</u>	<u>16%</u>	<u>46%</u>	<u>69%</u>	<u>24%</u>
Subtotal		48%	171%	16%	28%	54%	21%
61	Educational services	128%	89%	21%	0%	76%	0%
62	Health care and social assistance	<u>111%</u>	<u>88%</u>	<u>113%</u>	<u>124%</u>	<u>135%</u>	<u>53%</u>
Subtotal		114%	88%	97%	103%	125%	43%
72	Accommodation & food services	122%	121%	153%	78%	108%	373%
71	Arts, entertainment & recreation	70%	139%	0%	0%	51%	163%
81	Other services (except public administration)	<u>118%</u>	<u>71%</u>	<u>98%</u>	<u>78%</u>	<u>83%</u>	<u>94%</u>
Subtotal		107%	85%	77%	61%	76%	109%

Source: USDOC, Year 2000 County Business Patterns, (details, Table 8.)

Table 12
Employment Structure, 2000 Non Agricultural Employment by Sector

Industry	Total State	% of Total	Carroll	% of Total	St. Mary's	% of Total	Garrett	% of Total	Dorchester	% of Total	Wicomico	% of Total	Worcester	% of Total
Total	2,058,304	100.0%	43,525	100.0%	22,148	100.0%	9,219	100.0%	9,651	100.0%	37,306	100.0%	18,406	100.0%
23	159,216	7.7%	6,299	14.5%	1,762	8.0%	768	8.3%	541	5.6%	2,318	6.2%	1,488	8.1%
31-33	158,753	7.7%	4,115	9.5%	664	3.0%	1,231	13.4%	3,393	35.2%	5,232	14.0%	1,947	10.6%
42	95,135	4.6%	1,604	3.7%	152	0.7%	309	3.4%	348	3.6%	1,590	4.3%	1,249	6.8%
44-45	<u>284,601</u>	<u>13.8%</u>	<u>7,417</u>	<u>17.0%</u>	<u>3,740</u>	<u>16.9%</u>	<u>1,405</u>	<u>15.2%</u>	<u>1,126</u>	<u>11.7%</u>	<u>7,031</u>	<u>18.8%</u>	<u>3,383</u>	<u>18.4%</u>
Subtotal	379,736	18.4%	9,021	20.7%	3,892	17.6%	1,714	18.6%	1,474	15.3%	8,621	23.1%	4,632	25.2%
48-49	56,470	2.7%	876	2.0%	438	2.0%	289	3.1%	446	4.6%	1,181	3.2%	106	0.6%
51	71,221	3.5%	859	2.0%	287	1.3%	282	3.1%	114	1.2%	1,264	3.4%	185	1.0%
52	110,052	5.3%	1,392	3.2%	442	2.0%	320	3.5%	253	2.6%	1,218	3.3%	474	2.6%
53	<u>44,917</u>	<u>2.2%</u>	<u>391</u>	<u>0.9%</u>	<u>254</u>	<u>1.1%</u>	<u>153</u>	<u>1.7%</u>	<u>122</u>	<u>1.3%</u>	<u>536</u>	<u>1.4%</u>	<u>426</u>	<u>2.3%</u>
Subtotal	226,190	11.0%	2,642	6.1%	983	4.4%	755	8.2%	489	5.1%	3,018	8.1%	1,085	5.9%
54	192,610	9.4%	1,778	4.1%	6,401	28.9%	171	1.9%	186	1.9%	1,119	3.0%	413	2.2%
55	53,398	2.6%	401	0.9%	c	0.0%	b	0.0%	b	0.0%	856	2.3%	b	0.0%
56	<u>170,918</u>	<u>8.3%</u>	<u>2,030</u>	<u>4.7%</u>	<u>1,289</u>	<u>5.8%</u>	<u>126</u>	<u>1.4%</u>	<u>368</u>	<u>3.8%</u>	<u>2,125</u>	<u>5.7%</u>	<u>362</u>	<u>2.0%</u>
Subtotal	416,926	20.3%	4,209	9.7%	7,690	34.7%	297	3.2%	554	5.7%	4,100	11.0%	775	4.2%
61	54,213	2.6%	1,464	3.4%	521	2.4%	52	0.6%	a	0.0%	745	2.0%	c	0.0%
62	<u>259,960</u>	<u>12.6%</u>	<u>6,113</u>	<u>14.0%</u>	<u>2,461</u>	<u>11.1%</u>	<u>1,312</u>	<u>14.2%</u>	<u>1,513</u>	<u>15.7%</u>	<u>6,375</u>	<u>17.1%</u>	<u>1,221</u>	<u>6.6%</u>
Subtotal	314,173	15.3%	7,577	17.4%	2,982	13.5%	1,364	14.8%	1,513	15.7%	7,120	19.1%	1,221	6.6%
72	166,041	8.1%	4,298	9.9%	2,159	9.7%	1,140	12.4%	604	6.3%	3,236	8.7%	5,531	30.0%
71	30,817	1.5%	455	1.0%	461	2.1%	e	0.0%	b	0.0%	283	0.8%	448	2.4%
81	<u>112,244</u>	<u>5.5%</u>	<u>2,794</u>	<u>6.4%</u>	<u>853</u>	<u>3.9%</u>	<u>495</u>	<u>5.4%</u>	<u>412</u>	<u>4.3%</u>	<u>1,698</u>	<u>4.6%</u>	<u>947</u>	<u>5.1%</u>
Subtotal	143,061	7.0%	3,249	7.5%	1,314	5.9%	495	5.4%	412	4.3%	1,981	5.3%	1,395	7.6%

Source: USDOC, Year 2000 County Business Patterns.

Table 12 (cont.)
Codes

Employment size class of numbers withheld to avoid disclosing data for individual companies

a 0-19
b 20-99
c 100-249
e 500-999

Industry codes:

23 Construction
31-33 Manufacturing
42 Wholesale trade
44-45 Retail Trade
48-49 Transportation & warehousing
51 Information
52 Finance & insurance
53 Real estate & rental & leasing
54 Professional, scientific & technical services
55 Management of companies & enterprises
56 Admin, support, waste mgt, remediation services
61 Educational services
62 Health care and social assistance
71 Arts, entertainment & recreation
72 Accommodation & food services
81 Other services (except public administration)

3. SUMMARY OF LAND MARKET CASES

This section attempts an overall summary of how land markets are affecting forests in the case study areas. While policy suggestions may seem obvious from some of the discussion, those will be deferred to a later chapter.

The four case studies of land market trends and impacts were designed to obtain a fine-grained feel for what is happening to the land in a selected group of counties. The counties cover most of the range in percent forest cover, from Carroll at the lowest, to Garrett at the highest (Table 13). They also span a range of levels of development pressure. While we have assembled a considerable amount of such information, we have been unable to obtain detailed information as to how much of the subdivided land is forested. This cannot be accomplished without more detailed field research. Also, because of the varying sources relied upon, we cannot make statistical comparisons between counties for many of the variables that interest us. Our evidence is necessarily more anecdotal and impressionistic. Nonetheless, we think it provides a useful additional perspective compared to statewide analyses built on remote sensing and other data bases. We already know that considerable forest acreage is being converted. But how the process affects wood supply and other values may depend on many details. Also, management is probably affected by neighborhood effects leading to a “shadow conversion” effect.

Table 13
Summary of Forest Land Case Study Counties

	<u>Carroll</u>	<u>St. Mary's</u>	<u>Garrett</u>	3 Eastern <u>Shore</u>	<u>Source</u>
% of Land in Forest	22	47	69	37-52	Table 2
% Forest in Public Ownership	13	6	26	13-19	Fig. 8
Acres Lost to 2020 Projected %	-14	-12	-1	0.5-3	Table 3 (MDP)
Typical Subdivision Size	20-40	50	12	20-40	Interviews
Lot Size (acres)	2-3 A (increasing)	up to 5 (increasing)	5 (declining)	2-6 (no septic) 1 or less (if septic)	Interviews
Cost of 100 Acre Woodlot (\$1000)	\$1,000 (SE portion)	\$150-300	\$50-200	\$200-500 (w. mature wood)	Interviews
Forest Parcel Sizes (tbo)	n.a.	n.a.	n.a.	n.a.	
Jobs in Wood (%) *	15	5	40	4.9-9.6	Table ...
Ave Building Permits Per Year (periods vary) (no.)	1279	786	287	n.a	County data
Ave Land Subdivided/Year (acres)	2,400 (est.)	1,600 (est.)	800	1,600 **	County data
Forest Subdivided/Year (est. acres)	500	600	600	400 **	TIG estimate
Total Acres Lost/Household (acres)	1	1.3	3	.64-1.6	MDP, p. 19
MDP est. (1973-97) Annual Net Loss of Forest Land	147	429	302	731	Table 4

* All paper and wood products jobs as percent of all manufacturing.

** Wicomico and Worcester only.

Even in areas considered to have low development pressure, significant areas of land are being subdivided each year. Extrapolating these to the future would be dangerous given the overheated market of recent years. Extrapolations based on the MDP forecasts might be more reasonable for the long term.

Outside of Western Maryland, a good deal of recent major development is taking place on farmland, with minimal impact on forests. In these areas, perhaps 25% or less of the subdivided land is forest. This could change in the future, however, as the best open lands are taken up, and as newer developers position properties against the crowded homes on treeless lands, by offering shady lanes and verdant views to their customers.

Casual observation suggests that farmlands are preferred for the largest development projects, those involving hundreds of new homes. Such settings provide well-drained lands of moderate gradients, road access, and no clearing and stumping costs. In the small to medium sized, higher end developments, there is a preference for wooded lots. Realtors in several areas told us that whenever water views are not present, buyers do place wooded lots high on their list of desirable traits.

In one county (Carroll), local planning authorities maintained a printout of subdivisions affected by the FCA, which showed initial area and area of forest remaining after development. Several counties maintained information over time as to number of permits and subdivisions approved, but not all kept track of acres affected. There is a website that contains subdivision plats, which is a useful means of getting a quick overview of how major development look. One county (Wicomico) maintains an annual tally of subdivisions, lots, and acres affected. Its annual report supplies maps showing where the subdivisions are located. There is a good deal of data kept at local levels that is never compiled so that it can become useful information. This prevents keeping a current sense of what is happening to development pressures and trends.

Trends in lot size are various. In some areas, lot sizes are coming down as land prices increase and as the size of tracts available to subdivide grows smaller. In other areas, such as Worcester County, there is a major market for 10-15 acre wooded parcels for leisure retreats. Subdividing to pieces this size will mean the end of production from those forests except for the occasional scrap of fuelwood used by the owners. It seems that average lot sizes for new subdivisions in our case study counties have been much larger than the averages up to 1997 found by MDP. Also, these estimates do not include roads, infrastructure, and commercial development.

Commuting times are increasing and, with more workweek flexibility and two earner families, one-way commutes exceeding one hour are more frequently encountered. This is pushing the frontier for large developments well away from previous limits of suburbia. In some local areas, such as the Eastern Shore, retirees are a significant market segment, and of course they are not affected by commuting constraints.

Simply looking over advertisements for lot sales reveals some interesting facts. One is that few parcels offered on the market during summer 2002 were of the size that might be considered a manageable woodlot. There were a very few larger parcels, for estates or subdivisions, but most were far too small to offer more than nominal forest management opportunities. This could be because intermediate-sized parcels are in strong hands and are not coming to market, or it could mean that there simply are no tracts in these size classes. Without better data we cannot know.

In our interviews with Realtors and scans of advertisements, we sought an estimate of the cost of buying a 100 acre woodlot. As noted, such tracts seem to come to market only rarely, and often with a building. Working largely from Realtor estimates, we find that to buy such a woodlot would cost from \$50,000 to \$200,000 in Garrett County, and could cost as much as a million dollars in southeast Carroll county. Also, there is a market for hunting lands bought by individuals or groups, with properties as small as a hundred to a few hundred acres going to this use. Such uses may be useful interim holders of open space.

The cases show the critical role of highways in spreading growth out into rural counties. In Wicomico, Salisbury lies at the intersection of considerable strip sprawl north and south along Hwy 13, and east-west along Route 50 as well. And the influence of the four-lane Interstate 68 west of Hancock into Garrett County is clear. This highway improvement did not create the development around Deep Creek Lake, but improved its access to the eastward, and vastly boosted development pressure and land prices.

In several of the case study counties, there was little indication that growth management efforts had any material effect in increasing the percentage of development that occurred in concentrated areas. County planning documents point to this issue. In fact, in one county, it seems that in five years or so the concentrated areas will fill up, leaving huge development pressure for low density development in outlying areas. In fact, the MDP's land use projections seem to assume that growth management will have little impact in coming years. It might be argued that sprawl would be worse without growth management. All we are saying here is that in these counties, growth management is not yet materially increasing the proportion of growth that is occurring around existing developed centers.

From what we can see by inspecting individual subdivision plats and visiting sample subdivisions, Maryland's various subdivision and land use regulations, perhaps supplemented by market forces, are forcing better standards of planning, open space retention, waterway protection, and more efficient land use at the development level. But there does not seem to be any identifiable effect on where these developments are being located. Instead, large subdivisions are sprinkled about the landscape, in no obvious order. Many suggestive observations are made by Irwin, Bell, and Geoghegan in their Calvert County case study (2003).

In addition, due to various exemptions from rules, individual lots are being created in a helter-skelter manner on rural roads everywhere. This development, which we term "Spersopolis" after John Fraser Hart (1998, p. 343, 378), consists of small homes, mobile homes, small business, and minor industrial activities contributes to cutting the backland off from access. This low-density frontage sprawl will in time lead to substantial shadow conversion effects as residents of these areas challenge forestry operations on the now-stranded backlands. If anything, this uncontrolled spread of "Spersopolis" is as much a concern for forest management and public access as the tightly controlled huge subdivisions of hundreds of homes on a single site. Policy options discussed for "Growth Management" generally do not offer much potential for dealing with this one at a time form of "nibbling", which often takes place on grandfathered lots. These individual lots seem to provide the only noticeable source of affordable housing in many areas, where the bulk of the development is targeted at two-income upper middle class and high net worth buyers.

For many reasons, development of large properties by a single developer has significant social and environmental advantages, and can result in significant retention of forested acres and individual trees. On balance such large subdivisions are probably a good thing for forest retention. Yet, we encountered not a single example in which the retention of trees has led to

retention of real forest management potential (we hope there are many that we missed, and we heard one anecdote about forest being managed after development). Instead of maintaining the wooded areas in unified ownership of some kind so that management is possible, the woods are typically split up among the individual lots. Or, the retained trees are in narrow strips and stringers, cut off from effective access, and not likely to be manageable in the future. On small tracts, there are few choices. But every week, large tracts are being subdivided where *chances to retain manageable pieces of forest are being lost*. As a result, little of the FCA's considerable achievements in retaining trees will translate into retention of commercial wood supply for the future. We consider this a major tragedy.

INTREPRETATION

A major concern not visible by looking at air photos or land use data is what we may term "shadow conversion." This is easily illustrated by example. When a farmer sets off, say, ten acres in five lots along the roadside, they soon find that the new neighbors enjoy looking at open land but detest the actual practices involved with cultivating it. Equipment noise, odors, and pesticides are noticed in particular. The new neighbors troop off to the town hall or the county to seek protection through regulations. The farmer finds that the active use of the adjacent land is compromised. Thus, for ten acres developed, another ten, twenty, or more are compromised for future farming. It is likely that the shadow conversion phenomenon applies to timber harvesting as well. Experienced foresters in the Northeast suggest that the "conversion ratio" could far exceed what it seems to be for farming. If this is so, it would be realistic to expect that the entire 700,000 acres or so of "timberland" in the Urban/Suburban corridor, is already or soon will be, effectively removed from ongoing active management. This is exactly what the Wear, et al. and Conn analyses suggest (see discussion in chapter 9), when they show that population density is a proxy for availability, in the sense of probability of harvesting.

"Development" itself is not the only concern for long-term timber availability.

Fragmentation of parcels is ongoing and affects a far larger acreage than does development. Because of the age structure of the population of forest owners, a large share of the land turns over in ownership every 25-30 years. There is now debate over whether this turnover leads to ultimate availability of the timber for harvesting, or whether that has changed. Surely, as land prices continue to escalate, remaining parcels will be increasingly fragmented and used for green backdrops of one kind or another. These lands will quickly become too small to realistically engage professional management. They will produce wood episodically, when salvage is needed, or at times when patches are cleared for development.

Parts of the U.S. are experiencing a real estate market bubble at the present time, fueled among other things by historically low mortgage rates. The Washington and Baltimore metro areas have experienced housing price inflation at levels leading the nation in the past year or so. Housing prices have risen far faster than have incomes. The spread of development pressure outward is driven as much by the unaffordable prices within the metro areas as by any other factor. Discussions with Realtors repeatedly confirm this. Given this unusual market situation, we are not able to say whether the recent trends observed in our case studies can be expected to continue. We would be reluctant to assert that the last decade's trends in land consumption can continue for very long, fueled as they have been by unsustainable factors. Zoning rules may continue to stimulate use of excessively large lots, offsetting other pressures for more efficient use of land (see, e.g., Whoriskey, 2003). This leaves us in some difficulty for judging the long-term likely outlook for future forestland conversion.

Within the Corridor, there are many examples of multiunit construction in suburban areas, reflecting the high cost of land even at distances from city limits. Even this modest trend toward more efficient use of land has to be seen as a plus from the standpoint of efforts to retain some semblance of working landscape beyond the subdivision's fences. Unfortunately, this is the region where parcelization and shadow conversion affects are already eliminating forest management.

PART TWO. MARYLAND'S TIMBER-BASED ECONOMY

Overview: Timber-Based Economy Section

- 4. Economic Trends and Competitive Trends in Maryland's Forest Products Industry**
- 5. Maryland's Primary Wood Fiber Balance**
- 6. Maryland Wood Consumption Balance for End Products**

OVERVIEW: TIMBER-BASED ECONOMY SECTION

This section summarizes this part of the report (chapters 4,5, and 6). It is organized around the basic questions our project was designed to answer. The analysis in this section relies heavily on existing published data, interviews, and our own professional experience and judgment. Within the budget and schedule, quantitative modeling, numerical predictions, extensive mill canvasses for primary data were not feasible

1. Dependence on Maryland – Produced Wood

This question can be asked at three levels:

- (a) primary log/residue level
- (b) lumber, panel, and intermediate product level,
- (c) consumer end product level

(a) Log and Residue Level

On the basis of our analysis of woodflows in Maryland we find that 2.2 million tons of industrial roundwood are harvested annually in Maryland, about 2/3 hardwood. About 1.6 million tons of Maryland-produced primary wood fiber are used by primary industries within the State. More than 2/3 of the Maryland fiber is used by lumber mills, 25% by the pulp mill inside and outside of the State. Maryland has substantial cross border movements of wood, heavily influenced by MeadWestvaco's Luke pulp and paper mill which obtains the bulk of its wood out-of-state due to its location. Three other pulp and papermills in Virginia and Pennsylvania also obtain wood in Maryland. In total, Maryland is actually a net importer of fiber.

There is a complex web of interrelationships between industries. Wood flows both ways between states, markets are regional within the State, and there are dramatic differences between industries. So it is not possible to say with any certainty exactly how many jobs depend solely upon Maryland forests. We do estimate a range in the next chapter. Further, if we knew this figure on an average basis, small changes in availability could have effects out of proportion to their size. First, primary mills may be unable to adapt to even small changes and may not be able to operate at all with inadequate or unreliable wood supplies. Second, the delivered cost of wood increases with distance, so loss of nearby supplies is significant. A small reduction in wood availability within Maryland could cause a proportionately larger impact on local primary wood products employment, and would then further increase the State's reliance on wood products from elsewhere. Increased parcelization of the forest is reducing supply, raising wood cost, and challenging the logging sector in particular.

(b) Lumber, Panel and Intermediate Products

Much of the wood used by the State's so- called "secondary processors" comes from other places. There are several reasons. First, many of these operations need dry lumber and many Maryland sawmills are too small for kiln drying. Also, mills producing items such as Oriented strandboard, engineered structural products, and particleboard do

not exist in Maryland. In addition, the species needed by many users (e.g., spruce-fir for construction lumber; aspen for OSB) do not grow in Maryland. Our own brief survey did not yield a numerical result.

(c) Consumption Balance for End Products

According to estimates based on national average per capita consumption of wood products and its year 2000 population, we estimate that Maryland consumers use products equivalent to roughly 5 million cords of wood a year. This amount is almost 5 times the current annual removals from the State's forests. Each and every year, Maryland consumers rely for their wood needs on about 7.4 million acres of forests outside of the state. Another way of saying this is that Maryland is about 20% self-sufficient for its retail wood consumption needs. There is no reason to think Maryland should be 100% self-sufficient, but its overall situation for end products is an important part of the economic context.

2. Estimate In-Out Trade Balance in Primary Wood Items

In our woodflow analysis we estimated the State's in-out balance. We find that 35% of the in-state harvest is transferred out-of-state or exported, while the State's own industry is 52% dependent on fiber brought in from elsewhere, largely due to the large wood usage at Luke. Net import dependence is 38%. The overall average must be seen in light of the State's geography.

3. Trends and Outlook for Competitive Position of Maryland Industry

- a. No one general statement will supply an answer to this question for the industry as a whole. From 1980 to 1997, Maryland's pulpwood production rose faster than the nation. Because of its location relative to timber supply, however, Maryland's paper industry has fallen behind relative to the nation over the years; it is essentially impossible to predict the competitive outlook for a single mill.
- b. According to Census data, Maryland's lumber production and employment have actually increased somewhat relative to the nation as a whole, responding to strong demands and prices. In the last few years, however, output and demands for hardwood have declined somewhat in line with national trends. Nationally, sawmill numbers have been declining and will continue doing so; this can be expected in Maryland and in nearby areas as well. Surviving mills often modernize and enable total production to be sustained. Trends in mill number alone are not a reliable indication of competitive position.
- c. Production data for the numerous secondary products at a state level do not exist, but on the basis of a shift share analysis, Maryland furniture and wood products producers gained share relative to US manufacturing as a whole from 1988 to 1998. Secondary products producers are urban-oriented and have the advantage of a large high-income market in the DC-Baltimore-Philadelphia areas. In the future, though, furniture makers will come under increasing pressure from imports, especially from China. There are numerous challenges, as indicated in a recent summary prepared in Pennsylvania (Fletcher, 2001).

4. Role of Maryland Produced Wood in Competitive Outlook

The answer to this question varies by the degree of dependence of a particular firm or industry on locally produced wood. It also varies by the proportion of end product cost that consists of logs or wood fiber. In sawmilling and related primary industries, such as pallet plants that saw their own lumber, or bark mulch plants, primary fiber is a high proportion of total cost. In some other businesses, the proportion of cost due to fiber is much lower.

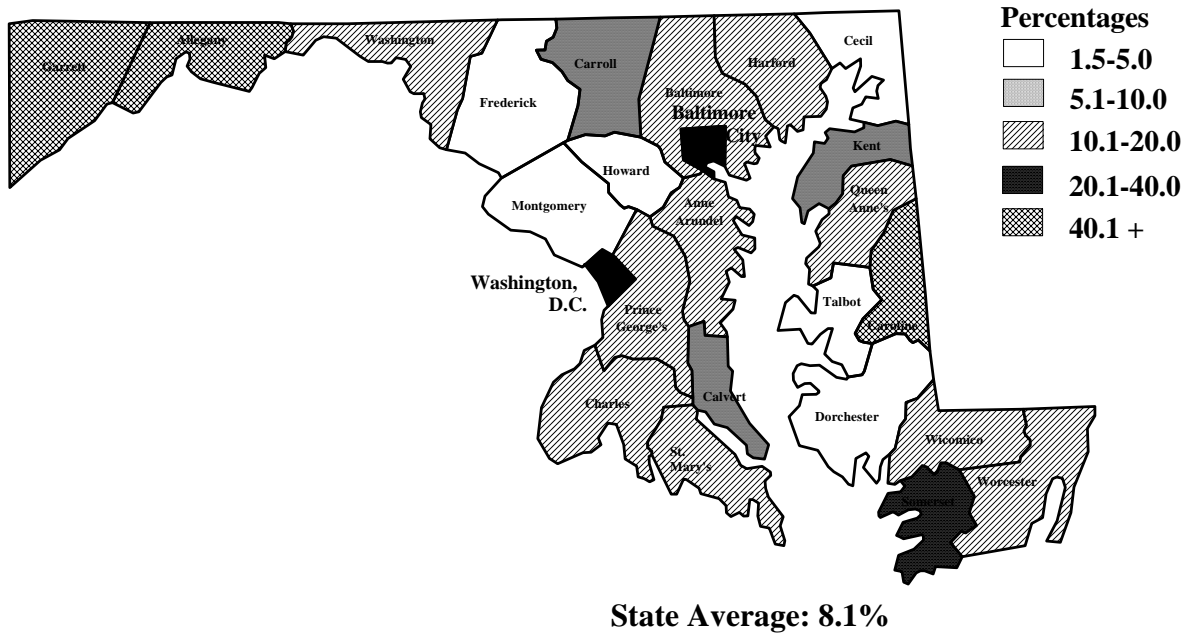
In addition to cost, there is the question of reliability of supply and quality. Many Maryland primary firms would be highly sensitive to further increases in the delivered cost, reliability of supply, or reductions in quality of their raw material supplies from the State's forests. Continued land use conversion and parcel fragmentation are likely to drive up delivered wood costs over coming years, as we argue below (Chs. 9 and 10). At the other end of the spectrum, some Maryland secondary wood products firms do not source within Maryland and would be unaffected.

5. Economy and Employment

- a. Maryland's economy and employment are heavily service and government driven. Manufacturing accounts for just 6% of total employment. Forest products (i.e. wood, paper and furniture manufacturing) accounts for about 9% of manufacturing employment statewide, but exceeds the statewide average in eight counties (Fig. 10).
- b. Manufacturing employment in Maryland has declined in numbers of jobholders and by more than national trends might suggest. Employment in Maryland's forest products sector has also declined, mainly because of contraction in the paper and allied products component. Employment in lumber and furniture manufacturing has remained stable or increased over the past decade, but not enough to offset the loss of jobs in paper and allied products. In the past three years, employment in the lumber industry actually declined once again.
- c. Because the share of the State's manufacturing employment in lumber and furniture manufacturing has increased, the importance of solid wood products in Maryland's manufacturing economy has also increased.
- d. Average annual earnings in Maryland's forest products industry in aggregate were about \$35,000 in 2001, below the average for all manufacturing, but significantly above those for many service sectors.
- e. Forestry, wood products and paper products constitute a basic industry in at least 7 counties, meaning that the industry's share of total employment in those counties exceeds national averages (Fig. 10). Approximately 2,500 jobs depend directly and heavily on Maryland wood (Table 18, Section 4, below). In total, an estimated 5,000 jobs can be said to depend on Maryland wood.

Figure 10

Maryland Forest Products Employment as a Percent of All Manufacturing, 2000



Source: Table 22.

- f. Locational forces have shifted the secondary wood-using industry over the century. Due to dependence on raw material transport, small firm size, and a need to be close to markets, in 1916 about 2/3 of the entire volume of wood used in secondary plants was used in Baltimore County alone. The other prominent centers were Hagerstown and Salisbury (Besley and Dorrance, 1919). At that time, there was little secondary manufacturing west of Hagerstown, despite the extensive forests and numerous sawmills there.

4. EMPLOYMENT TRENDS AND COMPETITIVE TRENDS IN MARYLAND'S FOREST PRODUCTS INDUSTRY

BACKGROUND

The purpose of this part of the project is to examine current employment and income characteristics of the State's forest products industry and provide some indication of how the sector has fared over time when compared to national measures and to manufacturing in the State in general. The analysis is based on several sources of data including Maryland Department of Labor, Licensing and Regulation (DLLR) employment and wages data, and Minnesota IMPLAN aggregated employment and earnings data.¹ We calculate employment dependency indices for the forest products sector by county and use a shift-share analysis to characterize the employment gains and losses relative to overall national and state trends.

This section adopts a convention often used but left unmentioned in similar studies. We do not know the "woodflow" balance, or the extent to which paper converters, cabinet shops, and furniture plants are using wood products from out-of-state. The import of wood by these sectors is undoubtedly large, but is impossible to document without a costly and time-consuming study. *For this reason, the jobs documented in this section are not all supported by Maryland forests.* To analyze the State's competitive position, however, we must analyze the whole industry. A rough estimate of jobs on Maryland wood only is ventured below.

CHARACTERISTICS OF MARYLAND'S FOREST PRODUCTS SECTOR

Maryland's forest products industry consists of forestry services, logging companies, approximately 40 full-time sawmills, numerous part-time sawmills, one major pulp mill, several paper converting plants, and two dozen or so pallet/container and miscellaneous wood product mills. The industry is also represented by makers of wood cabinets and other furniture. We estimate lumber production totaled about 288 million board feet in 2001, an estimate that is 10% higher than the Census Bureau reported for the same year. Because of incomplete mill lists and underreporting, we believe the Census Bureau underestimates lumber production in the State but provides useful trend information (Table 14). Over 60% of the lumber production is hardwood. Maryland doesn't possess any major panel (plywood, OSB, composite board) producing plants.

In assessing a state's competitive position, one straightforward approach is to see how its level of production compares with the nation. If a state's production is growing relative to the nation, it can be said that its competitive position is improving, and the opposite could be true. Such a comparison does not necessarily indicate the causes of the observed trends, but it is a commonly used diagnostic. In principle, it would be possible to compare a state to its immediate neighbors as well. For Maryland, this is not particularly useful, however. Pennsylvania is the

¹ Census Bureau Annual Survey of Manufactures and Census of Manufactures, Geographic Area Statistics; Minnesota IMPLAN county employment and earnings statistics for 1988, 1994 and 1998, courtesy of the American Forest & Paper Association; and Maryland Department of Labor, Licensing and Regulation, Office of Labor Market Analysis and Information, Industry Series 1988 through 2001.

nation's largest hardwood lumber producer, and its forest conditions are quite different. Delaware and New Jersey have sparse forest cover and minimally developed wood-based industries. Virginia has a large forest resources and large, diverse wood products sector, but its forest types and economic conditions are so different from Maryland's that comparisons would be of limited value.

From the early 1980's to 1999, Maryland and Delaware together gained share of national lumber production. For that time period, then, Maryland did not exhibit competitive weakness at all when production share is the standard. The production data have weaknesses, but they do not support a picture of a dying industry.

Table 14
Maryland Lumber Production

	(Million Board Feet)		
	<u>Softwood</u>	<u>Hardwood</u>	<u>Total</u>
1993	73	169	242
1994	80	163	243
1995	83	161	244
1996	82	158	240
1997	87	163	250
1998	94	177	271
1999	107	196	303
2000	109	184	293
2001	103	158	261

Source: U.S. Census Bureau Current Industrial Reports

Demand for lumber and other solid wood products tends to be closely correlated with construction, particularly housing and remodeling. Some sectors, such as pallets and furniture, are not as dependent on construction activity but depend on the overall strength of the economy. Paper demand also tracks overall economic growth. All forest products sectors have become increasingly trade sensitive so that changes in international demand, exchange rates or product flows affect the performance of the domestic industry. Over the past few years, softwood lumber demand has benefited from an historically high level of housing and other construction.

Nationally, U.S. softwood lumber consumption has reached record levels of 54 billion board feet each year since 1999. Unfortunately, imports have increased competition and have resulted in softer prices for U.S. producers despite the higher demand. At least one Maryland softwood mill closed last year, although production by remaining mills has increased since the early 1990s.² Weak domestic markets and the high value of the U.S. dollar have adversely affected hardwood lumber markets more recently. U.S. hardwood lumber production and consumption is down an estimated 25 - 30% from the mid 1990s. Hardwood exports have

² Spicer Inc. Lumber Company in Dorchester County closed in 2001.

declined and furniture manufacturing that is shifting overseas has weakened domestic demand for hardwood lumber.

Generally, capacity in the U.S. pulp and paper industry since the late 1990s has undergone a period of stagnation, even contraction, harmed by slow domestic economic growth, high imports and lower exports. More rigorous and costly environmental regulation has also led to mill or paper machine closures in many parts of the country. In the South, the largest pulp and paper producing region, pulpwood production declined by nearly 13% between 1998 and 2000.³ While Maryland's forest resources help support pulp mills in other states, the State's only integrated pulp and paper mill – MeadWestvaco -- has undergone a number of changes over the past several years in response to market conditions. The plant has shut two of five paper machines, one in 1999 and another in 2002. Other paper and paperboard producers and converters in the State have also closed.⁴ Lower paper industry employment figures reflect these curtailments.

Paper production data is not available for Maryland. Unfortunately, the U.S. Forest Service's Northeastern Research Station Pulpwood Survey was not conducted after 1997. From 1980 to 1997, Maryland pulpwood production from Roundwood increased by 35% (Table 15). Total pulpwood production increased 18.6% over these years, compared to a national change of only 4%. This comparison does not suggest a dramatic competitive disadvantage over that time period. But since 1995, U.S. pulpwood production has declined significantly, and the recent weakness in paper markets makes interpreting trends difficult. The Station hopes to resume the Pulpwood Survey in 2002; when results are available it will permit a better updating of the State's competitive trend for pulpwood. In 1997, nine Maryland counties produced above 5,000 cords of pulpwood, and the State's pulpwood "harvesting intensity" compared favorably with adjacent states (Fig. 11).

Table 15
Maryland Pulpwood Production
All Species (M Cords)

	<u>Roundwood</u>	<u>Residues</u>	<u>All Sources</u>	<u>Residues % of All</u>	<u>Memo: US Pulpwood Production*</u>
1980	147	133	280	47.5%	84.0
1990	178	120	298	40.3%	93.9
1997	199	132	332	39.8%	87.4
% Ch. 80-97	+35.4%	-0.8%	+18.6%		+4.0%

* Million cords. Includes residuals.

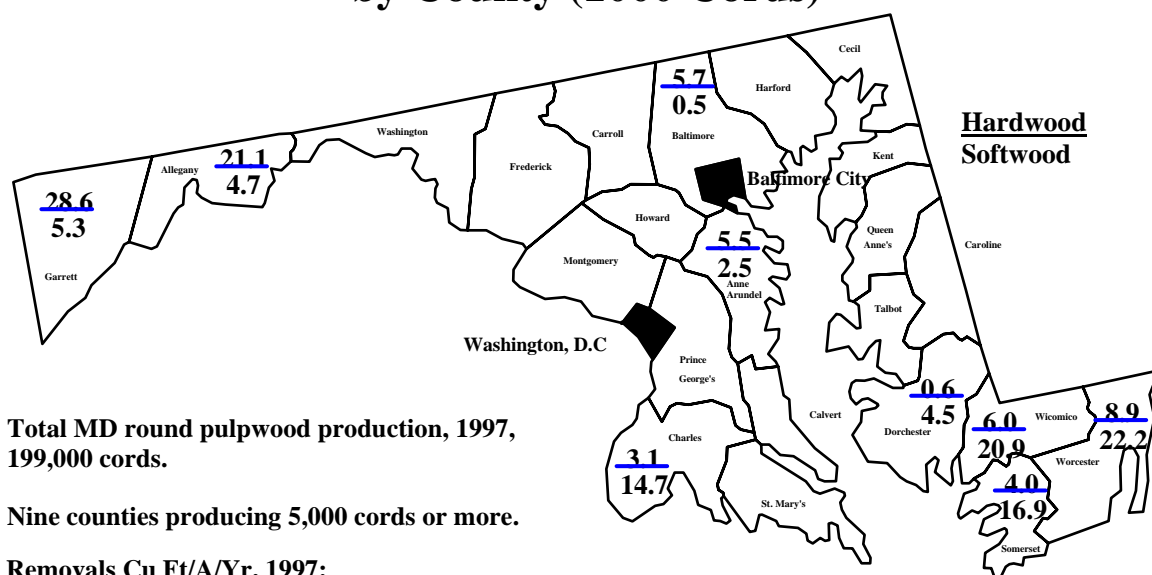
Source: US Forest Service Pulpwood Bulletins; and J. L. Howard, FPL-RP-595, 2001.

³ See Johnson and Steppleton

⁴ Caraustar's Chesapeake Paperboard plant in Baltimore is currently idle, as is a Hagerstown deinked market pulp mill owned by Belcorp.

Figure 11

Maryland 1997 Round Pulpwood Production by County (1000 Cords)



Removals Cu Ft/A/Yr, 1997:

Maine	17.50	Delaware	6.71
Pennsylvania	4.33	West Virginia	1.89
Massachusetts	0.51	Virginia	16.00
Maryland	6.99		

Source: RBNE-144, p. 113

MARYLAND'S CURRENT FOREST PRODUCTS EMPLOYMENT SITUATION

In 2001, Maryland DLLR reported slightly more than 2.4 million jobholders in the State, earning approximately \$92.6 billion.⁵ The average jobholder earned a little over \$38 thousand.

⁵ Maryland Department of Labor, Licensing and Regulation (DLLR) employment and earnings represent approximately 93% of total civilian employment. DLLR data exclude self-employed individuals and sole proprietorships.

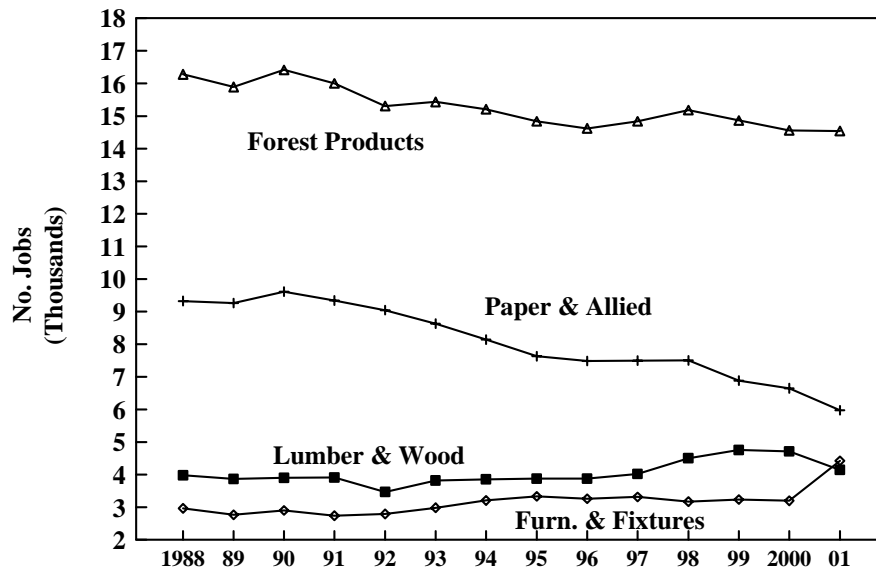
Services account for about two-thirds (67%) of all jobs and government accounts for another 18%. Moreover, because of Maryland's proximity to Washington, D.C., many service jobs are also in direct support of government activity. About 9% of Maryland jobs are in the natural resources, mining and construction sectors. Manufacturing accounts for just 6% of total employment (168,360 jobs). Manufacturing's share of Maryland's total employment has been gradually declining, to below 7% in 2001 (Table 16; Fig. 12).

Table 16
Maryland Employment and Earnings

Employment (# of Jobs)											
	Total Employment	Gov't	Services, Trade and Other	Services & Gov't % of Total	All Mfg	Mfg As % of Total Employment	Lbr & Wood Products	Paper & Allied Products	Furniture & Fixtures	Forest Products	Forest Products % of Mfg
1988	2,072,139	379,539	1,483,240	89.9%	209,360	10.1%	3,983	9,328	2,967	16,278	7.8%
1989	2,121,112	388,322	1,525,848	90.2%	206,942	9.8%	3,866	9,257	2,769	15,892	7.7%
1990	2,138,310	400,698	1,532,338	90.4%	205,274	9.6%	3,901	9,614	2,901	16,416	8.0%
1991	2,059,924	397,253	1,469,983	90.6%	192,688	9.4%	3,910	9,344	2,743	15,997	8.3%
1992	2,041,720	394,232	1,464,375	91.0%	183,113	9.0%	3,469	9,044	2,791	15,304	8.4%
1993	2,066,769	398,579	1,488,711	91.3%	179,479	8.7%	3,822	8,630	2,980	15,432	8.6%
1994	2,107,848	401,870	1,527,088	91.5%	178,890	8.5%	3,854	8,146	3,206	15,206	8.5%
1995	2,145,713	407,332	1,562,591	91.8%	175,790	8.2%	3,875	7,632	3,333	14,840	8.4%
1996	2,175,037	408,078	1,592,731	92.0%	174,228	8.0%	3,874	7,487	3,260	14,621	8.4%
1997	2,231,497	409,488	1,645,287	92.1%	176,722	7.9%	4,022	7,496	3,319	14,837	8.4%
1998	2,286,232	419,285	1,688,897	92.2%	178,050	7.8%	4,502	7,508	3,171	15,181	8.5%
1999	2,346,705	425,453	1,744,580	92.5%	176,672	7.5%	4,755	6,879	3,230	14,864	8.4%
2000	2,405,883	432,154	1,793,558	92.5%	180,171	7.5%	4,715	6,651	3,194	14,560	8.1%
2001	2,423,138	442,952	1,811,826	93.1%	168,360	6.9%	4,145	5,974	4,422	14,541	8.6%
Earnings (\$000)											
1988	46,507,258	9,972,198	30,874,133	87.8%	5,660,927	12.2%	76,120	237,371	59,519	373,009	6.6%
1989	49,809,966	10,808,040	32,977,896	87.9%	6,024,030	12.1%	75,934	241,424	58,392	375,750	6.2%
1990	52,879,851	11,743,093	34,882,009	88.2%	6,254,749	11.8%	80,027	261,020	64,230	405,276	6.5%
1991	53,477,895	12,452,968	34,888,587	88.5%	6,136,340	11.5%	85,442	263,225	62,038	410,705	6.7%
1992	55,408,422	12,634,590	36,652,065	89.0%	6,121,767	11.0%	78,896	270,715	67,132	416,743	6.8%
1993	57,211,990	13,127,584	38,002,575	89.4%	6,081,830	10.6%	87,546	260,339	72,616	420,501	6.9%
1994	59,891,203	13,683,788	39,869,951	89.4%	6,337,464	10.6%	88,817	253,296	79,053	421,165	6.6%
1995	62,526,988	14,162,240	41,913,634	89.7%	6,451,114	10.3%	92,426	251,921	81,987	426,334	6.6%
1996	65,851,245	14,710,223	44,511,771	89.9%	6,629,251	10.1%	94,056	263,580	84,847	442,483	6.7%
1997	70,840,890	15,350,237	48,477,253	90.1%	7,013,401	9.9%	99,752	279,107	92,533	471,392	6.7%
1998	76,091,502	16,243,556	52,423,649	90.2%	7,424,298	9.8%	118,133	282,059	88,617	488,809	6.6%
1999	80,910,267	16,572,934	56,711,569	90.6%	7,625,764	9.4%	126,563	260,681	92,814	480,058	6.3%
2000	87,566,975	17,464,603	61,827,141	90.5%	8,275,231	9.5%	133,972	265,466	95,934	495,372	6.0%
2001	92,614,109	19,277,655	65,400,628	91.4%	7,935,825	8.6%	126,578	243,660	138,580	508,817	6.4%
Source: Maryland Dept. of Labor, Licensing and Regulation											

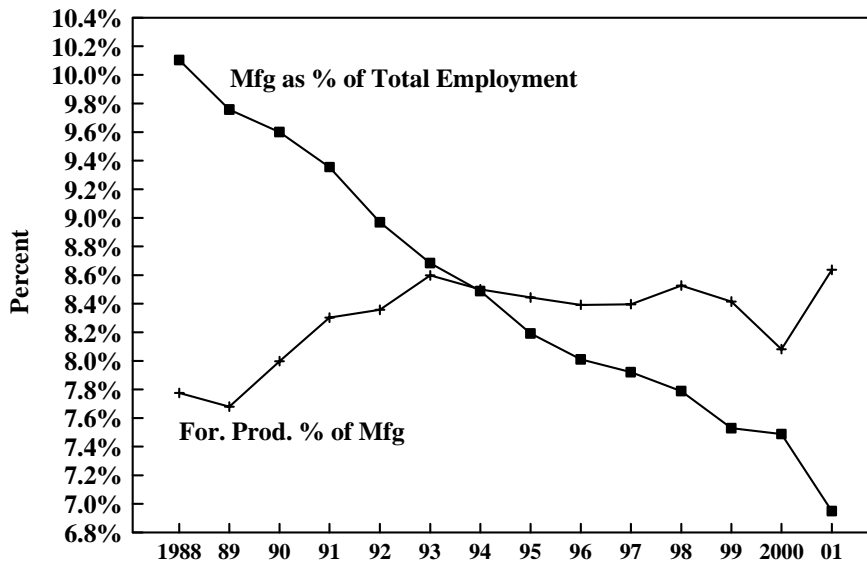
Figure 12

Employment



Source: MD Dept. of Labor.

Employment Shares



Source: MD Dept. of Labor.

The forestry and products sector – forestry services, lumber, and paper -- employs some 10,460 people directly, according to DLLR data (Table 16). Because of definitional differences and coverage of only payroll workers, these data vary somewhat from those estimated by Hilchey and Kay. The State data do not include sole proprietorships and self-employed persons.

Since furniture manufacture in the State is heavily wood-based, we have elected to include it in the aggregated figures for the sector. Furniture manufacturing employed 4,422 people in 2001, bringing the total for all forest products to 14,882.

DLLR statistics also indicate that average annual earnings in the forest products and furniture sectors were as follows: forestry services \$22,227, wood products \$30,537, paper and allied products \$40,787 and furniture and related \$31,339 or a total weighted-average of approximately \$35,000 (Table 17). Generally, these wages were below the average for all manufacturing (\$47,136) and, except for paper manufacturing, below the average for all private sector jobs (\$37,035). However, earnings in the forest products industry tend to be 40% to 60% higher than for food preparation and service related occupations typical of tourism and recreation that are often economically important in the same counties. These statistics also mask the economic importance of the forest products sector in some rural communities where forest products are major employers. DLLR (2001) lists individual wood or paper manufacturing companies as among the top ten employers in Allegany, Garrett, Queen Anne's and Somerset counties.

Table 17
Maryland Reported Employment, 2001

	Employment (# of Jobs)	Total Wages (\$)	Average Annual Wages (\$)
Forestry	341	7,579,572	22,227
Wood Products	4,145	126,577,544	30,537
Paper Products	5,974	243,659,599	40,787
Furniture & Related	4,422	138,579,965	31,339
	14,882	516,396,680	34,699
All Manufacturing	168,360	7,935,824,891	47,136
All Private Sector	1,980,186	73,336,453,139	37,035
Source: Maryland Dept. of Labor, Licensing and Regulation			
Data represent 91% of all civilian employment.			

HOW MANY JOBS RELY DIRECTLY ON MARYLAND LOG PRODUCTION?

This question cannot be answered authoritatively without a detailed industry-by-industry and firm-by-firm canvass to measure the total wood use picture. But, using County Business Patterns data, we can give a rough indication of the likely level of dependence on Maryland wood by industry sectors (Tables 18 and 19). This would be no more than 2,500, or some 10% of the total listed in Table 19. In summary, we find that a fraction of the jobs are moderately to highly dependent on Maryland-produced wood. About 10,000 wood-sector jobs probably depend very little on Maryland wood. Even within sectors, these general classifications undoubtedly mask considerable variation between firms.

Another method of estimating local jobs generated by the wood industry is used in the USDA Forest Service's economic analyses. The Forest Service factor for the Eastern Region (9) is 12 jobs per million bd. ft. processed. Based on our woodflow analysis, this would lead to an estimate of 5,000 jobs based on Maryland wood. This is something of a full-time equivalent concept, saying that a firm whose wood is 10% Maryland wood has 10% of its jobs based on local wood. There is no clear basis for preferring either view, so we may consider the range of 2,500 to 5,000 jobs a sensible estimate, depending on the user's purpose.

On the basis of this general assessment, it would not be possible to estimate how job levels would change with a given change in primary log production, since the relationships vary so much within the state, and since many firms would be able, at least in the short run, to adapt, at least to small changes.

This pattern has been well established for decades. When Besley and Dorrance (1919) documented Maryland's wood manufacturing sector as of 1916, they found that the State's wood-using industries used 345 million bd. ft. of lumber and wood. The leading species was southern pine – 242 million ft. But only 110 million was cut in the State. At that time, there were 1,168 establishments and more than 16,000 jobs in solid wood-using industries. By far the largest number of plants were in boxes and crates.

Table 18
Maryland Wood Sector Jobs by Estimated Degree of Dependence on Maryland Wood

<u>Estimated Dependence on MD Forest</u>	<u>No. of Employees</u>	<u>Payroll</u>	<u>No. of Establishments</u>
High	500-999	d	228
Moderate	1,517	37,136	62
Low	12,480	399,111	593
Nominal	6,627	200,658	197
Nil	4,022	119,701	76
Unknown	<u>0-19</u>	<u>d</u>	<u>2</u>
Total	24,646	756,606	928

d = Not disclosed due to confidentiality.

Source: U.S. Census Bureau, Maryland County Business Patterns, 2000; also see Table 19 below for details.

Table 19
Maryland Employees, Payroll and Establishments by Industry, 2000

NAICS Industry	No. of Employees	Payroll	No. of Establish.	Estimated Dependence on MD Forest
Total Total, All Nonagr. Employment	2,058,304	70,877,270	128,467	
11 Forestry, fishing, hunting, & agriculture support	f	d	228	High
113 Forestry and logging	e	d	69	
1131 Timber tract operations	a	d	4	
1132 Forest nurseries & gathering forest products	b	d	3	
1133 Logging	e	d	62	
1153 Forestry support activities	c	d	15	
321 Wood product mfg	4,388	126,017	148	
3211 Sawmills & wood preservation	1,064	27,741	44	
321113 Sawmills	933	23,922	39	Moderate
321114 Wood preservation	131	3,819	5	Low
3212 Veneer, plywood & engineered wood product mfg	1,081	38,108	19	
321211 Hardwood veneer & plywood mfg	a	d	2	Unknown
321214 Truss mfg	1,041	36,453	15	Low
321219 Reconstituted wood product mfg	b	d	2	Low
3219 Other wood product mfg	2,243	60,168	85	
32191 Millwork	1,121	29,102	41	Low
321911 Wood window & door mfg	361	10,504	13	Low
321912 Cut stock, resawing lumber & planing	321	6,851	8	Moderate
321918 Other millwork (including flooring)	439	11,747	20	Low
32192 Wood container & pallet mfg	263	6,363	15	Moderate
32199 All other wood product mfg	859	24,703	29	Low
321992 Prefabricated wood building mfg	658	19,669	7	Low
321999 All other miscellaneous wood product mfg	201	5,034	22	Low
322 Paper mfg	6,759	239,785	56	
3221 Pulp, paper & paperboard mills	1,903	90,859	6	Low
32212 Paper mills	g	d	4	
322121 Paper (except newsprint) mills	g	d	4	
32213 Paperboard mills	c	d	2	
322130 Paperboard mills	c	d	2	
3222 Converted paper product mfg	4,856	148,926	50	
32221 Paperboard container mfg	3,988	118,870	29	Nil
322211 Corrugated & solid fiber box mfg	g	d	21	Nil
322212 Folding paperboard box mfg	e	d	2	Nil
322213 Setup paperboard box mfg	b	d	3	Nil
322215 Nonfolding sanitary food container mfg	g	d	3	Nil
322222 Coated & laminated paper mfg	291	9,653	5	Nominal
32223 Stationery product mfg	440	15,736	9	Nominal
322231 Die-cut paper & paperboard office supply mfg	b	d	4	Nominal
322232 Envelope mfg	389	13,671	3	Nominal
322233 Stationery, tablet & related product mfg	b	d	2	Nominal
32229 Other converted paper product mfg	137	4,667	7	Nominal
322299 All other converted paper product mfg	137	4,667	7	

Table 19 (cont.)

NAICS Industry	No. of Employees	Payroll	No. of Establish.	Estimated Dependence on MD Forest
337 Furniture & related product mfg	4,210	122,837	233	
3371 HH & institutional furniture & kitchen cabinet mfg	2,009	56,305	167	Low
337110 Wood kitchen cabinet & countertop mfg	794	21,655	92	Low
33712 Household & institutional furniture mfg	1,215	34,650	75	Low
337121 Upholstered household furniture mfg	386	9,588	8	Low
337122 Nonupholstered wood household furniture mfg	497	13,781	48	Low
337124 Metal household furniture mfg	34	831	6	Nil
337125 Household furniture (exc wood & metal) mfg	a	d	2	Low
337127 Institutional furniture mfg	286	10,145	10	Low
337129 Wood TV, radio, sewing machine cabinet mfg	a	d	1	Low
33721 Office furniture (including fixtures) mfg	985	32,192	51	Nominal
337211 Wood office furniture mfg	175	5,101	8	Low
337212 Custom architectural woodwork & millwork mfg	332	13,107	18	Low
337214 Office furniture (except wood) mfg	72	2,889	4	Low
337215 Showcase, partition, shelving & locker mfg	406	11,095	21	Nominal
3379 Other furniture related product mfg	1,216	34,340	15	Nominal
33791 Mattress mfg	466	16,766	6	Nominal
337910 Mattress mfg	466	16,766	6	Nominal
33792 Blind & shade mfg	750	17,574	9	Nominal
337920 Blind & shade mfg	750	17,574	9	Nominal
Other Sectors				
33992 Sporting & athletic goods mfg	194	5,957	22	Nominal
339932 Game, toy & childrens vehicle mfg	e	d	10	Nominal
339992 Musical instrument mfg	c	d	7	Nominal
339994 Broom, brush & mop mfg	c	d	2	Nominal

Employment size class of numbers withheld to avoid disclosing data for individual companies

a	0-19
b	20-99
c	100-249
e	250-499
f	500-999
g	1000-2499

d = Not disclosed due to confidentiality restrictions

Source: U.S. Census Bureau, Maryland County Business Patterns, 2000.

Many of the wood-using firms are in small communities in rural areas. The State as a whole is clearly not the appropriate reference point for judging how "important" these jobs are. Even our estimated total of 14,882 jobs including furniture is tiny compared to nearly 2 million private sector jobs. Recognizing that only a fraction of these 14,882 jobs are based directly on Maryland-produced wood is helpful but does not change the importance of these jobs to their local communities. Further, Maryland wood supports jobs in communities in nearby states.

RELIANCE ON MARYLAND WOOD: QUICK PHONE SURVEY

This project was not designed or funded for a detailed inventory of wood usage by Maryland firms, we can find no detailed inventory since Besley and Dorrance's detailed 1919 report. But to gain a sense of the overall picture, we conducted an informal survey of 29 firms. These included sawmills, secondary plants, and pallet plants. Firm size ranged from 4 to 100, and they were from all across the State. We relied on the State's mill listing and a commercial industrial directory for listings. Since the sample was not random, and responses varied in detail, a full numerical summary would not be particularly useful. But the general picture that emerges tells us a few things.

Two out of seven sawmills interviewed were softwood mills. Both acquired most of their logs by buying stumpage. Several of the largest hardwood operations bought on a delivered basis, and some used brokers or bought wood roadside. Of six mills responding to the question, 5 bought 75% or more of their wood in Maryland, and one bought only 10%. Several sell high-grade logs to veneer mills or to export buyers.

Of the 14 secondary plants we interviewed, several cabinet and related operations buy little or no lumber, but mostly particleboard and plywood, which are not produced within Maryland. Those that do buy hardwoods needed dry lumber in virtually every case, and most Maryland mills sell only green lumber. Seven of these respondents did not know the State of origin of the lumber they use, which is not surprising. Seven respondents did buy lumber direct, some of them a large proportion of their needs. Most respondents needing lumber said they would be glad to buy from within Maryland if quality, species, service, and price were suitable.

We also interviewed a sample of eight pallet plants. These ranged in size from 10 employees to 100 employees. Half of them were in the business of pallet recycling or repair to at least some extent. These firms, then, are closing a materials loop relying on a product entering Maryland from far-flung locations. Several of the plants bought a portion of their lumber or parts from suppliers within Maryland.

We would think the State would wish to have a much more detailed picture of this situation. A detailed survey detailing these wood use flows and interrelationships should be considered. Such a survey would provide a rich picture of the State's woodflow balance, and would undoubtedly turn up numerous opportunities for business development for small Maryland suppliers.

ECONOMIC IMPORTANCE OF THE FOREST PRODUCTS SECTOR BY COUNTY

County Employment and Earnings

The DLLR employment and earnings data show that the forest products sector has a presence in virtually every Maryland County and is particularly important in certain counties

(Tables 20 and 21).⁶ Forest Products comprise over 40% of manufacturing employment in Allegany, Garrett, and Caroline counties, and 10% or more in another five counties (Somerset, Carroll, Calvert, Kent and Wicomico). Over 10% of manufacturing earnings in 7 counties is contributed from forest products, including as much as 57% in Allegany County.

Table 20
Maryland Manufacturing and Forest Products Employment 2000

Number of Jobs						
<u>County</u>	<u>Manufacturing</u>	<u>Lbr & Wood Products</u>	<u>Furniture & Fixtures</u>	<u>Paper & Allied Products</u>	<u>Forest Products</u>	<u>Forest Products % of Manuf</u>
Allegany	4,255	66	461	1,315	1,842	43.3%
Caroline	1,836	87	30	667	784	42.7%
Garrett	1,131	452	5		457	40.4%
Somerset	415	85			85	20.5%
Carroll	5,447	763	20	55	838	15.4%
Calvert	977	55	70		125	12.8%
Kent	956	40		81	121	12.7%
Baltimore City	27,606	271	382	2,192	2,845	10.3%
Wicomico	6,839	487	77	95	659	9.6%
Washington	10,706	314	364	279	957	8.9%
Queen Anne's	1,028	56	26		82	8.0%
Baltimore	33,995	267	794	1,282	2,343	6.9%
Prince George's	13,481	292	414	100	806	6.0%
Charles	1,405	83	0		83	5.9%
Harford	5,195	269	9		278	5.4%
Worcester	1,931	100	2		102	5.3%
St Mary's	733	38			38	5.2%
Anne Arundel	15,378	218	230	345	793	5.2%
Dorchester	3,618	75	33	69	177	4.9%
Howard	8,222	75	194	12	281	3.4%
Frederick	7,705	208	21	2	231	3.0%
Talbot	2,654	74			74	2.8%
Montgomery	20,220	279	53	153	485	2.4%
Cecil	3,784	50	5		55	1.5%
Non Distributed	555	11	3	3	17	3.1%
State Total	180,072	4,715	3,193	6,650	14,558	8.1%
Source: Maryland Dept. of Labor, Licensing & Regulation						

⁶ The most recent DLLR detailed county industry sector employment covers the year 2000.

Table 21
Maryland Manufacturing and Forest Products Earnings 2000

Total Earnings								Average Earnings
County	Manufacturing	Lbr & Wood Products	Furniture & Fixtures	Paper & Allied Products	Forest Products	Forest Products % of Manuf	Manuf	Forest Products
Allegany	145,731,818	1,400,929	72,168,139	9,606,430	83,175,498	57.1%	\$34,250	\$45,155
Caroline	48,453,305	2,047,007	18,446,497	704,130	21,197,634	43.7%	\$26,391	\$27,038
Garrett	26,872,401	10,070,324		207,791	10,278,115	38.2%	\$23,760	\$22,490
Somerset	7,014,627	2,153,466			2,153,466	30.7%	\$16,903	\$25,335
Carroll	202,343,603	22,962,037	1,800,248	280,871	25,043,156	12.4%	\$37,148	\$29,884
Calvert	32,434,673	1,781,282		2,644,238	4,425,520	13.6%	\$33,198	\$35,404
Kent	30,497,132	1,019,334	3,290,640		4,309,974	14.1%	\$31,901	\$35,620
Baltimore City	1,204,781,159	6,943,910	80,199,384	11,174,449	98,317,743	8.2%	\$43,642	\$34,558
Wicomico	237,634,156	12,568,840	3,509,054	1,880,299	17,958,193	7.6%	\$34,747	\$27,251
Washington	388,763,138	7,871,226	8,223,213	10,665,552	26,759,991	6.9%	\$36,313	\$27,962
Queen Anne's	30,989,697	1,673,598		773,964	2,447,562	7.9%	\$30,146	\$29,848
Baltimore	1,658,727,746	7,825,981	48,232,323	26,892,939	82,951,243	5.0%	\$48,793	\$35,404
Prince George's	635,935,898	10,935,899	4,451,442	12,448,862	27,836,203	4.4%	\$47,173	\$34,536
Charles	49,422,830	1,873,680		0	1,873,680	3.8%	\$35,176	\$22,574
Harford	188,974,517	7,898,592		244,636	8,143,228	4.3%	\$36,376	\$29,292
Worcester	44,696,940	2,368,364		48,000	2,416,364	5.4%	\$23,147	\$23,690
St. Mary's	23,263,327	747,550			747,550	3.2%	\$31,737	\$19,672
Anne Arundel	894,029,793	3,243,613	14,219,632	8,175,554	25,638,799	2.9%	\$58,137	\$32,331
Dorchester	120,546,170	7,013,567	2,583,431	685,093	10,282,091	8.5%	\$33,318	\$58,091
Howard	352,221,414	2,132,996	422,674	6,758,763	9,314,433	2.6%	\$42,839	\$33,147
Frederick	313,323,893	5,766,762	60,919	525,771	6,353,452	2.0%	\$40,665	\$27,504
Talbot	84,282,216	2,184,593			2,184,593	2.6%	\$31,757	\$29,522
Montgomery	1,338,437,820	10,065,929	7,510,111	1,968,236	19,544,276	1.5%	\$66,194	\$40,297
Cecil	172,376,482	1,119,516		117,770	1,237,286	0.7%	\$45,554	\$22,496
Non Distributed	35,764,262	303,415	210,218	85,141	598,774	1.7%	\$64,440	\$35,222
State Total	8,267,519,017	133,972,410	265,327,925	95,888,489	495,188,824	6.0%	\$45,912	\$34,015
Source: Maryland Dept. of Labor, Licensing & Regulation								

A significant portion of the State lies in metropolitan statistical areas (MSA). Not surprisingly, therefore, a large share of the forest industry jobs is located in metropolitan areas. About two-thirds of wood and paper manufacturing jobs are located in the metropolitan areas defined by Baltimore and Washington, D.C. These are virtually all converting and secondary operations using little or no roundwood.

Dependency Indices

Forest products typically form part of the “base” economy of a community since the sector produces goods and services that are exported out of the local area (Ben-David, 1991; Schallau, 1997). By exporting goods and services, firms bring new dollars into the community and thus contribute to its economic growth. Base industries support other economic activity such

as retail stores, restaurants, banking, etc. When a basic industry closes, the economic impact extends beyond the plant itself to those other enterprises. For example, when a manufacturing business shuts down in a community, the local drugstore might follow suit. If the drug store closes, however, the manufacturer is not likely to be affected (perhaps workers will be inconvenienced) but the business will continue.

The economic dependence of a community on a specific industry sector can be calculated using an “excess employment” technique. This approach uses the national distribution of employment and income as a norm. Local industries with income and employment in excess of this norm are considered to be exporting goods elsewhere and thus form part of the area’s economic base. The excess employment calculations for the State as a whole reaffirm the standout role of services and government and, to a lesser extent, construction as basic sectors (Table 22). On a statewide average, all manufacturing sectors, including forest products, fail the excess employment test. However, when this technique is applied to each Maryland county, one or more components of the forest products sector constitute a “basic” industry in 15 counties. Results will vary depending on how broadly the sector is defined. Forest products including furniture make up basic industries in five counties. A grouping of forestry, wood products and paper products constitute a “basic” industry in seven counties. In Allegany County, 38% of the county’s base economy is dependent on the sector (Fig. 13). Other counties with excess employment in the forest products sector are Caroline, Carroll, Garrett, Queen Anne’s, Somerset and Wicomico (Table 23). These counties would stand lose or gain the most from changes affecting the forest products industry. Table 24 displays dependency indices calculated for all sectors by county.

Multiplier Analysis

In a 1999 study, Duncan Hilchey and David Kay (n.d.) of Cornell University analyzed the economic importance of the Maryland forest products industry in some detail. They divided the State into four regions and used an IMPLAN model to calculate employment and output multipliers for the primary and secondary wood manufacturing industry in each region and in the State as a whole. They concluded that the forest-based industry supported nearly 14,000 jobs and \$2 billion in value added economic activity in 1996. The authors further noted that a relatively small change in industry output would have a significant impact on the State's overall economy because forest products is an important basic industry. As a basic industry, the impact of local or sector changes induces economic activity in other industries. The study concluded that a 10% change in primary wood manufacturing output would result in a \$156 million loss in the value of goods and services statewide.⁷ They did not analyze industry dependence on Maryland-produced wood.

Hilchey and Kay’s IMPLAN analysis calculated the following multipliers:

Employment	3.05
------------	------

⁷ A more complex model was developed to support the Mid-Atlantic Regional Assessment (MARA) of the National Climate Change Assessment. This was a 51-Sector Computable General Equilibrium (CGE) model implemented for the full region (MARA, 2000, App. F). Maryland details and multipliers were not presented in the regional report.

Output	2.04
Value Added	2.77

These multipliers show that total change in each economic variable that accompanies a one-unit change in employment, output, or value added in the wood products sector. In other words, if a single job is lost in the wood products sector – for whatever reason – the equivalent of three jobs will be lost in the Maryland economy (the wood products job plus 2.05 elsewhere). The “equivalent” is important, as it is not certain that three identifiable jobs will immediately vanish due to the small size of many wood-using firms.

Table 22
Maryland Employment Dependency Indices¹

Other Services		44.7%
Government		39.8%
Construction		9.4%
Fin, Ins, Real Estate		6.2%
Farm & Ag Services		*
Forestry		*
Mining		*
Paper & Allied Products		*
Lumber & Wood Products		*
Furniture & Fixtures		*
Other Manufacture		*
Transp & Public Utilities		*
Construction		*

¹ Sector Excess Employment as Percentage of State Excess Employment

*Excess employment is less than national average.

Table 23
Maryland Counties Where Forest Products Constitute Basic Employment

As % of Basic Employment						
	<u>Forestry</u>	<u>Lumber</u>	<u>Paper</u>	<u>Furniture</u>	Forestry, Lumber & <u>Paper</u>	Forest Products (incl. Furniture)
Allegany			41.9%		37.7%	34.3%
Baltimore			1.6%			
Calvert				1.3%		
Caroline	0.1%		21.3%	0.7%	20.4%	21.1%
Carroll	1.0%	7.5%			7.7%	4.8%
Charles	0.3%					
Dorchester		0.2%				
Frederick	0.5%					
Garrett	0.3%	21.0%				14.7%
Harford	0.1%				17.7%	
Queen Anne's		4.1%			1.6%	
Somerset	0.4%	2.4%			1.2%	
Washington				1.7%		
Wicomico	1.7%	8.0%		0.6%	9.0%	9.6%
Worcester	0.7%					
Source: Calculated Using Excess Employment Methodology						

Table 24
Maryland Employment Dependency Indices¹

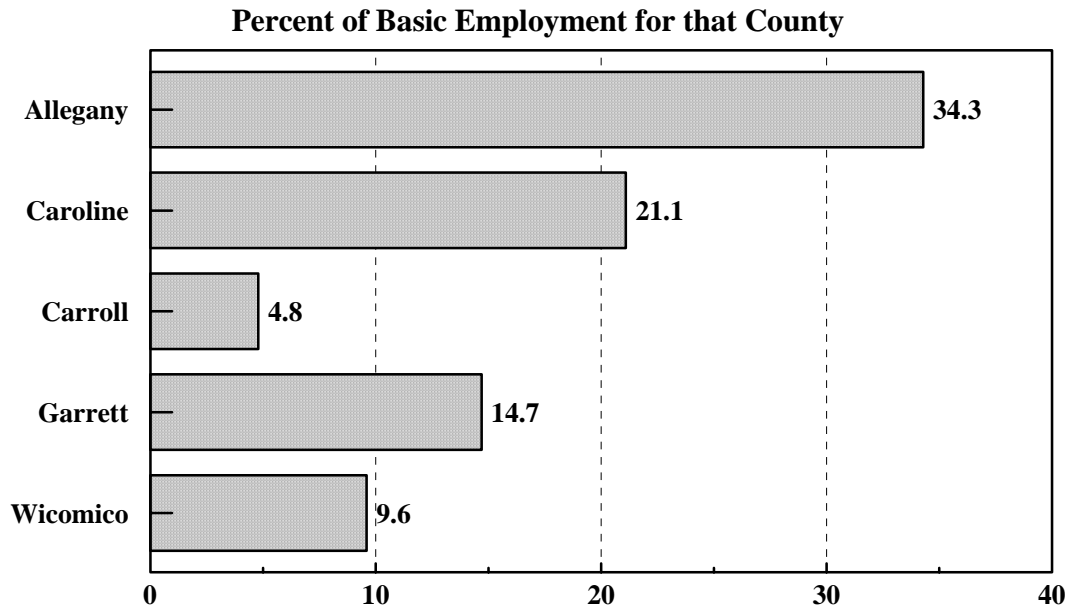
Dependency Indices																	
	Total															Forestry,	Forest
	All	Farm & Ag				Other				Transp &	WhlsI &	Fin, Ins,				Lumber &	Products
	Sectors	Services	Forestry	Mining	Constr.	Manuf	Paper	Lumber	Furniture	Public Util	Retl Trade	Real Estate	Services	Gov't		Paper	W/Furn
Allegany	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	41.9%	0.0%	0.0%	0.0%	31.1%	0.0%	0.0%	27.0%		37.7%	34.3%
Anne Arundel	100.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	6.4%	0.0%	0.0%	0.0%	91.6%		0.0%	0.0%
Baltimore	100.0%	0.0%	0.0%	0.0%	6.6%	0.0%	1.6%	0.0%	0.0%	0.0%	26.0%	21.3%	44.5%	0.0%		0.0%	0.0%
Calvert	100.0%	3.7%	0.0%	0.0%	58.0%	0.0%	0.0%	0.0%	1.3%	36.4%	0.0%	0.0%	0.6%	0.0%		0.0%	0.0%
Caroline	100.0%	26.5%	0.1%	0.0%	14.2%	0.0%	21.3%	0.0%	0.7%	37.2%	0.0%	0.0%	0.0%	0.0%		20.4%	21.1%
Carroll	100.0%	9.4%	1.0%	0.0%	55.0%	0.0%	0.0%	7.5%	0.0%	0.0%	27.1%	0.0%	0.0%	0.0%		7.7%	4.8%
Cecil	100.0%	9.6%	0.0%	0.0%	18.1%	13.1%	0.0%	0.0%	0.0%	8.2%	22.5%	0.0%	0.0%	28.4%		0.0%	0.0%
Charles	100.0%	0.0%	0.3%	0.0%	28.8%	0.0%	0.0%	0.0%	0.0%	0.4%	50.8%	0.0%	0.0%	19.7%		0.0%	0.0%
Dorchester	100.0%	28.7%	0.0%	0.0%	0.5%	69.5%	0.0%	0.2%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
Frederick	100.0%	4.3%	0.5%	0.0%	55.3%	0.0%	0.0%	0.0%	0.0%	0.0%	15.6%	24.3%	0.0%	0.0%		0.0%	0.0%
Garrett	100.0%	23.8%	0.3%	19.3%	20.9%	0.0%	0.0%	21.0%	0.0%	0.0%	14.6%	0.0%	0.0%	0.0%		17.7%	14.7%
Harford	100.0%	0.0%	0.1%	0.0%	14.5%	0.0%	0.0%	0.0%	0.0%	0.0%	21.4%	0.0%	0.0%	64.0%		0.0%	0.0%
Howard	100.0%	0.0%	0.0%	0.0%	11.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.7%	5.0%	51.3%	0.0%		0.0%	0.0%
Kent	100.0%	70.2%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.2%	0.0%		0.0%	0.0%
Montgomery	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.5%	75.3%	8.2%		0.0%	0.0%
Prince George's	100.0%	0.0%	0.0%	0.0%	19.8%	0.0%	0.0%	0.0%	0.0%	4.2%	17.0%	0.0%	0.0%	59.1%		0.0%	0.0%
Queen Anne's	100.0%	30.1%	0.0%	0.0%	27.8%	0.0%	0.0%	4.1%	0.0%	0.0%	37.9%	0.0%	0.0%	0.0%		1.6%	0.0%
St. Marys	100.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	8.2%	0.0%	0.0%	7.2%	83.4%		0.0%	0.0%
Somerset	100.0%	29.8%	0.4%	0.0%	1.3%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	66.2%		1.1%	0.0%
Talbot	100.0%	21.2%	0.0%	0.0%	13.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.2%	1.1%	60.5%	0.0%		0.0%	0.0%
Washington	100.0%	0.0%	0.0%	0.0%	14.1%	14.9%	0.0%	0.0%	1.7%	5.7%	35.1%	0.0%	28.6%	0.0%		0.0%	0.0%
Wicomico	100.0%	0.0%	1.7%	0.0%	18.9%	39.3%	0.0%	8.0%	0.6%	13.2%	18.2%	0.0%	0.0%	0.0%		9.0%	9.6%
Worcester	100.0%	4.4%	0.7%	0.0%	7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	72.3%	15.6%	0.0%	0.0%		0.0%	0.0%
Baltimore city	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	13.9%	53.3%	32.8%		0.0%	0.0%
State Total	100.0%	0.0%	0.0%	0.0%	9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%	44.7%	39.8%		0.0%	0.0%

¹ Sector Excess Employment as Percentage of State Excess Employment

* Excess employment is less than national average.

Figure 13

**Maryland Counties Where Forest Products (incl.
furn.) are Basic Employment
(share > US)**



Source: Table 5B below.

SHIFT SHARE ANALYSIS OF COMPETITIVE POSITION

It would be preferable to analyze only primary mills using Maryland wood, but data over time do not permit this. Hence, we analyze the competitive trend of the entire industry. One way to look at how a particular industrial sector in a state has performed is to view its growth over time relative to national and statewide measures. For this purpose, we use a shift-share technique (Herrick, 1976; Dutrow, 1972). First, we examine how manufacturing and forest products manufacturing in Maryland has performed relative to the nation using IMPLAN data available for 1988, 1994 and 1998. Then, we examine how the Maryland forest products sector has performed relative to manufacturing in the State in general using Maryland DLLR data available annually from 1989 through 2001. Table 25 presents the results of the national shift-share analysis.

This analysis focuses on employment trends for four sectors: forestry services, lumber and wood products manufacturing, paper manufacturing and furniture manufacturing. The shift-share methodology compares actual performance to what might have been expected given the broader national or state trends. For example, in terms of manufacturing in Maryland as a whole, the State has fared worse than the nation as a whole. Between 1994 and 1998, manufacturing employment nationally increased by 2.5%, but Maryland's manufacturing employment declined. The State actually lost 586 manufacturing jobs in the period. Had the State fared as well as the

nation on average, it would have retained the 586 jobs it lost and gained an additional 4,750 jobs. Thus, the difference or shift-share was 5,336 jobs.

When we apply this technique to the forestry and forest products sector, we find that during most of the 1990s, employment in Maryland's wood products and furniture sectors increased and did better than national averages (Fig. 14). However, employment in Maryland's paper sector declined and declined more than might have been expected given national trends. Also, employment gains in the furniture sector all occurred during the first half of the period, between 1988 and 1994. During the second half of the period, between 1994 and 1998, employment in Maryland furniture manufacturing actually declined even though U.S. employment in the furniture sector increased. On balance, in terms of employment growth, Maryland's lumber industry outperformed most other regions, while paper manufacturing did significantly worse than other regions.

Figure 14

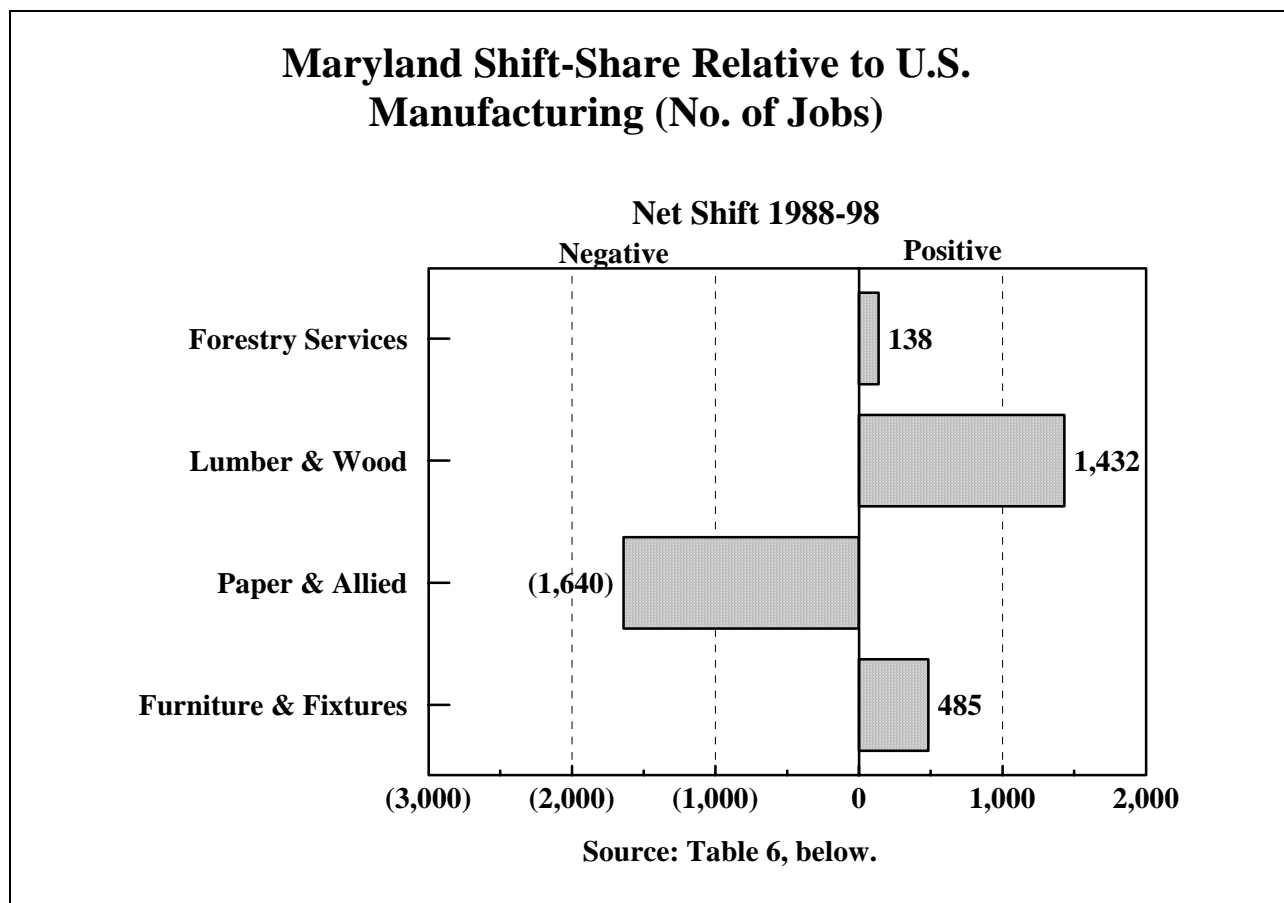


Table 25
Shift-Share Analysis of Maryland Forest Products Employment (Rel. to U.S.)

Shift-Share Relative to U.S. Manufacturing											
	Actual Employment				Expected Employment				Net Shift in or out of MD		
	1988	1994	1998		1988-1994	1994-1998	1988-1998		1988-1994	1994-1998	1988-1998
Manufacturing Employment	216,046	187,646	187,060		206,561	192,396	211,790		(18,915)	(5,336)	(24,730)
Forestry Services	369	395	500		353	405	362		42	95	138
Lumber & Wood Products	3,900	4,564	5,255		3,729	4,680	3,823		835	575	1,432
Paper & Allied Products	9,393	8,181	7,568		8,981	8,388	9,208		(800)	(820)	(1,640)
Furniture & Fixtures	3,264	3,950	3,685		3,121	4,050	3,200		829	(365)	485
Shift-Share Relative to Each U.S. Forest Products Sector											
Forestry Services	369	395	500		325	535	440		70	(35)	60
Lumber & Wood Products	3,900	4,564	5,255		3,992	4,878	4,266		572	377	989
Paper & Allied Products	9,393	8,181	7,568		9,432	7,999	9,222		(1,251)	(431)	(1,654)
Furniture & Fixtures	3,264	3,950	3,685		3,367	4,017	3,424		583	(332)	261
Shift-Share Relative to Maryland Manufacturing											
	Actual Employment				Expected Employment				Net Shift in or out of For Prod Se		
	1989	1995	2001		1989-1995	1995-2001	1989-2001		1989-1995	1995-2001	1989-2001
Manufacturing Employment	206,942	175,790	168,360								
Lumber & Wood Products	3,866	3,875	4,145		3,284	3,711	3,145		591	434	1,000
Paper & Allied Products	9,257	7,632	5,974		7,863	7,309	7,531		(231)	(1,335)	(1,557)
Furniture & Fixtures	2,769	3,333	4,422		2,352	3,192	2,253		981	1,230	2,169
Source: Calculated Using Shift-Share Methodology											

More recent state-reported employment data corroborate the above IMPLAN data. Employment in Maryland's lumber manufacturing sector increased between 1995 and 2001, but employment in paper manufacturing continued to decline. Between 1995 and 2001, the number of jobs in the lumber industry increased by 270 or 7%, while the number of jobs in the paper industry dropped by 1,658 or 22%. During the more recent three-year period (1999 – 2001), employment in lumber manufacturing actually turned down, declining by some 610 jobs or 13%. This is consistent with the downward trend in hardwood lumber production of those years. The trend in furniture manufacture is less clear. Jobs in furniture decreased during most of the 1995 – 2001 period, but increased in 2001 to show a gain relative to 1995.

In general, had employment in the forest products industry followed the same trend as in manufacturing overall during the 1995 – 2001 period, its expected employment would have declined by 486. Instead, it declined by 1,388, resulting in a net shift of employment strength – 902 jobs -- to other economic sectors. Excluding the paper industry, the component in which the entire decline occurred, provides a different result. The expected change in lumber manufacturing employment, had the same trend been experienced as for all manufacturing, would have been a loss of 164 jobs. Instead, employment gained by 270, resulting in a positive net shift of 434 jobs. Similarly, in furniture manufacturing, the net shift was a positive 1,230 jobs.

SUMMARY OF COMPETITIVE POSITION

The conclusions to be drawn from this analysis are that lumber and furniture manufacturing components of the forest industry in the State of Maryland have maintained a relatively stable, even increasing importance in the economic fabric of the State, but the paper component has struggled. A significant portion of the employment (and earnings) in the paper component has shifted to other states or regions. In at least seven Maryland counties, the fortunes of forestry, lumber and paper firms are critical to the local economy. Undoubtedly, adjustments in industry capacities and in local economies will continue. If current trends continue, Maryland's overall manufacturing base will continue to erode and that could have implications for the forest products sector as well. How the industry in Maryland fares depends in part on industry conditions in other states and nationwide.

SUMMARY OF INDUSTRY ECONOMIC IMPACTS

The wood-using sector employed 14,558 workers in 2000, which is small compared to the total Maryland economy. This sector accounts for more than 10% of manufacturing jobs in 7 counties. It will surprise some to know that Baltimore City has 10.3% of its manufacturing jobs in wood-using industries, continuing a long history in this industry.

We have estimated that perhaps some 2,500 of the wood industry jobs depend heavily on Maryland produced wood; and several thousand jobs rely on local wood to some extent. In total, up to 5,000 job equivalents are generated by Maryland wood.

According to the Hilchey and Key (1999) study, each wood-using job supports an additional 2.05 jobs.

5. MARYLAND'S PRIMARY WOOD FIBER BALANCE

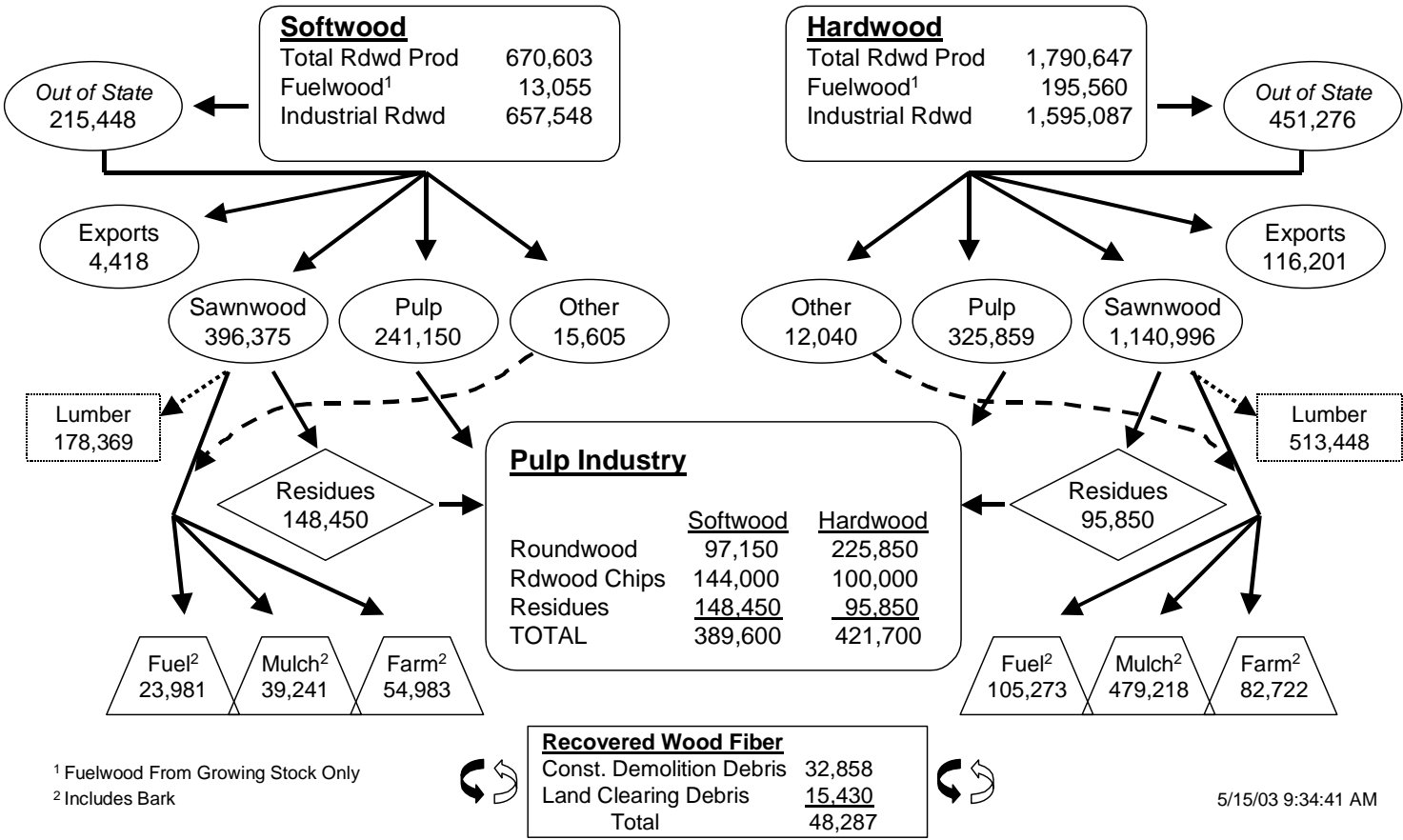
HIGHLIGHTS

- ❑ Maryland's forest products industry is concentrated in the western and eastern portions of the State, but small hardwood using mills are found throughout the central counties as well. Nearly 80% of the wood use in Maryland is hardwood.
- ❑ The state's "woodflow," or pattern of interstate wood use and movement, is very complex (Fig. 15A-D).
- ❑ About 25% of the industrial roundwood harvested in Maryland is used for making wood pulp, primarily at four mills located in Luke, Maryland, West Point, Virginia, Spring Grove, Pennsylvania and Roaring Spring, Pennsylvania. The balance of Maryland's wood fiber is used for solid wood products, principally lumber. Of the softwood roundwood, approximately 37% is used for pulp and 60% is manufactured into lumber. A small volume of softwood (3%) is used for posts, miscellaneous other products or is exported. Of the hardwood roundwood, approximately 21% is used for pulp and the balance for lumber and other solid wood products. In aggregate, small pallet or "Scragg" mills and portable sawmills account for a fairly large volume of hardwood lumber production.
- ❑ Both softwood and hardwood production has remained relatively stable over the past five years. Several mills have closed, but production increased at other plants.

Figure 15a

Maryland Wood Fiber Flow -- 2001

■ Wood Fiber Harvested in Maryland and Processed In and Out of State ■
(All units in Green Tons)



Seneca Creek Economics, as described in text.

Source:

Figure 15b

Maryland Wood Fiber Flow -- 2001

■ Wood Fiber Harvested in Maryland and Processed In and Out of State ■
(All units in Green Tons)

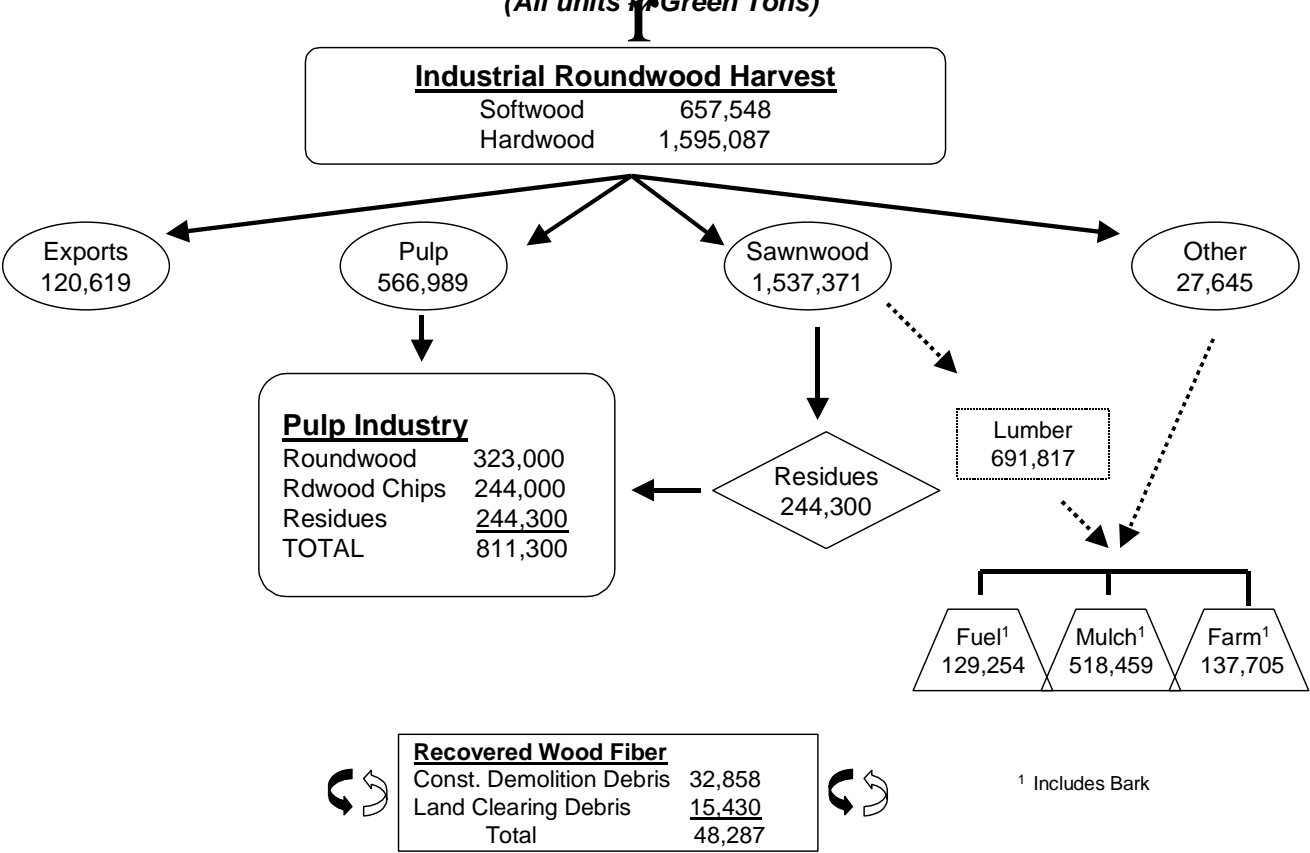
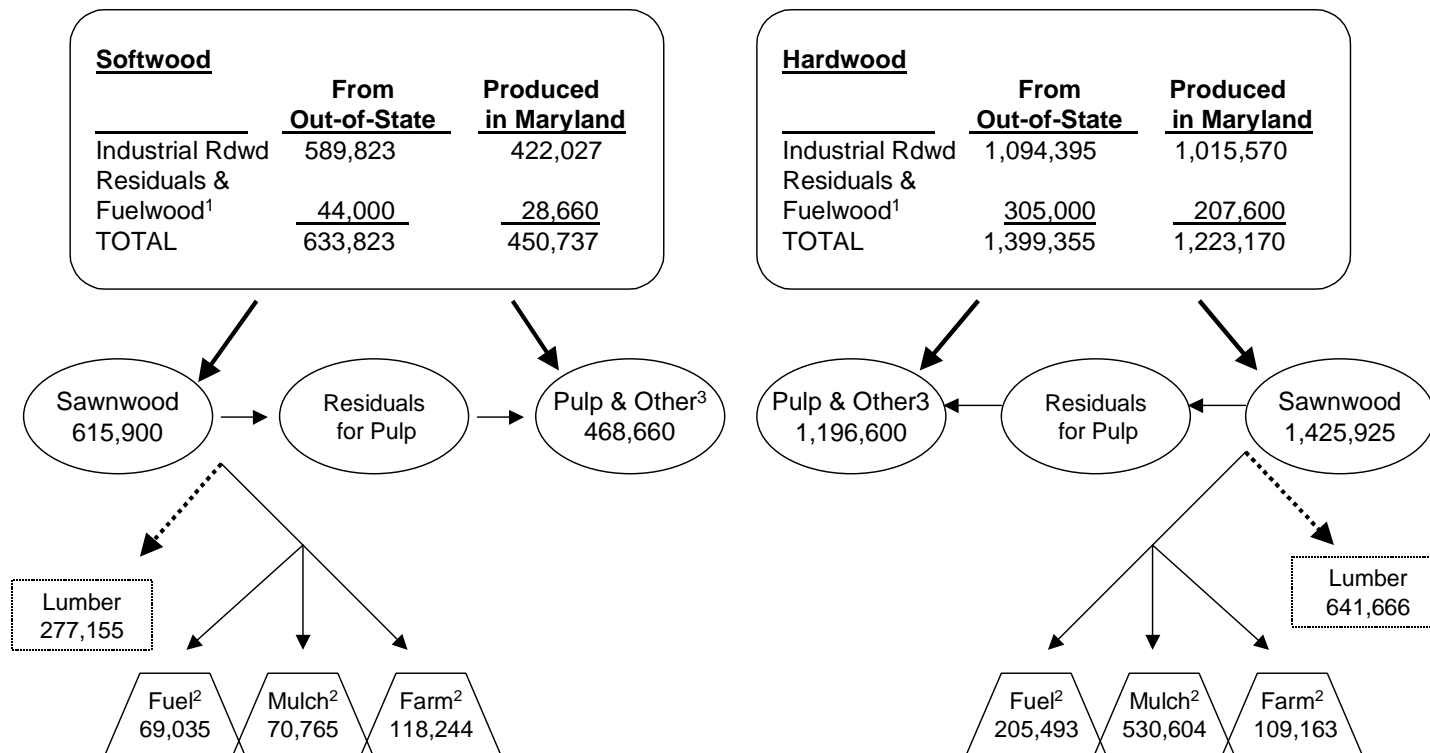


Figure 15c

Wood Fiber Processing in Maryland -- 2001

■ *Wood Fiber From All Sources (In and Out-of-State) Processed in Maryland* ■
(All units in Green Tons)



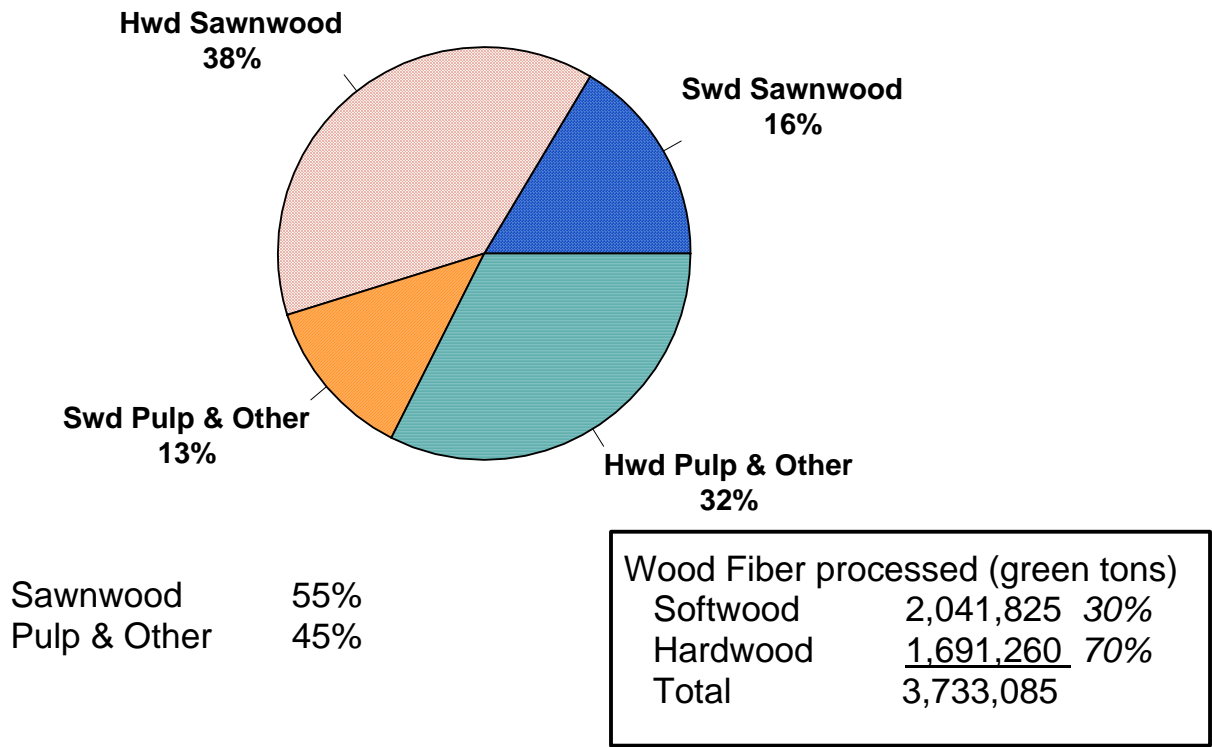
¹ Fuelwood From Growing Stock Only

² Includes Bark

³ Includes Pulp, Miscellaneous Manufacturing such as Posts and Fencing, and Energy

Figure 15d

Wood Fiber Processed in Maryland



Source: Seneca Creek Associates

- Based on the latest (1999) U.S. Forest Service inventory, net annual growth is 23.7 million cubic feet for softwoods, and 83.4 million cubic feet for hardwood. Growth/drain ratios for softwood and hardwood in 1999 were 1.25 and 1.31, respectively. From a forest productivity and habitat perspective, these figures are very positive. However, a significant portion of removals was attributed to reclassification of forest out of timberland and conversion of timberland to non-forest use. While the State's forest area has remained relatively stable, timberland is being parcelized into smaller and smaller ownerships as a result of population growth and development.
- In discussions with the trade, the most frequently cited factors affecting current and future wood fiber availability are: parcelization of land, state land set-asides, private set-asides, burdensome regulations, and lack of public awareness of industry's contribution. These factors are likely inhibiting any significant industrial expansions.
- Contrary to most perceptions, more wood fiber flows into Maryland for processing than flows out-of-state. In order of decreasing volume, wood fiber is procured from West Virginia, Virginia, Pennsylvania and Delaware.
- While a very small volume of wood fiber is occasionally trucked from Maryland to OSB plants in West Virginia, there are no major panel manufacturers in-state. High quality veneer grade logs are shipped to plants in Pennsylvania and the Midwest.

BACKGROUND

The purpose of this part of the project is to analyze wood fiber flow in the State of Maryland and identify some of the factors that might affect wood fiber flows in the future. The forests of Maryland support a diverse wood-using industry within the State as well as in neighboring states. In total, we estimate that approximately 2.4 million green tons of Maryland wood fiber was harvested and consumed in 2001 -- 27% of which was softwood and 73% was hardwood. This material was consumed primarily for manufacturing pulp, softwood and hardwood lumber. Very little Maryland wood fiber is used for manufacturing panel products such as OSB or plywood. Some veneer grade logs are transferred out-of-state or exported overseas. Though the volumes are low, the values per Mbf are very high. The above figures include a small volume (0.2 million tons) of fuelwood harvested from growing stock sources, but exclude removals of fuelwood from non-growing stock sources.

ESTIMATE OF 2001 ROUNDWOOD DEMAND

U.S. Forest Service publishes estimates of timber removals based on periodic inventories. Estimates of removals are based on average changes between survey periods and thus reflect average demand during the survey cycle. In the case of Maryland, the most recent survey was conducted in 1999 and showed average annual removals of industrial roundwood to be 82.7 million cubic feet (3.2 million green tons), 23% softwoods, 77% hardwood. According to the Forest Service, a significant portion of this volume (29%) was not technically harvested, but instead represents removals due to reclassification of timberland to a reserved forest category. An additional 9% of removals were due to conversion of timberland to nonforest use. The figure also includes a small volume of removals from growing stock used for firewood and some

additional volume used for nonindustrial purposes. Most of the fuelwood harvest in Maryland is derived from non-growing stock sources and is not included in this figure.

Our estimate of total wood fiber demand in 2001 from Maryland forests is 2.45 million tons, or approximately 63.5 million cubic feet under bark, comparable to the Forest Service estimate once adjusted for removals due to land reclassifications.

Table 26
Maryland Wood Fiber Balance – 2001 (Green Tons)

	<u>Softwood</u>	<u>Hardwood</u>	<u>Total</u>
1. Industrial Roundwood Harvested in Maryland	657,548	1,595,087	2,252,635
2. Logs/Chips Transferred From Other States	609,823	1,134,355	1,744,177
3. Logs/Chips Transferred to Other States	215,448	451,276	666,723
4. Logs/Chips Exported Off-Shore	4,418	116,201	120,619
5. Total Wood Fiber Processed in State	1,051,923	2,278,166	3,330,089
6. Maryland Wood Fiber Processed in State	442,100	1,143,811	1,585,911
7. Net Inter-State Transfers ¹	418,375	948,079	1,366,454
8. Maryland Fiber Processed for Pulp	241,150	325,850	567,000
9. Maryland Fiber Processed for Lumber	396,375	1,140,996	1,537,371
10. Maryland Fiber Processed for Other Products	15,605	12,040	27,645
Percent of Harvest Transferred and/or Exported ²	33%	36%	35%
Percent of Fiber Sourced From Out-Of-State ³	58%	50%	52%
Net dependence on Out-of-State Sources ⁴	39%	37%	38%
Percent of Maryland Fiber Processed for Pulp ⁵	37%	20%	25%
Percent of Maryland Fiber Processed for Lumber ⁶	60%	72%	68%
Percent of Maryland Fiber Processed for Other Products ⁷	2%	1%	1%
Percent of Maryland Fiber Exported ⁸	1%	7%	5%

Calculations

¹ Row 2 - Row 3

² (Rows 3+4)/Row 1

³ Row 2/Row 6

⁴ Row 10/Row 5

⁵ Row 7/Row 1

⁶ Row 8/Row 1

⁷ Row 9/Row 1

⁸ Row 4/Row 1

Because Maryland borders four states that also possess timber resources and wood-using manufacturing facilities, a significant volume of wood fiber is transferred among them (Table 27). We estimate that 667,000 tons of industrial roundwood harvested in Maryland was transferred out-of-state in 2001, 32% softwood and 68% hardwood. We also estimate that

approximately 1.7 million tons was transferred to Maryland from its neighboring states in roughly the same proportion of softwood and hardwood.

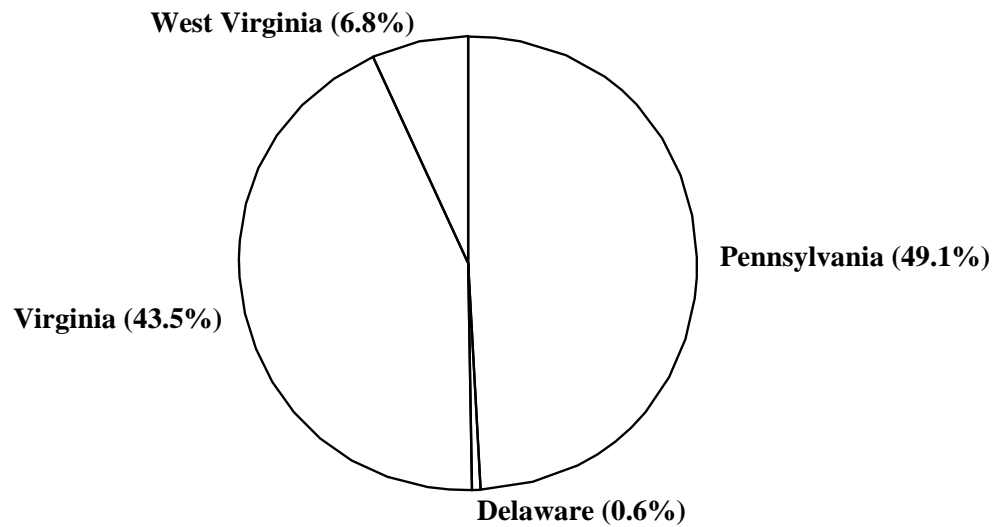
In 2001, an estimated 53,000 green tons of wood fiber was sold/harvested from Maryland State Forests. The majority of this volume, albeit small relative to the total production in Maryland, was likely shipped to consuming points in other states. About 65% of the total volume was purchased by operators based in either West Virginia or Pennsylvania, while some Maryland operators shipped logs or pulpwood out-of-state (Fig. 16).

Table 27
Estimated Inter-State Transfers of Wood Fiber, 2001
(Green Tons)

	<u>Softwood</u>	<u>Hardwood</u>	<u>Total</u>
<u>From Maryland To:</u>			
PA	133,783	300,913	434,696
DE	53	5,249	5,301
VA	214,008	170,606	384,615
WV	53	60,358	60,411
Total	347,898	537,126	885,023
<u>To Maryland From:</u>			
PA	34,928	315,738	350,666
DE	151,523	68,510	220,033
VA	280,973	281,485	562,458
WV	166,400	713,621	880,021
Total	633,824	1,379,355	2,013,178

Figure 16

**Estimated Inter-State Transfers of
Wood Fiber, From Maryland to:**



**Estimated Inter-State Transfers of
Wood Fiber, To Maryland From:**

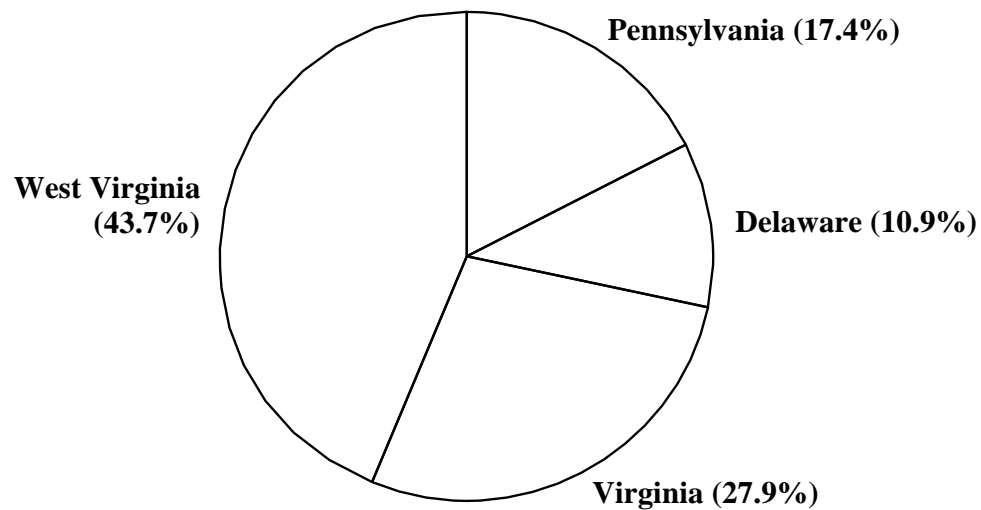


Table 26 and the previous flowcharts (Figs. 15a-d) detail Maryland's wood fiber flow for 2001. Sawmills are clearly the largest primary consumer of Maryland wood fiber, followed by four large pulpmills that draw partially from Maryland resources. Consistent with a resource that is predominantly hardwood, hardwood sawmills account for the lion's share of Maryland wood fiber use. Hardwood mills consumed an estimated 1.1 million green tons of wood fiber, or 72 percent of total industrial hardwood roundwood. Softwood sawmills consumed 396,000 green tons, or 61 percent of industrial softwood production. At the end of 2001, there were approximately 40 sawmills operating in the State of Maryland. This figure doesn't include an estimated twenty "Scragg" and other plants that manufacture pallets or miscellaneous wood products. We estimate that softwood lumber mills accounted for about 25% of the sawmills and produced 112 million board feet of softwood lumber. Hardwood mills comprised the other 75% of the plants and produced an estimated 176 million board feet of hardwood lumber.⁸ Maryland lumber producers derive considerable income from selling residual chips to the pulp industry, and bark, sawdust and shavings for mulch and farm use.

Of the four pulp mills that draw wood fiber from Maryland, only one is located in the State, the MeadWestvaco plant on the border with West Virginia. The other three pulp mills are: Smurfit Stone in West Point, Virginia; Glatfelter Paper in Spring Grove, Pennsylvania; and Appleton Papers in Roaring Spring, Pennsylvania. International Paper Company's Franklin, Virginia mill periodically procures some Maryland fiber but did not obtain any significant quantity in 2001. Collectively, the pulp industry consumed 811,000 green tons of Maryland wood fiber in 2001, of which 567,000 green tons was roundwood or roundwood chips accounting for 36 percent of the State's industrial roundwood usage. These mills consumed 390,000 green tons of softwood (48%) and 422,000 green tons of hardwood (52%), including residuals. Of the total volume of Maryland sourced fiber consumed by the pulp mills, about 40 percent was in the form of roundwood, 30 percent was chips from roundwood, and 30 percent was residues from sawmill manufacturing.

There are currently no primary producers of panel products (plywood, OSB, particleboard or MDF) located in Maryland, and only a small volume of Maryland fiber is transported to panel plants out-of-state. A very small volume of pulpwood grade material is trucked to a Weyerhaeuser OSB plant in West Virginia (Flatwoods, West Virginia), and some high-value logs are trucked into Pennsylvania and the Midwest to make veneer.

During 2001, the equivalent of 4,868 green tons of softwood logs and 128,054 green tons of hardwood logs was exported from the Port of Baltimore (Table 28). These figures include a small volume of chips. We estimate that approximately 10% of the hardwood and half of the softwood exported from Baltimore was sourced in Maryland. Most of the remaining material being exported comes from the Midwest and Pennsylvania.

While some 2.2 million tons of Maryland wood fiber is used by the forest industry (both in and out-of-state), 3.6 million tons of wood fiber (from both in and out-of-state) are used by processing plants located in Maryland. More than half (55%) of the wood fiber processed in the State is used by sawmills, while the balance is used for pulp and other products.

⁸ Our estimates compare favorably with those of the Bureau of the Census (BOC). BOC reported 103 million board feet of softwood lumber and 158 million board feet of hardwood lumber production in Maryland in 2001. The difference in our figures reflects a difference in methodologies and converting factors and the likelihood that BOC fails to capture production of small mills.

Table 28
Log and Chip Exports From Baltimore, 2001

<u>Logs</u>	<u>Cubic Meters</u>	<u>Green Tons</u>
Softwood		
Other Softwood	3,323	
So Yellow Pine	258	
Total	3,581	4,405
Assumed Maryland Sourced -- 50%	1,791	2,202
Hardwood		
Cherry	34,567	
Yellow Poplar	14,873	
Maple	12,601	
Red Oak	8,955	
Other Oak	7,066	
Other Temperate	1,535	
Ash	1,358	
Walnut	1,131	
Beech	147	
Birch	141	
Total	82,374	116,147
Assumed Maryland Sourced -- 10%	8,237	11,615
<u>Chips</u>	<u>Metric Tonnes</u>	<u>Green Tons</u>
Softwood	12	13
Hardwood	49	54
Total	61	67

MARYLAND TIMBER GROWTH AND DRAIN

The Forest Service 1999 FIA statistics suggest a growth-to-drain ratio in the State of 1.25 for softwoods and 1.31 for hardwoods, clearly indicating that more wood is being added to Maryland's forest inventory than is being harvested each year on average. According to FIA, 63% of average annual removals (from 1986 to 1999) were from timber harvesting, 28% were due to reclassification of timberland to a reserved forest category, and 9% were due to conversion of timberland to nonforest use.

As a practical matter, even with surplus annual growth, inventories cannot be expected to grow indefinitely; growth/drain ratios are likely to turn even or negative during some years in the future. However, removals as a percentage of total growing stock are low, equating to just 1.6% (using FIA data), slightly more for softwoods (2.4%) than for hardwoods (1.5%). Total removals also equate to the average growing stock on 1.2% of timberland or 30,000 acres. If all forest growth were to cease (an unlikely scenario), it would take 87 years to deplete Maryland's timberland at the current rate of harvest.

FUELWOOD PRODUCTION

The only data available for fuelwood production are from the Forest Service Timber Output Reports (Table 29). The agency estimates annual fuelwood production in Maryland to be 62,574 cubic feet (4,444 ft³ softwood; 58,130 ft³ hardwood). Only an estimated 8% of this volume is removed from growing stock, the rest is produced from non-growing stock sources such as dead and downed trees.⁹ We suspect this percentage is low; it should be re-measured in the field. Approximately 119,000 green tons of sawmill residues are used for fuelwood to fire dry kilns or other boilers within the forest products industry.

Table 29
Maryland Fuelwood Production, 1999

	<u>Cubic Feet</u>	<u>Green Tons</u>
<u>From Growing Stock</u>		
Softwood	373	13,055
Hardwood	4,889	195,560
Total	5,262	208,615
<u>From Non-Growing Stock Sources</u>		
Softwood	4,071	155,540
Hardwood	53,241	2,325,200
Total	57,312	2,480,740
<u>All Sources</u>		
Softwood	4,444	168,595
Hardwood	58,130	2,520,760
Total	62,574	2,689,355

Source: U.S. Forest Service

WOOD RECYCLING IN MARYLAND

By statute, Maryland's Department of the Environment (MDE) keeps track of solid waste streams and recycling activity, including disposition of construction and demolition debris and land clearing debris generated in the State. In 2000, MDE reported that a total of 3.5 million tons of construction and demolition waste was managed. Of that amount, 1.8 million tons was recycled or composted. An additional 317,000 tons of land clearing debris was collected of which 38,000 tons was recycled or composted. These categories of solid waste include a wide variety of materials including wood, plant fibers, concrete, gypsum and metal. Based on other research, we estimate that 40% of construction, demolition and land clearing debris is wood material. Thus, we estimate that about 48,000 tons of wood material was recovered from the waste stream and reused. This material was used primarily for recycled pallets, mulch or fuel.

⁹ We suspect this percentage is low; it should be re-measured in the field.

OUTLOOK FOR TIMBER DEMAND

Over the past five years, demand for Maryland wood fiber has mirrored the overall markets for pulp and solid wood products. Softwood lumber capacity has increased slightly, while hardwood lumber production has declined significantly. A number of smaller hardwood mills have closed during the past two years as a consequence of poor markets and a more difficult operating environment generally. At least one softwood sawmill has also closed, but its production has been offset by increased capacity at the remaining plants. There has been no increase in pulp mill capacity that would draw on Maryland fiber.

There would appear to be minimal prospects for expansion in Maryland's wood industry over the next twenty years. This is not because of a lack of biologically available supply, but because a combination of factors seems to be conspiring to constrain expansion. Urbanization and development is occurring rapidly throughout the State and it brings with it an anti-industrial sentiment along with increased demand for recreation and environmental set-asides. Almost all of our interviews with the trade raised issues of state bureaucracy as constraints to industry growth. These included concerns about the acquisition and management of state lands, discrepancies between Maryland DNR and Maryland DOE interpretations of Best Management Practices (BMP's), inconsistent permitting procedures, onerous trucking regulations, and overworked state personnel (slowing down permitting and technical assistance programs). Timber supply on the Eastern Shore is increasingly uncertain because of the environmental set-asides and restrictions (management for the endangered Delmarva fox squirrel for example). In the west and most of the rest of the State, the break-up of forestland into smaller and smaller tracts make operating them more difficult. Moreover, new landowners of smaller tracts are less likely to have timber production as an objective of owning land, as we discuss below. These factors all increase wood cost.

In our estimation, industrial wood fiber demand in Maryland will not increase appreciably. It is more likely to decline as Maryland producers find it increasingly difficult to compete against other regions and foreign imports.

Table 30
Maryland Timber Removals (From Growing Stock)

	U.S. Forest Service Forest Inventory & Analysis <u>1999</u>		The Irland Group Estimates <u>2001</u>		1999/2001 <u>Difference/Change</u>
	<u>Cubic Feet</u>	<u>Green Tons</u>	<u>Cubic Feet</u>	<u>Green Tons</u>	
Softwood	18,963,968	663,739	19,017,224	670,603	1.0%
Hardwood	63,733,466	2,549,339	44,516,172	1,790,647	-29.8%
Total	82,697,434	3,213,078	63,533,395	2,461,250	-22.7%

Available data do not permit breaking down removals (for growth or mortality) by counties or survey units within the State.

Table 31
Conversion Factors Used For Analysis

<i>Ton of Pulp</i>	Requires	2.13 Oven-Dried Tons Wood Fiber
<i>Ton of Pulp</i>	Requires	4.26 Green Tons Wood Fiber
<i>MBF Lumber SW</i>	Requires	1.1 MBF
<i>MBF Lumber HW</i>	Requires	1.1 MBF
<i>Green Ton</i>	Yields	0.25 Tons Chips
<i>Green Ton</i>	Yields	0.3 Tons Sawdust
<i>Green Ton</i>	Yields	0.1 Tons Bark
<i>MBF Logs SW</i>	Weighs	6 Tons
<i>MBF Logs HW</i>	Weighs	7 Tons
<i>Cubic Feet SW</i>	Weighs	0.035 Tons
<i>Cubic Feet HW</i>	Weighs	0.04 Tons
<i>Cubic Meters SW</i>	Weighs	1.23 Tons
<i>Cubic Meters HW</i>	Weighs	1.41 Tons
<i>Green Ton SW</i>	Equals	0.357 Cords
<i>Cord SW</i>	Equals	2.8 Tons
<i>Green Ton HW</i>	Equals	0.312 Cords
<i>Cord HW</i>	Equals	3.2 Tons
<i>Cord</i>	Equals	80 Cubic Feet

6. MARYLAND WOOD CONSUMPTION BALANCE FOR END PRODUCTS

In considering the retention of forest land for commercial wood production in Maryland, it is natural to wonder what level of contribution those forests can make to the wood products consumption needs of the State's residents. It would seem arbitrary to be concerned with only the log needs of Maryland mills, and not with the end product usage of Maryland consumers. This is an interesting exercise because much of society's wood products production is essentially invisible to consumers. Food, electronic equipment like computers, and other products are shipped into the State on pallets, which are returned for reuse without consumers ever being aware of them. Other uses of wood in shipping are extensive. All of the wood used in intermediate products, in construction of commercial and industrial buildings and offices, is meeting needs within Maryland but is not directly purchased by any individual household or consumer. Huge amounts of paper are used in manufacturing, services and government, also unseen by individual consumers. The proportion of total wood usage that consumers hold in their hands, buy at the store, or that arrives in the form of the daily paper, is a small share of the total. An emerging body of literature is just beginning to grapple with dilemmas posed by this situation (Shifley and Sullivan, 2002; Wernick, et al., 1998; Victor and Ausubel, 2000; and Berlik, Kittredge, and Foster, 2002). An especially detailed case study of Colorado by Lynch and Mackes (2001) supplies more detail than we attempt in this chapter.

Maryland, being a small state in land area, could not be expected to produce all of its wood needs. Nor would it be expected to produce every kind of wood product that its citizens need, just as it does not produce oranges, coffee, gasoline, or automobiles. Nonetheless it is useful to look at where Maryland's homeowners, manufacturers, businesses, and residents would be if they had to rely solely on the production of Maryland forests. First, there would be no supplies of:

- Oriented Strandboard
- Softwood plywood (produced on the Eastern Shore from 1966 to 1987)
- Engineered structural products like I-joists and laminated veneer lumber for construction
- Particleboard and Medium Density Fiberboard (MDF) for furniture and cabinetmaking
- Newsprint for newspapers
- Kraft bags for groceries
- Cardboard boxes

All of these products can be made from species grown in Maryland and in some instances Maryland wood goes to plants in nearby states that do produce these items.

Maryland does manufacture certain grades of paper; it produces softwood lumber and hardwood lumber, as well as bark mulch and pallets. The state's wood sector also includes many firms producing furniture, cabinets, and a wide range of products. These manufacturers often need species not produced in Maryland, or products not made locally, such as MDF. Many smaller local sawmills sell green hardwood lumber. Many end users need dry lumber and so do not buy, at least directly, from such mills.

The overall balance of Maryland consumption and production can be roughly estimated from available statistics. We can turn to a USDA Forest Service publication (Howard, 1999) for national estimates of per capita consumption. We have the State's population, and from the recent FIA data, we have the growth and removals of wood from the State's forests (Table 32).

Table 32					
Maryland Consumers: Wood Product Self-Sufficiency					
<u>Basics:</u>					
Forest area (1999)	All for.	2,566	<u>Population</u>		
	timberland	2,372	1990	4,700,000	
			2000	5,297,000	
Forest Production (1986-99 ave.)	(GS --MMCF)			All --	
		<u>HW</u>	<u>SW</u>	<u>All</u>	<u>Cords</u>
	Growth	83	24	107	1.34 million
	Removals	64	19	82	1.03 million
	G/R	1.30	1.26	1.30	
US per Capita Consumption 1997 (Howard, RP-595, p. 31)					
	<u>Cubic Feet</u>				
All products	74		A bit less than a cord of wood/ yr		
lumber	34.7	47%	Or, 4 cds for family of 4.		
ply/veneer	4.6	6%			
pulp products	23.5	32%			
Other industrial	1.8	2%			
Fuelwood	9.5	13%			
MD consumption	<u>(MMCF)</u>				
at US averages, 2000	392		4.9 million cords/yr		

Bringing these together (Table 33) we see that at present Maryland is consuming 4.2 times the removals from its own forests. This means that forests to a total of 8.4 million acres elsewhere – in addition to the State's own forests -- are being relied on by Maryland residents for their wood product needs. These are "ghost acres," as described in the writings of food scientist Georg Borgstrom, who devised the concept to show how industrialized nations depend on imported fertilizers, feed, and food precuts to meet their production consumption needs.

Growth per acre for softwood and hardwood, by sawtimber and growing stock is shown in Table 34.

Table 33
Maryland Wood Self-Sufficiency

Comparisons:

MD Consumption = 4.78 times Removals
 3.66 times Growth
 2.51 times Potential Growth*

Deficit on removals 310 MMCF

US average per acre 16 BCF/yr removals (GTR NC-216)
 503 MM acres timberland
 31.8 cu ft/ acre removals

Ghost Acres**

... Are acres of forest elsewhere that are supplying MD residents

9.7 million acres of total timberland used to supply MD needs each year.

7.4 million acres outside of state.

This analysis implicitly assumes that the growth/removals remain in the state, which is reasonable since we are talking about production at the forest level here. But this approach does assume away the woodflow issue for now.

* Assume potential growth = 66 cu. ft. per acre, compared to 45 cu. ft. between 1986-92. See Ch. on productivity per acre.

** Idea borrowed from writings of Georg Borgstrom, food scientist at Michigan State.

Table 34
Maryland Wood Self-Sufficiency (cont.)

Addendum: Maryland production per acre on 2,372,000 acres timberland
All owners, per acre

Growth of GS (Cu. Ft.)	<u>HW</u>	<u>SW</u>	<u>HW</u>	<u>SW</u>	<u>All</u>
Growth	83	24	34.99	10.12	45.11
Removals	64	19	26.98	8.01	34.99
Growth of Sawtimber (Bd. Ft.)	<u>HW</u>	<u>SW</u>	<u>HW</u>	<u>SW</u>	<u>All</u>
Growth	341	87.5	143.76	36.89	180.65
Removals	214	58.6	90.22	24.70	114.92

Source: Calculated from MD Statistical Tables, USFS, NEFES website.

CALCULATION OF WOOD PRODUCT CONSUMPTION BALANCE

In the tables, the calculations are shown for deriving the Maryland wood consumption balance. A few comments will be helpful. First, this section addresses the use of end products, such as homes, furniture, and paper, by Maryland citizens. It is, therefore, several steps down the marketing chain from the separate analysis of “woodflow” presented elsewhere in this report.

Basic data are displayed in Table 33, starting with forest area, population, and forest production. Production is shown both as net growth and as removals. Net growth is the amount of wood grown on average each year, after accounting for mortality to natural causes. Removals are amounts harvested for wood products, left on the ground as residues, and removed by land use change. The ratio of net growth to removals is a commonly used indicator of the balance between growth and cut. Recent measures of net growth are not the same thing as the long-term sustainable growth, which depends on a variety of factors and need not be identical to recent growth levels. According to the USFS data, Maryland forests grew 1.34 million cords of wood per year on average over the years 1986-1999. Removals accounted for about 1.02 million, leaving a net addition to growing stock each year of about one third of a million cords.

According to Howard’s Forest Products Laboratory bulletin, per capita usage of wood products was 74 cubic feet, a bit less than a cord of wood per year. A cord of wood is a stack of logs four feet long, piled four feet high to a length of eight feet. This is a total overall volume of 128 cubic feet as the pile is measured, but it is about 80 to 85 cubic feet of actual wood (we use 80 in these calculations). So, an average American family of four would use a bit less than four cords of wood each year. Obviously a family does not build a house every year – but about 1.5 million new homes are built in the U.S. each year. More than a hundred billion dollars of remodeling is done each year. Every consumer who buys groceries is using pallets on which those groceries are delivered to the store.

Based on year 2000 population, Maryland consumers then use about 4.9 million cords of wood each year in the form of all of these products. This is probably an underestimate, as it does not account for manufacturing yields, which would be a complex task.

So, in Table 34 we compare the estimated consumption with several measures of productivity. We find that Maryland consumption is about 4.8 times as large as the State’s actual removals, 3.66 times recent growth, and 2.51 times potential growth under improved management. So, even with a major increase in forest management, there is not enough forestland in the State to meet its recent level of wood use. Looking at removals, we see that Maryland is using 310 million cubic feet more of wood than it is removing from its own forests. This is almost 4 million cords.

So, Maryland consumers are, not surprisingly, getting their wood from someplace else. Exactly where does not concern us at present, but the amount of land involved might be of interest. Obviously how much land it takes depends on where the land is and how fast it can grow wood. But to illustrate the point we may simply use the U.S. average of removals per acre, which turns out to be 31.8 cubic feet when averaged across the nation’s 503 million acres of timberland. Dividing the 310 million cu. ft. of wood estimated to be the State’s “deficit,” we see that Maryland relies on a total of 9.74 million acres of forest in total for the wood it uses. Since the State has only 2.4 million acres of timberland, it must be relying on 7.37 million acres of forestland in other places.

PART THREE. TIMBER GROWTH POTENTIAL SUPPLY AND “CRITICAL MASS”

Highlights

- 7. Timber Production Potential Per Acre**
- 8. Potential Production Adjusted for Economic Limits
and Availability**
- 9. Defining the “Critical Mass” Threshold**

HIGHLIGHTS

This section reviews current and potential productivity of Maryland's forests, and explores the implications of land use change and changing availability (chapters 7,8, and 9).

- The condition and productivity of Maryland's forests has improved dramatically from the late 1940's. At that time, only 13% of the forest was classified as sawtimber, compared to 66% today.
- Annual growth of growing stock is roughly 45 cu. ft./A/yr. (about half of a cord); potential growth is roughly 66 cu. ft./A/yr., without assuming high management intensities.
- Lands lost to forest since the 1950's would have potential to produce substantial wood volumes had they remained in forest.
- Factors such as land parcel size, owner preferences, current stand condition, and regulations all affect harvesting decisions. It has been found that as population densities rise, harvesting declines. A recent DNR analysis shows that only about 1.1 million acres of forest is 50% or more likely to be harvested in the near term.
- Little is known about landownership by parcel size, and owner preferences and concerns.
- To supply the wood, fiber used by Maryland's primary industry today would require all of the growth on some 2.2 million acres of forest; yet a maximum of 1.7 million acres can be considered available for harvesting.
- Despite this comparison, there is no clear threshold below which the land area might fall ("critical mass") that would yield immediate and large job losses. Instead, the process is one of year-to-year "nibbling" with small job losses occurring each year. If such a threshold existed, Maryland would already be past it.

7. TIMBER PRODUCTION POTENTIAL PER ACRE

To estimate effects on future log supply from changes in the future commercial forest land base, we need to be able to translate acreage changes into future production possibilities. For this project, we will do this on the basis of a fairly heuristic method and not a rigorous harvest projection model. This section assembles some of the basic ingredients for this analysis.

Since the late 1940's, the quality of Maryland's timber resource has vastly improved. Burns (1948) noted that in 1948, only 13% of the forest (then 2.8 million acres total) held sawtimber. He saw 400,000 acres as "waste" land, not farmed and not carrying useful timber. He judged that 53% of the forest held "nothing better than cordwood." In the 1999 inventory, fully 66% of timberland was rated as sawtimber (on a landbase 15% smaller), and only 1% was rated nonstocked. Since 1953, sawtimber volume rose by 106% more than doubling, and total growing stock increased by 52%. This means that stocking per acre increased even more, since the timberland base shrank from 1953 to 1997.

We analyze the recent 1999 data with no indepth review of longer term inventory trends (Frieswyk and DiGiovanni, 1988; Brooks and DiGiovanni, 1988). Such an approach ought to recognize several factors:

- Current annual growth
- Biological potentials
- Economic limits, as in operability
- Differences in productivity within the State

It would be desirable to recognize the biological diversity within the State as that affects potential productivity. A perfect model would also try to recognize feedback of supplies into prices as that might affect incentives to manage (e.g. less land, less wood, higher prices, then more management). Based on informal inquiries, we have found no one with a rigorous inventory/supply model using current Maryland data.

CURRENT GROWTH

The components of change tables in the 1999 FIA data (Anon., n.d.) show that average annual net growth has been at 45 cubic feet per acre, or .56 cords per year, while total removals have been somewhat less (Table 35). Harvest removals are a still lower amount (discussed in separate section).

Table 35
Addendum: Maryland Production Per Acre, All Owners
on 2,372,000 acres timberland

	<u>Total -- MMcf</u>		<u>Per Acre -- cu. ft.</u>		
	<u>Hardwood</u>	<u>Softwood</u>	<u>Hardwood</u>	<u>Softwood</u>	<u>All</u>
Growth of Growing Stock					
Growth	83	24	35	10	45
Removals	64	19	27	8	35
	<u>Total -- MMbf</u>		<u>Per Acre -- bd. ft.</u>		
	<u>Hardwood</u>	<u>Softwood</u>	<u>Hardwood</u>	<u>Softwood</u>	<u>All</u>
Growth of Sawtimber					
Growth	341	87.5	144	37	181
Removals	214	58.6	90	25	115

Source: USFS Maryland 1999 FIA data, website, and TIG calcs.

In terms of sawtimber, net growth is a respectable 180 bd ft/a/yr, reflecting in part a significant amount on ingrowth from smaller sized trees in addition to improving stocking levels and good growing conditions. For sawtimber, growth/removal ratios are also favorable.

POTENTIAL GROWTH

If Maryland forests were brought into a regulated condition (balanced distribution of age classes), and stands were at desirable stocking levels (volume per acre) for best growth, total volume growth could be well above what is being occurring today, largely by natural forces. In many instances this would involve little more than restraint and care in harvesting. In others, it might require varying levels of intensive treatment or investment to bring stands to a high level of productivity. This does not include application of more intensive practices, which do occur in Maryland but on a relatively minor area, largely for pine management.

Roughly 3/8 of the State's forest land is classified as "poor" (20-50 cu ft/a/yr), and another 3/8 is fair. Only 8% is considered very good (Table 36). By multiplying acres in each class by the class mean potential productivity, we can form a rough estimate of total potential productivity. These estimates apply to individual stands and should not be extrapolated to entire forests. Despite the artificiality of these assumptions, however, they place an upper limit on potential productivity under ideal conditions. The data do not permit breaking down to softwood and hardwood. The result, 156 MMcf/yr, is well above the measured net growth of 1986-1999, which was 107 MMcf/yr.

Table 36
Maryland Potential Productivity Estimate

Productivity Class	Midpoint of Class (cu ft/a/yr)	Acres 1999 (000)	Percent	Total Potential Net Growth MMCF/yr
Very Good	120	191	-8.1%	22.9
Good	102	416	-17.5%	42.4
Fair	67	890	-37.5%	59.6
Poor	35	<u>875</u>	-36.9%	30.6
		2,372		155.5

Source: USFS FIA website, MD statistical tables, Table 100.

The implied potential growth would be 65.6 cubic feet per acre, compared to the present level of growth of 45 cubic feet per acre. This compares fairly closely to an undocumented estimate of potential productivity by Findley Burns (1948, p. 14), which was 71 cu. ft./A/year at prevailing merchantability standards of the time.

PRODUCTIVITY DIFFERENCES WITHIN THE STATE

Species and Species Groups

Looking just at the growth cut balance, it is clear that loblolly pine and the oaks, both commercially important species, are at roughly break-even levels in terms of growth/cut relationships (Table 37). Additionally, in both species groups, significant losses of acreage occurred during 1986-1999: in loblolly pine, 9,600 acres were lost (3.3% of type), and in the oaks, more than 140,000 acres. This would suggest that if retention of commercial forest production potential is important, then attention might focus specifically on these two forest types. In 1990, a State forestry task force, the Loblolly Pine Task Force, reported results on retaining and managing loblolly on the eastern shore (Perdue, 1990).

Table 37
Average Annual Net Change of Growing Stock Volume on Timberland,
Selected Species and Components of Change, Maryland, 1999
(thousands of cubic feet)

<u>Species</u>	<u>Accretion</u>	<u>Gross Growth</u>	<u>Mortality</u>	<u>Net Growth</u>	<u>Harvest Removals</u>	<u>Accretion div. Gross Growth</u>	<u>Mortality div. Gross Growth</u>	<u>Net Growth div. Harvest Removals</u>
Loblolly Pine	11,269	17,618	(2,691)	14,927	(13,906)	0.64%	0.15%	1.07%
Virginia Pine	5,047	8,187	(2,985)	5,202	(2,075)	0.62%	0.36%	2.51%
Total Softwoods*	19,505	29,987	(6,254)	23,675	(15,981)	0.65%	0.21%	1.48%
Red Maple	10,856	15,040	(5,728)	7,994	(3,453)	0.72%	0.38%	2.32%
Sweetgum	10,227	12,568	(3,828)	8,864	(585)	0.81%	0.30%	15.15%
Yellow-Poplar	23,674	30,019	(2,611)	27,087	(6,005)	0.79%	0.09%	4.51%
Ash-Walnut-Cherry	3,850	7,127	(1,534)	6,277	(1,119)	0.54%	0.22%	5.61%
Oaks	23,593	27,341	(14,160)	14,208	(16,411)	0.86%	0.52%	0.87%
Total Hardwoods*	87,554	111,783	(30,288)	83,117	(36,072)	0.78%	0.27%	2.30%
All Species*	107,060	141,769	(36,543)	106,791	(52,053)	0.76%	0.26%	2.05%

Source: USFS 1999 FIA data, Table 41, http://www.fs.fed.us/ne/fia/states/md/tables/MDTB41_new.8.L.htm

* These include all species and not only those shown in this table.

Note: For Hardwoods, harvest removals are roughly half of total removals.

REGIONAL DIFFERENCES IN PRODUCTIVITY

The components of change information is available by state and species by not by region of the State. But the land in the top two productivity classes is concentrated disproportionately in the Forest Service's Central Survey Unit, much of which is subject to intense development pressure (Table 38). This unit has an estimated 10.2% of its area in the very good class, and 23% in the good class, for a total of 33% in the top 2 classes. By contrast, the Southern unit has only 15% of its acreage in the top two classes, and the Western unit about 23%. Looking at stand-size classes, the Central Unit is also highest in stocking of sawtimber stands, at 71% of its area (Table 39). The lower Eastern Shore had the lowest proportion of area in sawtimber, at 55%. According to the FIA data, the three westernmost counties are relatively low in board foot volume per acre (Fig. 17).

A more refined display of stocking levels is by stand volume classes in cubic feet per acre (Table 40). With this measure, we find that the Southern Unit has the highest proportion of its area in the 2,500+ class, while the Western Unit has half the proportion of area in this class.

All of these measures have their weaknesses for our own objectives here – which is to get an idea of how future production potential changes as land leaves forest use. In the future, a more refined approach to accounting for differences within the State will be needed.

Table 38
Area of Timberland and Site-Productivity Class, Maryland, 1999

Thousands of Acres

	Productivity Class (cu. ft./a/yr)				
	Very Good (120+)	Good (85-119)	Fair (50-84)	Poor (20-49)	All Classes
Central Unit	105.9	239.4	424.5	267.4	1,037.2
Southern Unit	15.5	42.8	85.4	237.7	381.3
Lower Eastern Shore	41.3	57.3	189.8	204.4	492.8
Western Unit	28.4	76.4	189.9	165.9	460.6
All Counties	191.0	415.9	889.6	875.4	2,371.9

Percent of All Counties

	Productivity Class (cu. ft./a/yr)				
	Very Good (120+)	Good (85-119)	Fair (50-84)	Poor (20-49)	All Classes
Central Unit	55.4%	57.6%	47.7%	30.5%	43.7%
Southern Unit	8.1%	10.3%	9.6%	27.2%	16.1%
Lower Eastern Shore	21.6%	13.8%	21.3%	23.3%	20.8%
Western Unit	14.9%	18.4%	21.3%	19.0%	19.4%
All Counties	100.0%	100.0%	100.0%	100.0%	100.0%

Percent of All Classes

	Productivity Class (cu. ft./a/yr)				
	Very Good (120+)	Good (85-119)	Fair (50-84)	Poor (20-49)	All Classes
Central Unit	10.2%	23.1%	40.9%	25.8%	100.0%
Southern Unit	4.1%	11.2%	22.4%	62.3%	100.0%
Lower Eastern Shore	8.4%	11.6%	38.5%	41.5%	100.0%
Western Unit	6.2%	16.6%	41.2%	36.0%	100.0%
All Counties	8.1%	17.5%	37.5%	36.9%	100.0%

Table 39
Area of Timberland and Stand-Size Class, Maryland, 1999

Thousand of Acres

	<u>Stand-Size Class</u>				
	<u>Saw- timber</u>	<u>Pole- timber</u>	<u>Sapling & Seedling</u>	<u>Non- stocked</u>	<u>All Classes</u>
Central Unit	738.5	172.4	106.3	20.0	1,037.2
Southern Unit	299.7	53.7	27.9	0.0	381.3
Lower Eastern Shore	270.5	141.5	79.2	1.6	492.8
Western Unit	266.3	138.4	55.1	0.9	460.6
All Counties	1,575.0	506.1	268.4	22.5	2,371.9

Percent of All Counties

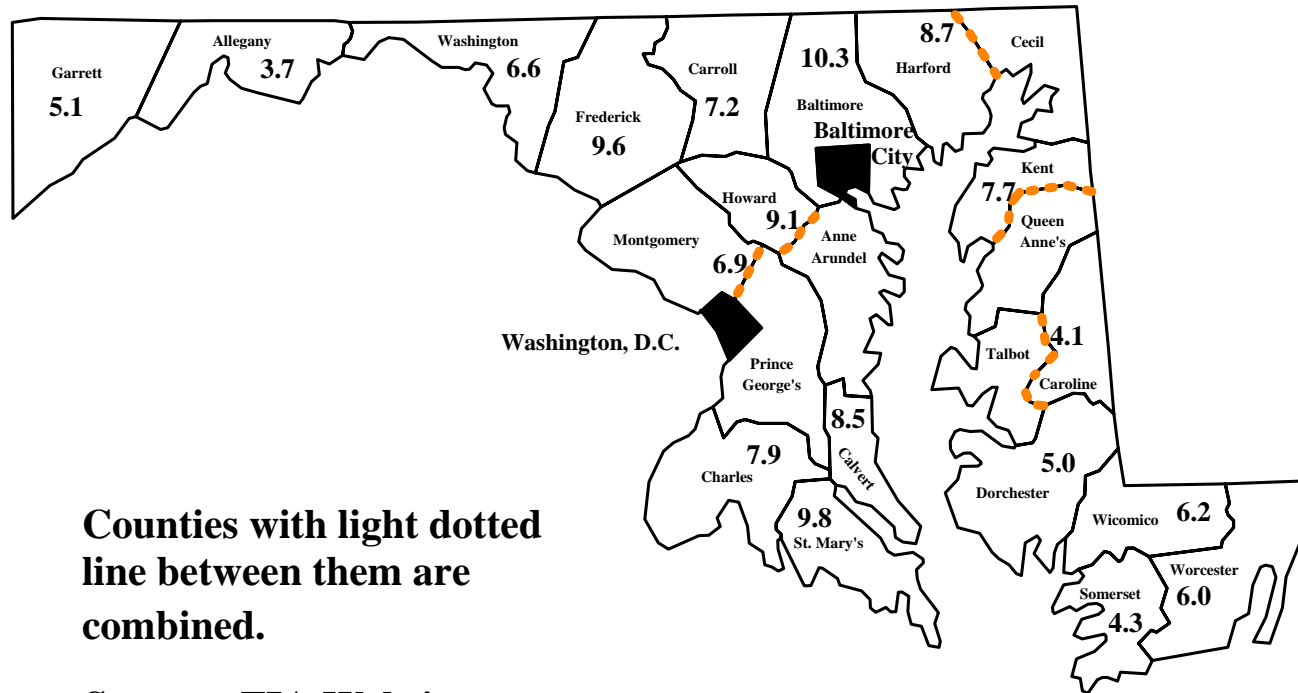
	<u>Stand-Size Class</u>				
	<u>Saw- timber</u>	<u>Pole- timber</u>	<u>Sapling & Seedling</u>	<u>Non- stocked</u>	<u>All Classes</u>
Central Unit	46.9%	34.1%	39.6%	88.9%	43.7%
Southern Unit	19.0%	10.6%	10.4%	0.0%	16.1%
Lower Eastern Shore	17.2%	28.0%	29.5%	7.1%	20.8%
Western Unit	16.9%	27.3%	20.5%	4.0%	19.4%
All Counties	100.0%	100.0%	100.0%	100.0%	100.0%

Percent of All Classes

	<u>Stand-Size Class</u>				
	<u>Saw- timber</u>	<u>Pole- timber</u>	<u>Sapling & Seedling</u>	<u>Non- stocked</u>	<u>All Classes</u>
Central Unit	71.2%	16.6%	10.2%	1.9%	100.0%
Southern Unit	78.6%	14.1%	7.3%	0.0%	100.0%
Lower Eastern Shore	54.9%	28.7%	16.1%	0.3%	100.0%
Western Unit	57.8%	30.0%	12.0%	0.2%	100.0%
All Counties	66.4%	21.3%	11.3%	0.9%	100.0%

Figure 17

Net Volume of Sawtimber Trees per Acre of Timberland, Maryland, 1999 (Thousand Board Feet)



Source: FIA Website.

Table 40
Area of Timberland and Cubic-Foot Stand-Volume Class of Growing Stock Trees, Maryland, 1999

Thousands of Acres

	Stand-volume class (cubic feet per acre)						
	500-	1000-	1500-	2400-	All		
	<u>0-499</u>	<u>999</u>	<u>1499</u>	<u>1999</u>	<u>2499</u>	<u>2500+</u>	<u>Classes</u>
Central Unit	124.6	85.2	139.0	134.7	155.8	397.9	1,037.2
Southern Unit	22.1	29.3	19.9	60.2	49.3	200.6	381.3
Lower Eastern Shore	96.3	37.8	55.6	99.7	71.5	131.9	492.8
Western Unit	52.8	91.7	62.4	82.5	58.5	112.8	460.6
All Counties	295.7	244.0	276.8	377.2	335.1	843.2	2,371.9

Percent of All Counties

	Stand-volume class (cubic feet per acre)						
	500-	1000-	1500-	2400-	All		
	<u>0-499</u>	<u>999</u>	<u>1499</u>	<u>1999</u>	<u>2499</u>	<u>2500+</u>	<u>Classes</u>
Central Unit	42.1%	34.9%	50.2%	35.7%	46.5%	47.2%	43.7%
Southern Unit	7.5%	12.0%	7.2%	16.0%	14.7%	23.8%	16.1%
Lower Eastern Shore	32.6%	15.5%	20.1%	26.4%	21.3%	15.6%	20.8%
Western Unit	17.9%	37.6%	22.5%	21.9%	17.5%	13.4%	19.4%
All Counties	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Percent of All Classes

	Stand-volume class (cubic feet per acre)						
	500-	1000-	1500-	2400-	All		
	<u>0-499</u>	<u>999</u>	<u>1499</u>	<u>1999</u>	<u>2499</u>	<u>2500+</u>	<u>Classes</u>
Central Unit	12.0%	8.2%	13.4%	13.0%	15.0%	38.4%	100.0%
Southern Unit	5.8%	7.7%	5.2%	15.8%	12.9%	52.6%	100.0%
Lower Eastern Shore	19.5%	7.7%	11.3%	20.2%	14.5%	26.8%	100.0%
Western Unit	11.5%	19.9%	13.5%	17.9%	12.7%	24.5%	100.0%
All Counties	12.5%	10.3%	11.7%	15.9%	14.1%	35.5%	100.0%

Table 41**Average Annual Net Growth and Average Annual Removals of Growing-Stock Volume on Timberland by Ownership Class and Species Group, Maryland, 1999 (thousands of cubic feet)**

<u>Ownership Class</u>	<u>Net Growth</u>			<u>Removals</u>			<u>Growth/Removal Ratio</u>		
	<u>Softwood</u>	<u>Hardwoods</u>	<u>All Groups</u>	<u>Softwoods</u>	<u>Hardwoods</u>	<u>All Groups</u>	<u>Softwoods</u>	<u>Hardwoods</u>	<u>All Groups</u>
Other Public	4,871	1,663	6,535	1,671	23,520	25,191	2.92	0.07	0.26
Forest Industry	3,044	1,169	4,213	3,813	3,897	7,710	0.80	0.30	0.55
Other Private	15,760	80,283	96,043	13,480	36,274	49,754	1.17	2.21	1.93
All Classes	23,675	83,117	106,791	18,963	63,691	82,655	1.25	1.31	1.29

Source: USFS 1999 FIA data, Table 43, http://www.fs.fed.us/ne/fia/states/md/tables/MDTB43A44_new.6.P.htm

NOTE: Removals for “other public,” largely presume the State – are high because removal, include volume lost due to lands being taken out of the “timberland” class. That is, these state lands were removed from future cutting by policy decisions.

Table 42
Average Annual Net Growth and Average Annual Removals of Sawtimber Volume on Timberland by Ownership Class and Species Group, Maryland, 1999 (thousands of cubic feet)

<u>Ownership Class</u>	<u>Net Growth</u>			<u>Removals</u>			<u>Growth/Removal Ratio</u>		
	<u>Softwood</u>	<u>Hardwoods</u>	<u>All Groups</u>	<u>Softwoods</u>	<u>Hardwoods</u>	<u>All Groups</u>	<u>Softwoods</u>	<u>Hardwoods</u>	<u>All Groups</u>
Other Public	24,274	6,471	30,745	4,798	75,368	80,166	5.06	0.09	0.38
Forest Industry	6,015	10,033	16,048	9,387	10,442	19,830	0.64	0.96	0.81
Other Private	57,223	324,541	381,763	44,415	128,245	172,659	1.29	2.53	2.21
All Classes	87,511	341,045	428,557	58,600	214,055	272,655	1.49	1.59	1.57

Source: USFS 1999 FIA data, Table 44, http://www.fs.fed.us/ne/fia/states/md/tables/MDTB43A44_new.6.P.htm

IMPLICATIONS

Thinking in terms of productivity per acre provides a heuristic way of thinking about the timber supply implications of land use conversion. Summary per acre estimates are:

	<u>Per Acre</u>
Average net growth, growing stock	45 cu. ft.
Average growing stock removals (est.)	25 cu. ft.
Potential growing stock growth	66 cu. ft.
Average sawtimber net growth	180 bd. ft.

One could defend using any of these per acre growth/removal rates. To see what the effects might look like, we analyze two hypothetical productivity scenarios. First is the 190,000 acres lost to development from 1973 to 1997, only a quarter century. Second is the 432,000 acres of timberland lost from 1953 to 1997, barely half a century. At the minimum, of 25 cu. ft./A/yr., the area lost 1973-97 would yield 56,000 cords per year of wood, enough for seasonal firewood needs for perhaps 11,000 homes. Another way to look at the 190,000 acres is that it far exceeds the former ownerships of Glatfelter, Chesapeake, and Mead/Westvaco combined.

Looking at sawtimber, if only 60% of average growth were used, the 190,000 acres lost in the past century could support two sawmills equal in size to the largest now working in Maryland. The total area lost since 1953 could support four.

Table 43
Implication of Timberland Loss: Hypothetical Maryland Scenarios Related to Past Land Use Changes

		Total Annual Production On:			
		Area Converted, 1973 to 1997 (190,000 acres)		Area Converted, 1953 to 1997 (432,000 acres)	
<u>Measure of Productivity</u>	<u>Rate</u>	<u>Cubic Ft.</u>	<u>Cords</u>	<u>Cubic Ft.</u>	<u>Cords</u>
Average net growth on growing stock	45 cu ft	8,550,000	100,588	19,440,000	228,706
Average removals of growing stock	25 cu ft	4,750,000	55,882	10,800,000	127,059
Potential growth of growing stock	66 cu ft	12,540,000	147,529	28,512,000	335,435
			<u>Mmbf</u>		<u>Mmbf</u>
Average net growth of sawtimber	180 bd ft	34,200,000	34.2	77,760,000	77.8
If 60% used			20.5		46.7

8. POTENTIAL PRODUCTION ADJUSTED FOR ECONOMIC LIMITS AND AVAILABILITY

The previous chapter discussed productivity and productive potential. Yet, actual supply is also determined by availability. Factors affecting availability might include population density, parcel size, regulations, and landowner preferences, and proximity to urban areas. Also, slope, poor soil drainage, or other physical factors may affect operability.

MARYLAND FOREST LANDOWNERSHIP, 1989

A current survey of Maryland forest landowners is not available; the most recent detailed USFS survey was conducted for year 1980 (Kingsley and Birch, 1980). While that report contains much useful information, it will not be discussed here. This survey provided useful breakdowns of information according to both numbers of owners and number of acres, and ownership size, which is critical.

Due to the highly skewed nature of forest ownership, averages mean little. For example, a very large number of individual owners with small parcels hold a fairly small proportion of the total land. What is important for studying availability and for policy is knowing how the ownerships are distributed by size (Fig. 18). Birch's more recent survey (1995) gives a somewhat more current indication for 1989, though the sample size is small. In 1989, 85,000 individual owners with forest parcels of 1 to 9 acres in size accounted for only 257,000 acres of land among them. Thus, 65% of the owners – the smallest ones – owned about 10% of the private forest land at the time (which was estimated at 2.3 million A.). Not surprisingly, corporate owners accounted for the great majority of the largest ownerships. Today, however, those ownerships have essentially vanished, having been sold to governments, TIMO's, and others.

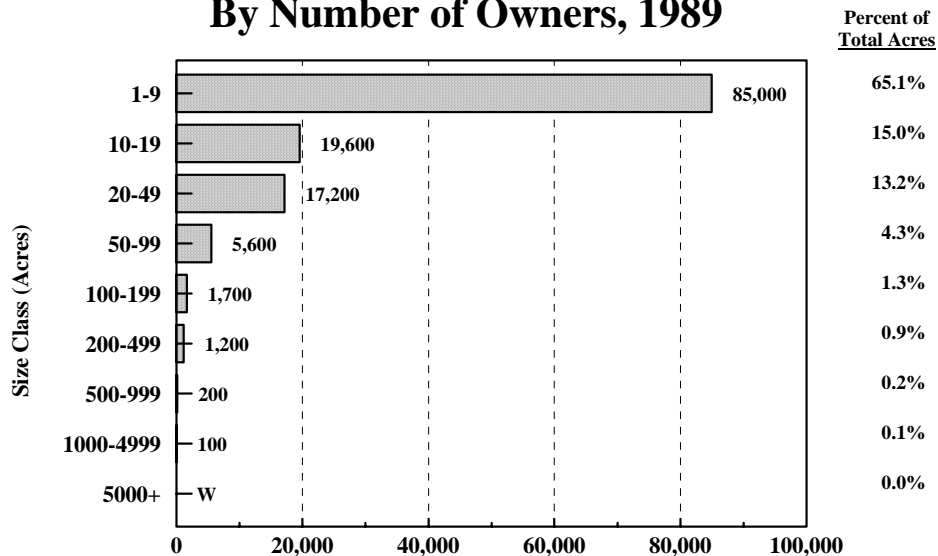
In terms of all individual and corporate ownerships, fully 2 million acres were owned by owners with more than 10 acres (Table 44). There were 45,600 of these owners, or 35% of the total number of owners. Because of its long history and the past importance of agriculture, Maryland's size distribution is not as skewed as in some other eastern states. In 1989, owners holding 5,000 acres or more held only an estimated 166,000 acres, or only 7% of the total. In 2002, the acreage and percentage were of course far smaller.

Table 44
Estimated Number of Ownership Units and Acres of Forest Land, Maryland, 1989

	OWNERSHIP CLASS						Total	SE
	Individual	Percent	Corporation	Percent	Other	Percent		
<u>No. Owners</u>								
Subt. over 10 A.	39,300	35	3,100	52	3,300	25	45,600	9.5
Total	111,700	100	5,900	100	13,000	100	130,600	14.6
<u>Thousand Acres</u>								
Subt. over 10 A.	1,424	87	383	95	208	92	2,015	2.6
Total	1,645	100	402	100	225	100	2,272	1.2

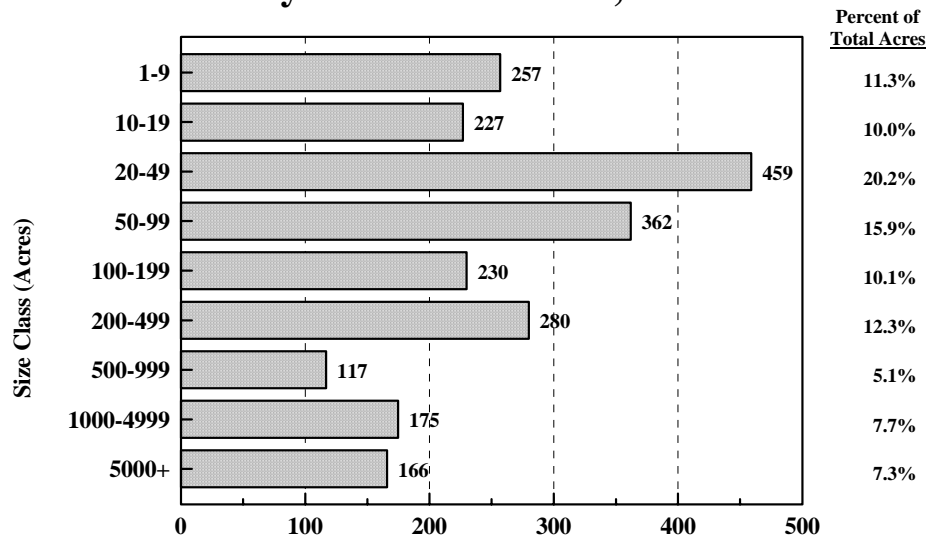
Source: Birch, T. W., 1995, RB-NE-136.

Figure 18
Acreage Classes
By Number of Owners, 1989



Source: USDA-FS, NEFES, Res. Bull. 136. pp. 140

Acreage Classes, By Number of Acres, 1989



Source: USDA-FS, NEFES, Res. Bull. 136. pp. 140

In 1989, incorporated entities held 402,000 acres of the private forest land, or 18% (Table 45). Farmers, according to this estimate, continued to be major forest owners with a total of about 800,000 acres. Forest industry at that time held an estimated 130,000 acres according to this estimate.

Table 45
Estimated Number of Ownership Units and Acres of Forest Land, by Incorporated and Unincorporated Businesses, Maryland, 1989

	OWNERSHIP CLASS							
	<u>Individual</u>	<u>Percent</u>	<u>Corporation</u>	<u>Percent</u>	<u>Other</u>	<u>Percent</u>	<u>Total</u>	<u>SE</u>
<u>No. Owners</u>								
Subt. over 10 A.	39300	35	3100	52	3300	25	45600	9.5
Total	111700	100	5900	100	13000	100	130600	14.6
<u>Thousand Acres</u>								
Subt. over 10 A.	1424	87	383	95	208	92	2015	2.6
Total	1656	100	402	100	225	100	2272	1.2

Source: Birch, T. W., 1995, RB-NE-136.

A tiny proportion of the survey's respondents claimed to have held their land since before 1900 (Table 46). Inheritance and purchase are the primary means of acquiring forest land. This means that owners tend to be in their 40's or older. In 1989, an estimated 31% of the private forest acreage had been acquired since 1970. Those lands had been held 20 years or less. These properties, however, accounted for a full 42% of the number of owners, or more than 54,000. This indicates that the more recently acquired properties at that time were smaller than the average. The age structure of this population suggests that a change of ownership is likely for much of Maryland's private forest acreage in the next 20-30 years. Regional research indicates that the leading causes of parcel fragmentation are death, urbanization, income, and regulatory uncertainty (Mehmood and Zhang, 2001, p. 34).

Table 46
Estimated Number of Ownership Units and Acres of Forest Land, by Date of Acquisition, Maryland, 1989

<u>Date of Acquisition</u>	<u>No. Owners</u>	<u>Thous. Acres</u>
1980-1989	16,300	228
1970-1979	38,500	471
1960-1969	28,600	529
1950-1959	19,100	328
1940-1949	6,900	211
1901-1931	2,300	238
Prior to 1900	500	85
No Answer	<u>18,400</u>	<u>183</u>
TOTAL	130,600	2,272

Source: Birch, T. W., 1995, RB-NE-136.

Surely with the developments of the 1990s, the number of individual owners has increased, and the size distribution of parcel sizes has shifted downward. In addition, due to major land sales, the forest industry role in forest landownership has essentially ended.

In 1989, only a few thousand owners held forest lands of 100 acres or more. The aggregate total of acres was just under a million acres, or almost half of the State's forestland. With land sales and the continued fragmentation of parcels, the amount privately owned in parcels exceeding 100 acres could now be below 500,000 acres. In the past, foresters would consider a 100 acre woodlot a good opportunity for management. A 50 acre or smaller lot would be worth managing if it had good soil quality, good access, and a good stand of existing timber. The good news is that in 1989, a small number of owners held 60% of Maryland's private forest in holdings 50 acres and larger. Reaching these owners is a manageable task if pursued seriously.

MARYLAND PROPERTY VIEW ANALYSIS

The DNR kindly provided us with a data summary from an overlay of forest vegetation cover against the Maryland Property View Ownership Parcel database. These are tracts without buildings. This is a potentially powerful tool for studying ownership patterns. Such datasets have inherent limitations, so we would not want to exaggerate the significance of the results, however. Specifically:

- Parcels are identified from local plot records that are not designed to identify cumulative ownership of corporate entities or natural persons. For example, all of the Chesapeake Forest parcels would not be readily identified, as previous owner identities did not always change when Chesapeake acquired the tracts.
- Also, an individual might own three nearby separate tracts that would make a very manageable forest unit, but in this dataset that fact would not be evident. This biases the distribution downward, probably significantly.
- Because of the nature of the GIS database, the proportion of each tract in forest cannot be measured. To partially overcome this, we present results only at the regional level. But we are certain that the acreages reported consist of a mix of land uses, not only forest. This would tend to bias the size distribution upward.

While this information gives us a useful view, it clearly illustrates the need for a survey focusing on owners, not on individual parcels.

The results (Table 47) are consistent with expectations. An extreme degree of fragmentation has already occurred across the State, with only 3% of the ownership parcels larger than 25 acres, according to Maryland Property View. The eastern shore has the greatest percentage of 25 acre and larger parcels. The distribution of total area by parcel size would be a good deal more encouraging, with a much larger share of the acres included in 25 acre or larger parcels.

Table 47
Maryland Ownership Parcel Size Distribution by Region, from Property View

Name		Parcel Size Class									Total
		<u>0-1</u>	<u>1-5</u>	<u>5-10</u>	<u>10-25</u>	<u>25-50</u>	<u>50-100</u>	<u>100-500</u>	<u>500-1000</u>	<u>>1000</u>	
Western Maryland		103,894	46,763	9,710	7,581	4,052	3,124	3,006	49	65	172,000
	Percent	60.4%	27.2%	5.6%	4.4%	2.4%	1.8%	1.7%	0.0%	0.0%	100.0%
Urban/Surburban-Corridor		577,892	134,415	18,003	11,491	4,479	2,842	2,158	78	76	746,280
	Percent	77.4%	18.0%	2.4%	1.5%	0.6%	0.4%	0.3%	0.0%	0.0%	100.0%
Southern Maryland		62,419	35,363	5,496	3,721	1,586	1,208	1,162	47	19	108,585
	Percent	57.5%	32.6%	5.1%	3.4%	1.5%	1.1%	1.1%	0.0%	0.0%	100.0%
Eastern Shore -- Upper		23,690	27,078	2,761	2,234	1,251	1,165	1,752	36	8	57,014
	Percent	41.6%	47.5%	4.8%	3.9%	2.2%	2.0%	3.1%	0.1%	0.0%	100.0%
Eastern Shore -- Lower		59,225	19,266	4,340	4,458	2,895	2,592	2,297	124	57	90,184
	Percent	65.7%	21.4%	4.8%	4.9%	3.2%	2.9%	2.5%	0.1%	0.1%	100.0%
TOTAL MARYLAND		827,120	262,885	40,310	29,485	14,263	10,931	10,375	334	225	1,174,063
	Percent	70.4%	22.4%	3.4%	2.5%	1.2%	0.9%	0.9%	0.0%	0.0%	100.0%

Source: Maryland Property View, tabulation by John Wolf, DNR, summarized by TIG.

FACTORS AFFECTING AVAILABILITY

Wear and others (1998) have attempted to use population density as a readily measured proxy for how suburbanization and development affect availability. They presented a case study of a region in Northern Virginia, which showed how population density would affect availability. Christine Conn of DNR has used 2000 Census block data and state vegetation mapping information to apply Wear's results to Maryland. She provided a summary by counties and has also showed public lands separately. This analysis suggests that large portions of Maryland's forest are in areas of low logging probabilities (Table 48). This is consistent with research in Mississippi and Alabama that found that "Almost all measures of urbanization examined in this study are associated with lower harvesting probabilities" (Barlow, et al., 1998).

On this analysis, only about half of the State is forest area where the probability of cutting is 50% or more. An analysis is now underway using cutting permits that may significantly refine our understanding of some of these issues.

There is no fixed tract size limit that dictates whether wood is available or not available to cut. Rather, with declining tract size, the financial feasibility of regular management under professional supervision declines, probably reaching its end at about 40 acres under most conditions. *If a parcel contains high quality wood, however, loggers can cut even smaller tracts and in Maryland they do so every day.* What happens, however, is that for smaller tracts, owner objectives are more likely to preclude even occasional timber harvesting. Loggers, however, tell us that with good wood they can cut tracts of 5 or 10 acres or less. Sawmills routinely buy tracts in these size categories. It seems that loggers can operate much smaller tracts than foresters can afford to properly manage. This disconnect in sizes is going to have to be addressed in the future if quality timber growing is to retain a place in the Maryland landscape. The sizes of tracts that can be cut, therefore, is far smaller than the sizes likely to be managed for long-term timber crops.

Forest analysts have conducted few studies on the relation between parcel size and availability. In a study in Massachusetts, Kittredge, Mauri, and McGuire (1996) found that loggers there would buy sales as small as 5.5 acres, but only if the timber quality was high. Massachusetts is an area with a very weak to nonexistent pulpwood market. For a sample of forest owners in Vermont and New Hampshire, Dennis (1992) found that parcel size was related to harvesting behavior, but not strongly. Factors such as owner education, affluence, and per-acre volumes and composition were also important. Parcel sizes as small as 1-9 acres were included in this study. Smaller owners were more likely to post their land as well.

In our interviews with foresters, loggers, and sawmill operators, we have been told that parcels as small as one acre, if holding valuable timber, can be cut. Cuts that small may be unusual, however, and this does not by any means suggest that further parcel fragmentation is a matter of indifference. In fact, when we asked opinions about the market, virtually every respondent remarked first of all that "my biggest competitor is the Realtor."

Ownership objectives may strongly affect availability. Lands owned by wood-using industries and timber investors are most likely to be intensively managed and harvested at a high rate related to growth. Lands owned as hunting reserves or large estates may be harvested enough to pay the taxes. Mini-estates of 15 acres or so will only receive occasional salvage cutting, if that, after ice storms or hurricanes. Around the northeast, forest industry owners have been selling their holdings.

Table 48
Forest Area by Probability of Harvest and Region, 2000 Census Data

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The above table shows the amount of forest acres in each commercial timber management class by county. Also shown by county is forest acres in public ownership (Public Forest) and non-forested acreage. This summary reflects population density thresholds based on 2000 census data. Public land data reflects DNR's updated public lands shapefiles for 2002. This data includes land owned by federal, state and county entities tracked by DNR, in addition to parcels acquired or put into easements through the GreenPrint Program. The NLCD was used to map forest cover (provided by Christine Conn, DNR).

Note: Forest acres here slightly exceed other estimates.

This process is now virtually complete in Maryland. The reasons are numerous and complex, but are no longer a practical concern in this State (for background, see Irland Group, 1999, and Pinchot Institute, 2002).

The net result is that in the past decade, Maryland has experienced a significant shift within the private sector, from owners more likely to harvest, to owners less likely to harvest, if at all.

Owners' attitudes are considered important determinants of harvesting behavior. In the 1980 study of Maryland landowners, Kingsley and Birch (1980) found that many owners expressed an unwillingness to harvest. If the available growth of the time were discounted by expressed owner intentions, the State would have been overcutting relative to "available" timber at that time. Analysts have since debated the significance of owner intentions. At one time the consensus was that expressed intentions would over time yield to practicality. In addition, given the age of most owners, future heirs would probably cut wood if only to help with taxes – or they would sell to someone who would cut.

This line of thinking has been challenged by others who see that parcels are not remaining intact as they often did in the past. Also, a new breed of affluent suburbanite landowners "from away" is more firm in negative attitudes about harvesting. These owners are buying land at prices far above timber values. They are affluent enough to pay the taxes while ignoring timber revenue possibilities. Increasingly, these analysts argue, the "it will get cut sometime" reasoning is obsolete. While there is no current research on this topic in this region, this view is probably persuasive.

Physical factors can also affect availability. In an early review along these lines, Cabbage and Abt (1994) examined FIA data for 5 southeastern states, Florida to Virginia. The studied terrain differences similar to those found in Maryland. By accounting for 8 physical factors, they found that in the mountains, only about 25% of the measured inventory could be considered "available" by these discount factors (which included public lands and proximity to urban areas). They found that in the Coastal Plain the discount for availability was enough to remove 51% of the measured inventory. They acknowledged that many of these "discounted" acres could actually be logged, but at a higher cost. They argued that these "availability" factors helped explain rising hardwood stumpage prices in the face of an apparently huge standing inventory (this is echoed by Luppold, 1994). Changing equipment and markets may change the impact of these availability factors, but the concept remains valid.

In a more recent analysis, the North Carolina Governor's Task Force on forest sustainability (1996) suggested that "as much as 40% of our forestland has a very low probability of yielding timber crops" (p. 20). They acknowledge that the true extent of non-availability is unknown, but is certainly influenced by urban sprawl. Another study, using an economic and engineering approach, estimated availability relationships in Virginia's Jefferson National Forest area (Sloan, et al., 1995). All of these availability studies suggest information that would be useful to acquire for Maryland.

Finally, there are concerns about availability on public lands. On the State forests, understaffing, underfunding, and controversy over management priorities are responsible for a very low yield compared to sustained yield capacity. These conflicts are likely to come to a head in the upcoming process of revising Management Plans. Of equal concern to wood buyers is the likely stability and predictability of planned harvests. The prime example of this situation is of course the Chesapeake Lands.

9. DEFINING THE “CRITICAL MASS” THRESHOLD

This chapter draws together information from the rest of the report to discuss the “Threshold” issue. The first section reviews a number of points concerning the current supply and it provides a broad short summary. The second section discusses why fragmentation of parcels affects supply. The third section reviews how many available acres are needed to supply the current wood usage by Maryland mills. The fourth poses a hypothetical supply scenario for 20 years in the future. The last section asks the question of “why does it matter,” and concludes that it does.

The concept of a “critical mass” has been widely discussed in agriculture. It is well defined in Professor Lori Lynch’s 2003 Agriculture Critical Mass report to the Agro-Ecology Center:

“Many people see the logic in the idea that there is a critical mass of agricultural activity that must be sustained in order for an area's agricultural economy to remain viable. The critical mass concept is based on the idea that economies of scale exist in both input and output businesses and services that are essential to agriculture. As production levels decline below a given threshold, costs will rise, and support businesses will close or relocate. If the input and output firms exit the county, the closest input supplier may not only be farther away for a fanner but may also charge higher prices for inputs, veterinarian services, and equipment repairs due to less competition and need to covered fixed costs. Similarly, if the nearest processor goes out of business because it cannot cover its fixed costs due to an insufficient supply of output as acreage decreases, the nearest outlet for the product could involve additional transportation costs and/or a lower purchase price, either raising fanners' production costs or decreasing their revenue.¹⁰ Changes in farmers' comparative advantage and their net revenues alter the relative returns of exiting farming. A decline in agriculture profits and thus a higher relative return for conversion to residential, recreational or forestry uses may increase the rate of loss of farms and farmland in the area.

Researchers and policymakers articulated the concept of critical mass and recognized its complexities as early as the 1970s. Lapping noted that the critical mass level would vary from crop to crop, and that local growing conditions, traditions, and existing infrastructure would affect the profitability and sustainability of agriculture and the level of a critical mass threshold in any particular geographic area. Further, the threshold was believed to change over time due to technological changes. (For example, the transition of suppliers from traditional farm supply stores to internet sales using delivery services could overcome some of the negative consequences of a local input supplier leaving the area.)” Source: Lynch (2003.).

It is natural to wonder if this concept might also apply to forest resources; that is, is there a minimum acreage of working forest that must be sustained if Maryland’s rural wood-based industries are to survive? This chapter addresses this question.

¹⁰ Alternatively, if smaller locally based input and output firms are consolidated permitting larger more regionally focused businesses, these firms may achieve greater economies of scale. Then the major factor would be the effect of increased transportation costs on farmer's costs.

GENERAL OBSERVATIONS ON SUPPLY

A. The Timber Supply Acreage Base is Smaller Than It Looks

In the last survey, 40% of the timberland was in properties 50 acres and smaller, which are more costly to harvest and on which sustained long-term management is less likely (see discussion below). Perhaps more importantly, the 1999 FIA data show that 60% of the timberland area is in sawtimber stands. With the limited markets for pulpwood over much of the State, stands without sawtimber stocking are probably not operable except under special circumstances. This is all the more true for smaller tracts. The harvest level is about 60% of annual growth. This figure represents market evidence that various availability factors do constrain supply to the marketplace.

On the public lands, there is no number available that expresses the acreage available for timber cutting, but we think that the number is less than would be suggested by the FIA data. For the Chesapeake lands, it is too early to judge.

B. There is No “Threshold” for Critical Mass..

...for commercial timber supply. Instead, there is a broad fuzzy range where local supplies get tighter, hauling costs increase, and as land parcels get smaller, administrative costs and risks of buying timber increase. As these factors continue to pressure the supply, smaller mills may reduce operating hours, shift operations elsewhere, and finally close down. Larger mills may survive by hauling farther.

The relationship will differ between the Eastern Shore and Western Maryland. On the Shore, there are no accessible alternative supplies to which mills can turn as local supplies dwindle. To the South, bridge tolls make hauling uneconomical. To the North, the nearest commercial timber supplies are far beyond the I-95 urban corridor. In Western Maryland, there are heavily forested regions near at hand which already supply wood to Maryland mills, but those areas are subject to the same forces that are affecting supply.

Instead of a dramatic threshold, which once crossed will bring down large mills all at once, there is a gently sloping line relating available timberland acreage to timber-dependent jobs in Maryland. Every 1,000 acres deleted from the available supply costs some amount of employment, somewhere, perhaps in the form of a few hours to one mill, a few hours less at another. The relationship is none the less real just because it is subtle and does not lend itself to precise measurement.

The relationship is not a direct one in engineering terms -- so-and-so-many tons of wood equals so many jobs -- it is mediated through changes in availability, logging costs, prices, and log hauling costs as distances increase.

C. The State’s Recent Annual Harvest Of 2.2 Million Tons Is Coming, Theoretically, From 2.4 Million Acres Of “Timberland”

So, on these figures, the total timberland base is being harvested at a rate of 0.9 tons per acre per year. This of course is the average of a wide range which includes occasional light cuts for fuelwood or pulp at one end of the spectrum and intensive managed acres on the other. If we say that a green ton equals 0.3 cords, this is an average cutting rate of .27 cords per acre. This

ought to be well below growth, even on the acres receiving little or no management, because most of the forest is assessed as being well stocked.

This does not adequately account for the limited stocking and growth of quality logs, which is an issue in some species groups and some areas. It would be reasonable to suspect that current cutting practice is reducing quality in residual stands in many instances.

D. Survivability Of The Logging Sector: A Key Bottleneck

Logging has become a highly capital intensive business. Modern equipment is expensive to own and operate; downtime is costly. These machines can work on small and large tracts, but cannot work tiny parcels cost-effectively. Small tracts are usually harvested with skidders, crawlers, or other methods, but those methods are costly. In logging, what can be done technically, and what makes business sense, are often not the same.

As availability shrinks and parcel sizes decline, the logging sector is likely to shrink. As this occurs, not only are jobs lost, but the ability of mills to obtain supply declines, competition for stumpage declines, costs increase for remaining owners and mills, and the key link in the supply chain withers away.

Detailed cost analyses of logging systems would substantiate this relationship and enable it to be more specifically measured.

E. Economic Forces Will Shrink The Available Private Land

The size of forest parcels is small and getting smaller. Mills and loggers tell us that it is possible to operate very tiny parcels, if they have good wood. Still, it is costly and difficult to run a sawmill entirely on 5-acre cutting jobs. Regulations and political issues pose risks to buyers of such stumpage sales.

As to active management prospects, we can make several observations. First, at land prices current in our sample counties, it is basically impossible to accumulate timberland as an investment for the long term. Some operators are buying and holding, but they cannot anticipate returns at these price levels solely on the basis of timber income.

Second, given the ages of forest owners, fragmentation of much of this land in the coming 20-30 years is a virtual certainty. Third, even tracts now under one form or other of management will in many instances be broken up in time with the complete loss of expected future timber benefits. Since fragmentation is inevitable, we think that efforts to promote conservative cutting and retain quality stocking on these lands would be the only way to maintain potential for these lands to contribute to future supply. If all they contain is firewood and pulpwood, they will be deleted from the future supply.

F. Choices On Public Lands Are Critical

The State now has control of about 20% of the recent harvest level on the Eastern Shore, and it owns 42% of the forest land in the five western counties. The State is inevitably a major actor in the commercial timber supply. There is no one thing the State can do regarding private lands that affects as much supply as its decisions on the public lands. Management priorities on these lands are appropriately not dominated by commercial timber production. But the importance of that production should not be ignored.

Given the ongoing fragmentation of private forest lands, and the State's major position as a wood supplier, *we believe the burden of proof lies on anyone making the claim that the timber production on these lands is not needed by the Maryland economy.* Previous work on the Eastern Shore argues (Parker Forestry Services, 2001), persuasively we think, that the Chesapeake lands there are essential to the survival of many mills. Their loss would not merely cause a proportional cutback in their output, but would cause them to close altogether. The reason is that a large land area providing a regular supply, in cost-effective units, is critical to the overall supply picture. Loggers and mills cannot survive on five-acre lots alone, even though they will on occasion harvest such lots. Further, tiny lots will not be cost-effective to actively manage for the long run.

The newly acquired industrial lands on the Eastern Shore include many parcels that may be too small for effective management. More importantly, they may include acres well suited to long term forest management which at the same time lack size or features of recreational or ecological significance. The size distribution of parcels indicates a large number of small pieces (Table 49). Though this dataset exaggerates the degree of fragmentation of these ownerships, a better portrayal is not available (maps are on the DNR website). We think a careful program of land trading could produce major social, environmental, recreational, and economic benefits if a long term process of blocking up these ownerships could be carried out.

Table 49
Ownership Units, Chesapeake Forest Lands

<u>Size</u>	Dorchester		Somerset		Wicomico	
	<u>No.</u>	<u>Total</u>	<u>No.</u>	<u>Total</u>	<u>No.</u>	<u>Total</u>
0-20.9	7	53.534	56	517.835	46	337.718
21-40.9	4	103.543	39	1154.559	37	1175.770
41-100.9	18	1163.534	53	3396.432	62	4042.979
101-200.9	16	2320.558	36	5161.251	33	4549.744
201-500.9	17	5308.268	14	4244.667	12	3211.024
501-1000.9	3	2138.888	2	1793.730	1	619.807
1000 +					1	1299.407
<u>Size</u>	Worcester		Wicomico/Worcester		All Counties	
	<u>No.</u>	<u>Total</u>	<u>No.</u>	<u>Total</u>	<u>No.</u>	<u>Total</u>
0-20.9	7	24.137			116	933.224
21-40.9	9	306.509	1	37.520	90	2,777.901
41-100.9	19	1255.871	2	184.956	154	10,043.772
101-200.9	20	2795.672			105	14,827.225
201-500.9	12	4381.026	1	359.036	56	17,504.021
501-1000.9	5	3404.458			11	7,956.883
1000 +					1	1,299.407

Source: MDNR.

Note: These tracts represent separate ownership units and do not account for the fact that some are contiguous, which yields larger management units than this distribution of ownership units would suggest.

G. This is a Cumulative Impact (Nibbling) Problem

The loss, acre by acre, tract by tract, of commercial wood supply potential is a steady, continuous process. It does not occur in large jumps, except where public policy decisions affect large areas at once. The response to these slow changes is not some instant crisis that mobilizes all to action. It is the loss of a job here, a small mill there; a logger who quits somewhere else... none being noticed at the time. The process is largely irreversible. On both public and private lands, once down this path, there will be no way back. If state government could simply flip a switch and restore availability immediately, there would be no reason to be concerned about commercial wood supply.

Cumulative Impact problems have no real solutions - you just try to manage them. The forces for change are so powerful that there is no way to freeze the status quo, even if that were desirably.

H. Retaining “Forest” Is Necessary But Not Sufficient

Maryland’s numerous programs aimed at retaining or increasing forest cover have accomplished a great deal. Yet, retention of wood supply is for many of them a byproduct. Some opportunities (FCA) are being missed.

I. Objective: No Net Loss

In the absence of some precisely definable threshold, we can reasonably claim that the State really needs ALL of the present commercially available timberland. Now, this does not translate into a recommendation that we retain all of it -- that is impossible. Instead, the goal is to develop approaches to retaining as much of it as possible to make it a clear policy priority instead of an accidental byproduct. Maryland needs to steer away from policies that inadvertently, and for no good social reason, consume supply potential. In this area, sound growth management could make a major contribution,

What about a No Net Loss goal for commercial timber potential? This could state that any policy decision affecting supply should be balanced by another one offsetting the loss. This would at least have the merit of making the tradeoffs clear and visible to all. This would be meaningless if it did not have due regard for economics and focused only on acres, tons or cords.

WHY PARCEL FRAGMENTATION REDUCES FOREST MANAGEMENT AND WOOD SUPPLY

The general relationships between forest parcel size and management by tract size are well known. Without detailed surveys within Maryland, we cannot define specific numerical measures for these relationships. Fortunately, to understand the issue does not require that we know all of the numbers. A general understanding of the issues will suffice. A detailed analysis by Thorne and Sundquist (n.d.) for New Hampshire illustrates the issues; the general relationships are probably similar in Maryland. The literature on forest fragmentation is growing daily. A good start is the “Proceedings of the Forest Fragmentation 2000 Conference” organized by two respected Maryland experts, Lester DeCoster and Neil Sampson. See also, Kittredge, Mauri and McGuire (1996); Tyrell and Dunning (2000); Anon. (2000); Barlow, Munn, Cleaves and Evans (1998); Alig, Butler, and Swenson (2000); and Luloff (2000).

A. Wood Supply – Short Term Availability

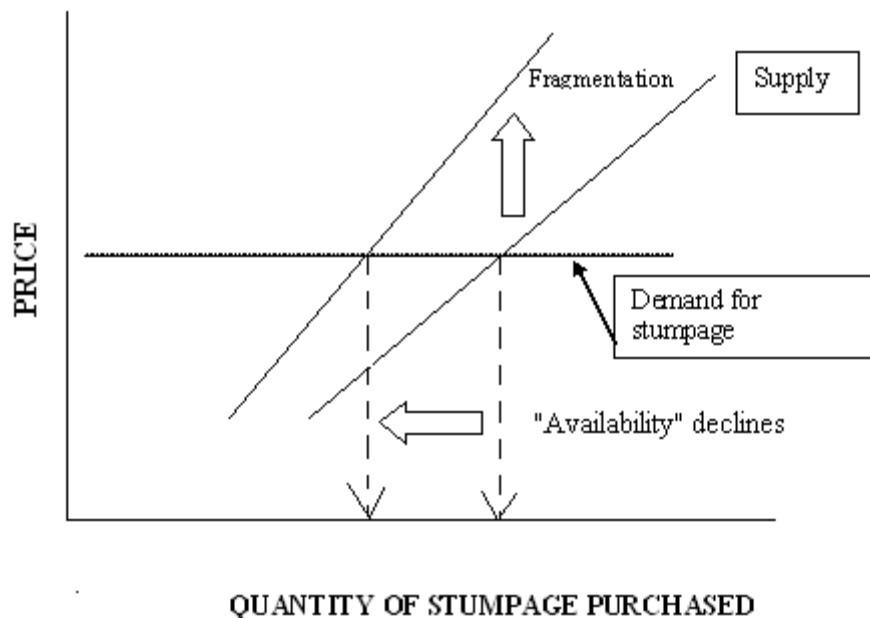
Small parcels offer less desirable “logging chances” because the cost of moving equipment to set up for work has to be spread over a small volume of wood. Additionally, professional assistance needed to make decisions or meet regulatory requirements will be more costly on small tracts. Smaller volumes of wood will attract few bidders when wood on a tract is auctioned. For the smallest tracts, say, 20 acres and below, there may only be one offer, in a negotiated sale. Abundant evidence shows that stumpage prices are strongly increased as the number of bidders rises.

Because of higher logging costs and lower stumpage prices for wood, returns to timbergrowing will naturally be lower on smaller tracts. Land prices are typically higher for smaller tracts as well, so the small woodlot owner may have (or at least perceive) a higher opportunity cost for retaining land in forest use than does the owner of a far larger tract. In many instances, management in the past has been limited or even exploitive on smaller parcels with the result that a small tract may have less valuable timber to offer for sale today.

On smaller tracts, the chance for a regular flow of timber income is minimal. Tiny parcels might yield harvests only once every few decades, where a tract of a few hundred acres could realistically yield a harvest every 5-10 years. Finally, recent buyers of the smaller tracts are likely to be more concerned with maintaining greenspace around an existing or planned home or leisure cottage. Given Maryland land prices today, they are not likely to be as concerned about revenue potential from the land.

For all of these reasons, as tract sizes decline over time, the availability of wood declines. In Maryland in the past few decades, the total inventory volume has risen significantly on private lands, but the level of harvest has not. A major reason for this is the higher cost of accessing smaller lots, and the changing willingness of owners to harvest what timber they have. This can be visualized as an upward shift in the supply curve for stumpage, as in Figure 19. The chart depicts a local area in the short run, where stumpage sellers are assumed to be price takers. Parcel fragmentation is unquestionably a major factor in the tightening supply of wood in the Mid Atlantic states in recent decades.

Figure 19
Schematic – Local Stumpage Market Effects of Fragmentation in Short Run



Loggers and mills will purchase timber from very small parcels, as small as one to five acres. But *this does not mean that they can survive financially on an exclusive diet of such wood.* The smallest parcels supply the highest cost wood. The fact that such tracts are being purchased, in fact, is not a good sign -- it indicates a situation of virtual desperation for current wood supply.

B. Long Term Supply – Forest Management

Long-term supply will be determined in part by the way in which the land is managed. Management decisions are affected by many of the above factors – all of the factors that reduce short-term net revenues from individual timber sales also reduce the financial motivation for long-run management.

Forest management can be viewed as a range of levels of forest practice. At a minimum level, it would consist merely of *careful cutting*. Such cutting would be designed to retain some value in residual stands, to take advantage of opportunities for regeneration, and avoid damage to residual stands. Such cutting practices have a cost to the landowner, whether professionally supervised or not. The timing of the cutting may well be opportunistic and unplanned. There may be little or no consideration for intermediate treatments or thought for future harvests. To the extent that tracts smaller than 100 acres or so are being managed at all, this would probably describe the approach being taken. Careful cutting is surely a good deal better for the land and for the future than the typical alternatives.

Levels of Forest Management	
Careful Cutting	Practice sound cutting when harvests occur
Conscious Long Term Management	Plan management overtime; use professional aid; schedule cuts at silviculturally best times
Intensive Management	Intensive attention to stands; lighter cuts; shorter cutting cycles; focus on quality; may include planting, vegetation control.
Nontimber Management	Riparian Plantings, or management for habitat or other objectives.

Some of these smaller tracts have benefited from plantings and thinnings with cost-share funding in the past. Evidence shows that retention and follow-through on management treatments is weaker on the smaller tracts. This follows from the low motivation of such owners and the adverse economics. If a publicly funded program cost-shares a 3-acre plantation, this is fine, but there may be no way to get it thinned at a suitable time in 15-20 years.

Delivering forestry information, advice, and services to the smallest owners is far more costly than to larger ownership sizes (see, e.g., Londo, 2002). Further, the smaller tracts are likely to turn over faster, so the education job needs to be re-started from scratch with a new owner.

Our interviews with loggers and industry sources convince us that wide use of careful cutting will contribute to retaining quality growing stock on small tracts, and will improve the quality of future growth. This is the one most important thing to accomplish on these lands. Without some amount of quality growing stock, it will not matter what tax program the land is in or what the owner's motives are.

This has critical implications for public policy. Abundant experience teaches us that it is extremely difficult to foster quality management through coercive regulations (Irland, 1996). Regulations can succeed in compelling owners to restrain undesirable behavior such as skidding through creeks or ignoring machinery defects that can cause forest fires. But to motivate small owners to improve stand quality will require a mix of different approaches. Often, a landowner may be introduced to forestry by responding to someone advocating that they use more careful cutting practices.

Conscious long-term management would describe a next level of management. This recognizes that forestry is not merely the random application of practices at unplanned times, but is a conscious pattern of activity in harvesting, tending, and establishing stands over periods of time. Improvement cuttings are used to upgrade growth rate and quality; thinnings to remove trees of poor form and vigor; cleanings to remove less valuable competing vegetation. Harvests may be planned to maximize regeneration of desirable species and not merely to remove the most commercial value. Rigid sustained yield is not usually a realistic objective, even for tracts as large as 250 acres, but owners plan to improve growth rates and stand quality and species composition. In addition, conscious long-term management may suggest that for at least some stands, the time to cut is not now, but later. Or, that the best treatment right now is an

intermediate cut rather than a final harvest. In planned long-term management, as in intensive management (below) significant parts of the total harvest come from intermediate treatments and not final harvests (which is why volume markets for pulpwood grade material are so important).

Intensive forest management would be one step beyond conscious long term management. Intensive management involves higher degrees of management attention and investment. The purpose may vary from place to place, and is often aimed at improving stand composition and quality and not only at improving volume growth. Retaining supply potential for the southern yellow pines on many sites involves planting and some level of stand tending prior to crown closure, as well as thinnings over the life of the stand. Suitable measures to foster, or at least avoid disincentives for, intensive management, will be important to offsetting future erosion of the commercial forest base.

Nontimber forest management. The emphasis on riparian buffer planting is an example of a forest practice with a nontimber objective. There may be others. Practices implemented for nontimber purposes may require intensive site preparation, removal of competing vegetation, and various forms of early tending. We expect that there will be an enduring strain of such practice in Maryland forest policy and do not intend to downplay their importance here. Our assignment, however, has been to examine commercial wood supply only so we have no further comment on nontimber forest management.

To predict future productivity, it would be most desirable to conduct a rigorous, third-party assessment of quality of cutting practice, such as was recently done in West Virginia (Fayvan, Grushesky, and Hassler, 1998). Such a survey would objectively document how future stand productivity is being affected by current cutting practices. It would supply vital guidance for extension, landowner education, research, and policy. It would also supply a more rigorous basis for predicting future productivity. As a by-product, it might also help motivate awareness of forest management.

A related need is for a periodic survey documenting the total acreage harvested in Maryland, and the annual amount of planting, thinning, and other treatments. Surveys of this kind in Minnesota and Maine offer excellent examples. Even if this could only be done every three years, it would be a valuable contribution. Some of this is already collected, but there seems to be no overall use of the data.

C. Management as a Response to Potential Stresses on Long Term Growth

More widespread use of careful, active forest management will contribute to society's ability to respond to a number of uncertain long term stresses on future forest health and productivity (see, e.g., Millers, Shriner, and Rizzo, 1989; Twardus, 1999; and Sharov, et al., 1999). To the extent that more active management may help offset future adverse impacts on growth, it can also help offset loss of commercial forest landbase.

Maintaining stand vigor is often the most common recommendation for preparing forests to weather infestations of southern pine beetle or other native pests. Sound matching of species to site is a related practice.

Reducing stand vulnerability to exotic pests such as the gypsy moth may require intelligent intermediate cuttings to maximize stand vigor and to remove low-vigor individuals on highly vulnerable sites. Managing white pine blister rust often includes pruning and removal of alternate hosts (ribes) of the pathogen. (This is only conducted today for high – value stands)

For other pests, such as the hemlock wooly adelgid, no known preventive methods or insecticidal treatments are available. Prompt and careful pre-salvage or salvage can protect other

forest and landowner values and may help in reducing fire hazards if properly conducted. (the ecosystem's need to retain snags and down woody debris should be considered, but this may not be best managed by doing nothing).

A heightened concern has been evident in recent years for the effects of exotic invasive plants. Some of these plants threaten regeneration of desirable timber species and others may eliminate important understory plants from the forest. It is on the smallest properties that the chances of owner involvement in removing invasive exotics may have the best chances of success. There may be few more potent messages for getting owners re-connected to their land than the issue of exotic plants.

Potential stresses on forest due to high levels of air pollution have long been a concern. Maryland, for example, is in a zone subject to unusually high ozone stress, and to elevated levels of nitrogen and other deposition. It is recognized that certain species of trees are vulnerable to certain pollutants. Sea level rise has been ongoing for centuries and is likely to continue. Encroachment of salinity and higher water tables are likely to affect forest site productivity in local areas (Kearney, 2002). Extensive areas on the Eastern Shore are at risk.

There is considerable debate over whether long-term future climate change will affect forest health and productivity. The current state of the science does not permit credible predictions for local areas, and the likely extent of and importance of future impacts are much in dispute. Impacts on forest growth and composition, if they occur, could well vary within the State. At present, there is no consensus over whether future climate regimes will include, for example, higher frequencies of extreme storms that will damage forests. Some climate scientists believe the odds are likely that this will occur. In the Mid Atlantic Regional Climate Change Assessment (MART, 2000), an effort was made to assess cost impacts of higher storm frequencies by surveying forest managers. This survey yielded estimates of cost increases, which were used in an economic model to assess economic impacts. Such estimates are highly speculative at this point, and can be considered illustrative only. Yet, among those assessments expecting future climate change to affect forests, there is a universal acceptance that more active management will supply one approach to "coping" with the situation.

In dealing with these and other potential long term stresses on forest health and growth, a measure of management in advance of a crisis is often most helpful. Active management in support of generalized concern with forest health can be supportive of long term commercial wood supplies as well.

HOW MANY AVAILABLE FOREST ACRES ARE NEEDED TO SUPPORT MARYLAND'S INDUSTRY?

Table 50 shows a very simple, judgment-based approach to this question. Panel A shows a number of ways to view the issue of available acres. The FIA estimate of "Timberland" is an "air photo" estimate of timberland. It does account for many factors affecting actual supply. This view is taken in many other studies, some cited in the text of our draft.

This table drops out all acres shown as "urban" in FIA. This brings the acreage down to 2.2 million acres. It allows 5% off for topography (swamp in E. Shore; steep slopes in W. MD). Then on private land, it removes another 5% for nontimber goals and regulations (buffers). This could be low. On the public lands, it drops out all but an estimated 117,000 acres of State forest. (Note: FIA tallies as "reserved" only acres legally and clearly reserved... even on National

Forests, it does not net acres down to what is shown as suitable and available in Forest Plans. MDNR does not have a number corresponding to that concept)

This nets down to 1.7 million acres (row labeled “B” on the spreadsheet) that could be considered “available” for management and harvesting. But this does not consider the fact that only 66% of the State’s acres have sawtimber. In an area with limited pulpwood markets, we can assume that stands with no sawtimber are not usually operable – especially so on the small holdings. Also, no allowance is made for the 40% of the land below 50 acres in tract size. Taking these out would potentially cut the landbase down to 673,000 acres of really manageable and operable land. The odds that the bits below 50 acres in size today will still be in the commercial supply in 20-30 years are vanishingly small. At this point we do not need to choose any specific combination of these assumptions as a final estimate. The fact that only 60% of the annual growth being cut is evidence that availability factors do function.

Panel B. shows alternate measures of the production requirement. For the moment, we set aside the distinctions between growing stock and total harvest, and between land clearing and other sources. Based on our woodflow analysis above, about 2.2 MM green tons are cut within the State, and 3.6 MMGT are used.

Assuming the recent measured growth from FIA, that is .56 cord/A/yr. To produce that 2.2 MMGT of fiber would require 1.3 million acres, *all of it managed and all of this growth being cut*. If, more realistically, we assume that the same percentage of annual growth would be cut as is being cut now, it would require 2.2 million acres to supply 2.2 MMGT/yr. If owners could boost growth by good management (not intensive), it would reach .82 cds./A/yr., and industry would need only about 900,000 acres. But, again, owners would have to manage and operate all of these acres over time. It would be useful to run a good Woodstock or Atlas analysis that would recognize that the sources of supply, and future management options, are far more complex. As listed in this panel on the right-hand side, Maryland mills already buy a much of the wood elsewhere (almost half a million cds, or enough for a modestly large pulp mill) Some of the wood now comes from opportunistic sources like land clearing and salvage; some comes from basic, plain vanilla good cutting practices. Far less comes from planned long term silviculture and intensive management, from which significant volumes emerge from intermediate treatments. It would be useful to know the numbers and to model all of this in a more sophisticated way.

To supply the TOTAL usage of Maryland mills (3.6 MMgt) would take 2.1 million acres of available land, based on recent measured growth rates. Again, this would require cutting all of the growth on all of these acres, something which we know is not happening now. (The question posed to us does not distinguish between supplying just the current fraction, or the total usage.) Interestingly, to run Maryland’s own *domestic forest industry* does not require near as much land as to meet the *consumption requirements of Maryland residents*.

The short answer to the question of how many acres are needed, is that, when the realities of supply and availability are taken into account, *Maryland needs more than it has today*. Due to data limitations, we base this conclusion on professional judgment and on a highly schematic analysis. The assumptions used, we think, have been clearly indicated so that others can examine the problem using any assumptions they prefer.

Table 50
Maryland Forest Land Needed

A. Landbase Data		1000 A.					
		<u>Total</u>	<u>Public*</u>	<u>Private</u>		<u>Remarks</u>	
All forest		2,565.8				"All forest" not broken down pub/pvt.	
Less prod res & other		-193.9				*Public:	
						crude est:	
A. Timberland		2,371.9	479.6	1,892.3	**	421.6	FIA 99
						58	Chesapeake
Less urban		-138.5				479.6	total
		2,233.4	479.6	1,753.8			FIA showed 88,000 industry w. 24.6% SE
Less topo							**Miller s/s Jan 8, 2003 shows pvt forest
@ 5%		2,121.7	455.62	1,666.1	=		"2171.7"
Less: nontim							
goals, regulation			338.6				Assume on pvt. another 5% lost -- avoid overlap
							w. topo.
B. Equals		1,699.8	117	1,582.8			117,000 from RW policy dft, p. 4 notes.
C.		1,121.9					sawtimber is 1,575,000 A. vs total of 2,372,000
							or 66%
D.		673.1					40% of all forest land is smaller than 50 acres

Table 50
Maryland Forest Land Needed (cont.)

B. Alternate Measures of Production Requirement							
		1,000 grn	1000		<i>Sources of Supply of Roundwood</i>		
		<u>tons</u>	<u>cords</u>				Percents???
Roundwood harvested		2,253	733	Net Imports			
Total Fiber used by MD mills		3,619	1,178	Opportunistic	ROW/land clrg		
					terminal cuts		
Net imports		1,366	445		salvage		
				Sound Cutting practice			
Acres to supply 2001 Harvest:							
				Longterm planned silviculture			
Recent grth			1,000 Acres	intermediate/salvage			
.56 cord/A.			1,310	final harvest			
				Intensive Practices			
Potential grth				intermediate/salvage			
.82 cd/A			894	final harvest			
Acres to supply 2001 Usage:							
Recent Grth			2,104				
Potential grth			1,437				
.....							
		<u>Pct of cut</u>	<u>Cord/ton</u>				
conversion:	HW	0.7	0.312				
	SW	0.3	0.357				
		ave	0.3255				

Observations

This kind of judgment-based analysis has the merit of being simple and easy to understand. Making it more complex delivers little additional value. But such a framework enables others to explore assumptions they may prefer, and to incorporate any better data that may become available. Certainly the differences between Western Maryland and the Easter Shore in forest types, wood markets, and ownership would be highly relevant. But analyzing them separately would require redoing the wood flow analysis, specializing it to each region – which is not feasible for this project. Also, FIA data show that pine and oak are closer to the breakeven point in growth/removals than the rest of the species.

We could say, why not just let Maryland's available timber resource run down as the developers subdivide the land, and just buy the wood we need from nearby states? From the wood industry's standpoint, this amounts to assuming that there are no developers or land use pressures in those adjacent states. Question: Are Maryland's policies pushing development into adjacent states? It was widely believed during the 1970's and 1980's that, for example, Vermont's stringent development rules pushed subdividers, esp. the more short-term exploitive

ones, to New Hampshire. It has been said that Vermont's forest practice rules have about run the "liquidators" out—they're now prospering in New York.

SCHEMATIC ANALYSIS OF FUTURE SUPPLY – IN ACRES

"Availability" is less a black and white difference than a spectrum. An acre is not "Timberland" or "Not Timberland." Many ownerships are someplace on a spectrum between providing occasional, almost accidental supply, versus what may be termed passive management (no intensive practices but occasional managed cutting), and then actively and even intensively managed acres. A given tract might move between these levels of management over time. The Chris Conn analysis of logging probability is useful, though it is hard to explicitly reconcile with the actual level of recent production.

The table below suggests a way to think about this in simplified form. Does it help us explain the issues here? Obviously this only illustrates the issue and does not embody meticulous surveys and calculations justifying the classifications. The results, though based on assumptions, show the importance of recognizing the spectrum of management activity and how it might be affected by tract size. The most effective policy responses would likely vary according to the sizes of tracts, objectives of owners, and local market realities. We suspect that county level staff already account for these factors in their work, but at state and federal level, these factors do not always receive due weight.

Table 51
Hypothetical Sketch of Future Supply Base

Maryland Commercial Timber Base -- 20 yrs on

Item	Amount 1000 A.	Occasional Supply	Passive Mgmt	Active Mgmt	Remarks
Total Timberland 1999	2,372				From FIA 1997
Less all in "Urban Corridor"	585				Assume supply potential zero in 20 yr
Equals	1,787				
Less 50 A. & Smaller	934	600	334		Assume 2/3 passive
Equals	853	300	300	253	Assumptions (optimistic?)
Recap:					
	Total timberland				2,372 IN 1999
	Future Base:				
		Occas.	900		
		Passive	634		1787 IN 2022
		Active	253		

WHY DOES A COMMERCIAL TIMBER SUPPLY MATTER FOR MARYLAND?

As we have seen in previous sections, the wood-based economy of Maryland is very small compared to the State's total economy. Also, a portion of the employment in these businesses depends on wood from out-of-state, and on wood that could not be produced in Maryland due to the composition of its forests, or the economics of supply from fragmented small ownerships. In the short run, few if any Maryland *consumers* would notice if log production from Maryland were to cease. We argue above that the small parcel sizes, the extensive competition for land, and the likely further conversion to other uses in the future will reduce availability. We think the answer to the question "How much commercial forest does Maryland's economy need?" Is simple: **All of it.**

This cannot be demonstrated with numbers. We argue above that there is no critical threshold beyond which a crisis occurs. The process is largely irreversible. We think the

prudent course is to take the issue seriously and not watch resource supplies and economic opportunities slip away. The public in Maryland readily accepts the need for retaining forests as open space and habitat. Voters have funded extensive programs for these purposes. These efforts are justified by the many positive externalities yielded by forests. The opportunity and the need to retain long term production benefits from those forests has gained much less attention. Why should citizens care?

a. Timber-Based Jobs are important in Rural Areas

Only nine counties of Maryland are outside of metropolitan areas. These counties account for a small share of the population, but in these counties, wood-based pursuits are important to the local manufacturing sector. In some areas they supply important year-round jobs that supplement activity in the seasonal tourist sector. In many small communities, the tax base provided by small mills and wood using operations is important to their tax base.

As we indicate elsewhere, even small plants generate multiplier effects, so that total jobs involved are 2-3 times the number of direct jobs supported by Maryland timber.

b. Timber Production Provides An Additional Positive Reason For Open Space Retention

Their role as suppliers of raw material provides an additional positive reason for retaining forested open space. It would be rare that timber revenues could actually pay for those other benefits, but they would offer a means of contributing to funding overall management budgets. It is certainly true at present that on many public and private management units the timber revenues are supporting roads and facilities used by the general public.

c. Timber Production Provides some Revenue for Rural Private Landowners

Over time, a significant income flow to rural landowners and rural areas comes from forest management and utilization. We have no good measurement of the dollar amounts, but it is real and it is important to many people. In some counties, timber is likely a significant product in revenue terms, compared to farm crops.

d. Working Forest Infrastructure Can Support Other Social Purposes

The existence of logging and milling operations enables the removal of wood cut in land or right of way clearing, salvaging storm damaged trees, and in some cases recycled urban and manufacturing wood wastes. This reduces costs of managing these problems.

e. The Rural Economy May Be Small, But It Is Important

States have struggled for generations with various efforts to maintain the vigor of small rural places in our society. The reason is that there is a widespread feeling that they should not be totally left behind as economic change centralizes more and more economic activity into metro areas.

f. Retaining Commercial Forest Retains Options

When oil prices skyrocketed in the 1970s and 1980s, many families in rural and suburban areas turned to wood heating to offset the impact of the cost of oil. In so doing, they became involved directly in supplying one of their own life necessities, which cannot be a bad thing. They saw directly that using the forests for products can be beneficial. The option to use wood on a larger scale in educational, commercial, and large facilities, has value to our society in the longrun.

When softwood lumber prices spiked to historically high levels during the 1990's, small local mills turned to local species and were able to meet at least local needs for lower grade wood at times of nationwide shortages.

g. Halting Wood Production In Maryland Moves The Environmental Issues Elsewhere – Out Of Sight

As Berlik, Kittredge, and Foster (2002) argue, shutting down local wood production gives an “Illusion of Preservation.” It creates the impression that so-and-so many acres of forest are being saved. Well, they are – in Maryland. But the same acreage – or more – will be harvested elsewhere to supply the State's wood needs. Maryland already imports the bulk of its wood for good economic reasons. It would be silly to propose that the State should be self-sufficient. But an “Illusion of Preservation” should not be the basis for hasty judgments about the importance of the State's own renewable wood supply.

f. Public Actions have Caused Significant Reductions in Supply Potential

The most important factor affecting commercial uses of Maryland forests has been road and bridge developments that brought subdividing for the leisure lot market to formerly remote corners of the State. Those highways have brought opportunities and a measure of prosperity, but they have also stimulated the conversion, fragmentation, and loss of resource supply potential in both agriculture and forestry. The land has been converted from a productive asset to a consumption good and a speculative vehicle for short-term profits.

The underlying cause was not “the market” but public action. Rising market values followed road building. There is reason to argue, then, that public action to offset the consequences of these unintended changes is warranted.

PART FOUR. POLICY ASSESSMENT AND RECOMMENDATIONS

10. Policy Assessment

11. Findings and Recommendations

10. FORESTLAND AND PUBLIC POLICY

HIGHLIGHTS

1. Maryland has an extensive suite of forest policies. These policies are primarily aimed at public ownership, regulation, management and education. Retention of commercial wood supply is not a clear goal of most of these policies.
2. It is a daunting task to compile all information on all those programs, the acreage and participants, and to estimate their effects and their cost-effectiveness. This chapter offers only an initial sketch.
3. In total, about 24% of Maryland's forest is "protected" in one sense or another by the State's programs.
4. At the same time, since development is driven by demand, and constrained to a degree by public policies, it is not certain what the net effect of these policies has been, in a with-without sense.
5. The reason for public policies to retain forest lies in the uncompensated positive externalities generated by private forest land.
6. Many questions were encountered during this brief assessment; these are listed at the end of this chapter.
7. Policies at the federal level, and policies not principally directed at forest retention and management, are not considered in this study.
8. A specific list of findings, information needs, and recommendations appears in the next chapter.

INTRODUCTION

Maryland has a number of public policies and programs aimed at retaining forests as a preferred land use. These policies and programs range from direct ownership of forestland to easements, regulations, economic incentives, and education and extension. Some programs, such as forest management education and extension, do not have “retaining forests as a preferred land use” in their official mandate but, to the extent that these programs offer landowners greater benefits from their forestland, they may increase the likelihood that land stays in forest uses, all other things being equal.¹¹

Even so, forests are becoming a less common land-use. Since 1950, Maryland has lost about 12 percent of its total forest land. Between 1986 and 1999, total forestland decreased by 3 percent. While the loss of forestland has not been nearly so drastic as state losses in farm land (a fifty percent decline since 1950), it has been significant. Moreover, along with the general

¹¹ Maryland's own forest policies are well summarized in Maryland Forest Task Force (2000); Maryland Dept. of Natural Resources and Office of Attorney General (2001); and Environmental Law Institute (2000). Hairston-Strang, Harding, and Powers (2002), discuss the application of many of these policies on the Eastern Shore. On farmland issues, see Anon. (2001). Specific State policies, with lessons learned, are described in Wagner, et al. (2002); Kittredge, Rickenback, and Broderick (1999); Rose and Coate (2000); Irland and Maass (1991); Rosen and Kaiser (2003); Jones, et al. (2001); Irland (1996); Irland and Connors (1994); Irland (2001); Moffatt and Speir (2002); Fraser (2000); Guillery (2000); and Larson (2000).

decrease in total forests, there has been a shift in some fundamental characteristics of the remaining forestland.

In 1986, just under 4 percent of Maryland's forestland was held in productive reserve¹². By 1999, 7 percent of Maryland's forestland was held in productive reserve¹³. This change was generated by a decrease in total forested acres and by a 72 percent increase in productive reserve. As discussed below, these Forest Inventory Analysis (FIA) statistics may understate the shift of timberland to productive reserve.

Along with withdrawals of forestland from timberland, Maryland's forests are becoming increasingly fragmented, as discussed in the first section of this report. This increased fragmentation of forests has both environmental (habitat) and commercial impacts. Smaller forest parcels are less useful to wildlife and, at some point, they become less useful to commercial buyers of timber. In addition, population growth and development which generate smaller forest parcel sizes also tend to reduce the likelihood that the remaining forestland can be used as timberland (Conn, 2001). It is important, therefore, to consider not just changes in total acres of Maryland forestland but, also, changes in the ownership and parcel sizes of forestland with respect to its environmental, social and commercial benefits.

This section will discuss these changes with regard to policies and programs designed protect forest land uses. Many of the policies discussed will have direct forest retention objectives underpinning them. Others have water quality, wildlife, or aesthetic objectives as their basis. These policies will be considered with regard to their impact on retaining land in forest uses and the quality of forest uses that they generate.

This discussion will break out policies in terms of their degree of public control, starting with public ownership of forestland and continuing through regulatory, incentive-based and educational policies and programs. Following the description of existing policies and programs, we will assess their costs and their actual or likely impacts with regard to retaining land in forest uses.¹⁴ An important distinction will be made between forestland and timberland. The set of land that qualifies as "forestland" includes, "land that is at least 10 percent stocked with trees, or that formerly had such tree cover and is not currently developed for a non-forest use." This set includes several sub-categories including, "timberland." Timberland is forest land capable of producing more than 20 cubic feet of wood per year and not withdrawn from timber utilization. The final phrase of that definition refers to productive forestland that, for one reason or another, will never have its trees harvested. This is known as "productive reserve," or "reserved productive forestland."

Specifically federal policies, such as federal income taxation, are outside the scope of this report.

As we were completing this work, Kenneth Miller of DNR provided a spreadsheet summarizing public protected lands (nonmilitary). It identified a total acreage of 1.1 million protected acres, 17.9% of the State. It did not identify vegetation cover, however. This information will be of great interest to readers of this report.

¹² Forest land sufficiently productive to qualify as timberland but withdrawn from timber utilization through statute or administrative designation.

¹³ These percentages are based on *Forest Statistics for Maryland: 1986 and 1999*. Thomas Frieswyk, USDA Forest Service, Northeastern Research Station, 2001.

¹⁴ A variety of recent publications provides general overview and assessment of major policies for private forestry: Best and Wayburn (2001); Sampson and DeCoster (1997); Ellefson, Cheng, and Moulton (1995); Boughmann (1994); Maine SPO (2001); and Kilgore, Ellefson, and Phillips (2003).

A. PUBLIC OWNERSHIP

State Owners

Maryland's Department of Natural Resources manages over 435,000 acres of public land in the State¹⁵. State Parks, State Forests, and Wildlife Management Areas comprise the majority (328,202) of these acres. At present, another 60,958 publicly-owned acres fall into the category "undesignated." These include 58,257 acres of Chesapeake Forest (Caroline, Dorchester, Somerset, Wicomico and Worcester Counties), 2,225 acres of Chapmans Forest (Charles County) and 476 acres of Franklin Point (Anne Arundel County).

Some of the properties managed by DNR have nothing to do with forests. These include Marine/Communication facilities (85 acres), a beach erosion control district (15 acres) and a property formerly used by the Tidewater Administration (1,023). However, taken together, these properties account for less than 0.3% of the total. For all DNR-managed, State-owned properties, forests only comprise 77 percent of the total.

State Parks account for 91,920 acres of DNR's land portfolio and these are managed primarily for outdoor recreation and conservation of open space. There are 48 State Parks in Maryland, ranging in size from the 4 acre Casselman Bridge in Garrett County to Gunpowder Falls, which occupies 14,913 acres in Baltimore and Hartford Counties. While most of the land in Maryland's State Parks is in forest, measures of the precise forest acreage are not available.

State Forests are managed for a wider range of uses, including water quality protection, wildlife, timber, scenic beauty and low-intensity recreation. These lands constitute the largest State landholdings, accounting for 135,656 acres. There are 11 State Forests in Maryland, but the largest five of these account for over 90 percent of the total area.

While, in general, State Forests are managed for multiple uses, 12 percent (17,093 acres) of these lands are set aside as "wildlands." These lands are preserved for their wilderness characteristics. There are an additional 26,266 acres of wildlands distributed among other State-owned lands. Only about 50 percent of State forestland is under "general management," which permits harvests so that, the actual acreage that is "timberland" is closer to 70,000 acres.

Natural Resource Management Areas (22,152 acres), **Natural Environment Areas** (12,458 acres) and **Wildlife Management Areas** (100,626 acres) together account for 135,236 acres of woodland, marsh and farmland. These are three distinct categories of DNR-managed public land, but they share many management characteristics and are primarily maintained for agriculture, environmental benefits, and hunting and birding. Commercial timber extraction is not a standard use for these properties.

Undesignated Lands (60,958 acres) are uncommonly large at present, due to the recent acquisition of the Chesapeake Forest properties on the Eastern Shore. This is not a single contiguous block, but includes a number of forested tracts in Caroline, Dorchester, Wicomico, Worcester, and Somerset Counties. An Advisory Committee has been formed as a first step in the process of developing a long-term natural resource management plan for these lands. Preliminary indications are that a significant portion of these tracts will remain available for timber production (Glatfelter not included).

¹⁵ Public Lands, 2002 Acreage Report, Maryland Department of Natural Resources, April, 2002.

Other Public Landowners

In addition to DNR, both the federal and county levels of government own significant forested acres in Maryland. Using MDP figures¹⁶, out of a total of 90,087 Federal acres in Maryland, about one half of these (49.9%) are forested. Over 21% of the federal government's holdings in Maryland are wetlands. Counties are also major landowners. Out of their holdings of 119,576 acres, 78,210 are forested. These figures do not include forestland owned by municipalities.

Table 52
Public Ownership of Land in Maryland (2000), by Owner and by Land Use*

	Agriculture	Forests	Wetlands	Other	Total
Federal Lands	8,444	44,913	19,195	18,017	90,569
DNR Land	32,457	328,419	60,016	7,525	428,417
County Land	12,101	78,210	1,693	27,572	119,576
Total	53,002	451,542	80,904	53,114	638,562

Source: MDP Analysis.

*The discrepancies between these figures and State ownership figures given in the text can be accounted by the use of more recent DNR Public Lands data in section A, above (there have been post-2000 purchases by the State).

Table 52, above, provides a summary picture of public ownership of land and forestland in Maryland. These figures are based on MDP analysis of satellite images and Maryland Property View for the year 2000. Interestingly, forestland (328,419 acres) comprises only 78 percent of all DNR's property. It should be noted, however, that the more recent DNR Public Lands figures cited on pages 3 and 4, above, show an additional 6,000 acres in DNR's portfolio. It is not known what percentage of those acres are forested.

Discussion

Given the current estimate (Frieswyk, op. cit.) of forested land area in the State (2.565 million acres), DNR's forestland holdings amount to almost 13 percent of the forest base. However, if timberland is the parameter of interest, then the State share of the total drops to just below 5 percent.¹⁷ These disparate statistics raise the question, with regard to forestland retention; retained for what?

¹⁶ Data provided by Lynda Eisenberg, Maryland Department of Planning: "Protected Lands in Maryland by Land Use Classification", November 2002.

¹⁷ Calculated as State Forest Land not including wildlands (117,540 acres) divided by state timberland (2.372

Land managed by DNR but functionally excluded from timberland amounts to 298,406 acres, or, about 72 percent of their total holdings¹⁸. These acres offer many of the benefits of forests (e.g., preservation of open space, habitat preservation, air and water quality benefits, recreational benefits, and others), but not timber extraction. These reserved lands have been increasing over the past 14 years.

While total forestland in the State diminished by 3 percent between 1986 and 1999, over this same period timberland fell by almost 6 percent. Some of this shift was caused by an increase in publicly owned productive reserved forestland (from 104,300 acres to 179,800 acres, using USDA statistics). Some was caused by the conversion of timberland acres (from 2.422 million acres to 2.234 million acres). Interestingly, this loss in timberland was focused in rural areas. Over this same period, urban timberland actually increased (Frieswyk, p. 34).

Publicly owned forestland is managed for multiple uses. It is beyond the scope of this study to address the relative weights given to timber as opposed to non-timber uses of public land. On the other hand, it is relevant to ask how publicly-owned timberland is being utilized, relative to Maryland timberland in general. Toward this end, a five year average annual Maryland forest harvest figure was developed for the years 1995 to 2000 and this average was compared with harvests from all State-owned timberland over the years 1998 to 2001¹⁹. These figures are given in Table 53, below.

Table 53
DNR and Average Maryland Harvested Acres By Year*

	1998	1999	2000	2001
DNR Forest Harvests (acres)	1168.6	832.4	931.1	730.5
1995-2001 State-wide Average (acres)	27069	27069	27069	27069
Ratio of State Forest to Total Harvests	0.04317	0.03071	0.03440	0.02698

*DNR Forest harvests data from Jack Perdue, MD DNR, 1995-2001 State harvest average from Sediment and Erosion Control Plans filed with Soil Conservation Districts (also, Jack Perdue)

By this measure, State Forests have only come near to supplying annual harvests (on an acreage basis) commensurate with their share of total State timberland (5 percent) in 1998. This statistic could be biased, to the extent that there is any downward trend in harvests over the period averaged. The data are limited for this test. From 1999, onward, timber harvests from State lands have been a smaller and decreasing proportion of total state timber harvests. Of course, these State averages mask a great deal of local variation. In Allegany and Garrett counties, timber from State-owned lands have accounted for 19.6 and 17.6 percent of their

million acres). As the State Forest Land acreage that is actually in forest cover is not known, and the complete acreage under general management is, similarly, not known, the full acreage of State Forest Lands is used here, giving a maximum calculation of this parameter.

¹⁸ This estimate excludes all DNR-managed land such as State Parks, WMA, NRMA and other DNR lands and includes only State Forestlands net of wildlands. It is based on total ownership figures from the Public Lands Report and is not prorated with respect to forest cover.

¹⁹ These figures are based on DNR data and were provided by Jack Perdue, MD DNR Forest Service.

respective annual County harvests. In Worcester County, harvests from State-owned land (3.4 percent of the County average harvest) were closer to the State-wide figure.

Harvest rates (on an acreage basis) of State-owned timberlands are, in general, lower than harvest rates on all Maryland timberland, and the trend for the sample seems to be downward. On the other hand, over the long run, harvests from State Forest land will remain possible because harvests are primarily from areas that are managed for timber production. Timber harvests from private land are often a prelude to development and thus represent the end of forest uses for those parcels.

In addition, DNR-managed forests can, to the extent that they employ best management practices, provide a useful demonstration effect for private landowners. Harvest and timber management practices demonstrated on these lands can have a beneficial impact on private forestland management if an active effort is made to extend information about them through public outreach and bringing private landowners to those demonstration sites.

The State clearly has multiple objectives for its forestland. The specific ratios of timberland to recreational or wilderness uses are a result of political processes that play out on a case-by-case basis as new public forestland is acquired. An indication of the current political balance can be observed over the next several years as the public and the State agencies hammer out the uses for Chesapeake and Glatfelter Forests on the lower Eastern Shore. As this is done, a careful process of trading to selectively “block up” units would serve multiple goals.

B. CONSERVATION EASEMENTS

Although the State’s holdings of forestland are substantial, a much larger share of the total is held by private landowners. Almost all privately held forestland qualifies as timberland. About 82 percent²⁰ of the State’s timberland is held by private sector owners. About 4.5 percent of private timberland (88,000 acres [Frieswyk, pg 43]) was held by forest industry owners in 1999 and the other 95.5 percent is held by smaller-scale private landowners.

Today, industry ownership is negligible. The uses of private timberland are largely private decisions. Zoning ordinances and State regulations such as the Critical Areas Law and the Forest Conservation Act (discussed below) impose some restrictions on these decisions, but even with these ordinances and regulations, private timberland continues to move out of forest uses. A widespread and growing approach for stemming this shift is the purchase of conservation easements.

Conservation easements entail the transfer of certain use rights associated with ownership of land, but not ownership. That is, a landowner retains ownership of the land but is prohibited from developing it or has prescribed conservation practices that must be employed during the life of the easement. The easement rides with the land, regardless of changes in ownership. While each easement specifies its own terms and conditions, in general, they prescribe what activities can and cannot be undertaken on the lands for the life of the easement.

Several State agencies acquire and facilitate the acquisition of conservation easements. Pre-eminent among these are the Maryland Environmental Trust (MET) and the Maryland Agricultural Land Preservation Foundation (MALPF). In addition to these agencies, new State

²⁰ This percentage is based on the FIA (2001) which only extracts as reserve land those acres that are specifically precluded by legislation or regulation from harvests. In our calculation of the State’s timberland, we excluded all forested property that was not part of the State Forest System. Under that criteria, private ownership of forestland was closer to 95 percent of the total.

programs such as Rural Legacy and GreenPrint work to conserve forest land through conservation easements, among other practices. We are grateful to MDP for supplying interim estimates of easement acreage. Unfortunately, it was not possible to complete up-to-date year-end 2002 data in time for this report.

The Maryland Agricultural Land Preservation Foundation

The Maryland Agricultural Land Preservation Foundation (MALPF) was established by the Maryland General Assembly in 1977. Its mandate is to preserve agricultural land and woodland through the establishment of agricultural land preservation districts. These districts are composed of properties for which the owners have offered an explicit price at which they will sell a permanent conservation easement. Local Agricultural Land Preservation Boards use funds generated by property transfer taxes to buy easements on portions of these preservation districts, up to their available funding. Criteria for selecting properties and easements have been cost, contiguity and concentration, and environmental value of properties.

By their own report, through the end of 2001, MALPF helped to protect about 198,276 acres of Maryland agricultural land (including woodlots) through perpetual preservation easements. The purchase price for these easements has been approximately \$258 million (Maryland Agricultural Land Preservation Foundation, 2001). In addition to this expenditure, there is an additional fiscal cost to the State caused by these purchases. Most MALPF easements are sold at a discount from their appraised value. From inception up to 2001, MALPF estimates that the total value of this discount has been almost \$78 million. However, this difference between the easement purchase price and its market value can be deducted from the sellers tax bill as a loss in income, so that some portion of this savings has been lost to the State as diminished tax revenues.

The Maryland Environmental Trust

The Maryland Environmental Trust (MET) was formed in 1967 to “conserve, improve, stimulate, and perpetuate the aesthetic, natural, scenic and cultural aspects of the Maryland environment” (Chapter 648, Acts of 1967). MET also promotes conservation of open space, and appreciation of the environment and its care. MET is the second largest holder of conservation easements in Maryland. While not funded to purchase easements, it is able to offer tax benefits for the donation of easements. In addition, MET has helped to facilitate the efforts of local land trusts in acquiring easements and raising resources with which to acquire them.

MET has a small staff and operates through Maryland’s DNR. Its operating budget in 2001 was \$629,634. Most of its funding derives from the MD general fund. MET is able to leverage these resources through its work with the many local land trusts in the State and through other programs such as Rural Legacy and GreenPrint. MET’s experience and administrative capacity are used in implementing these other programs. Table 54 provides total and forested MET easement acres by county.

Table 54
MET Easements (as of 2000) By County and Land Use

County	MET Easement (total land)	MET Easement (forested)
Allegany	1,069.03	760
Anne Arundel	324	238
Baltimore County	10,173	3,659
Calvert	2,753	1,936
Caroline	1,365	472
Carroll	748	195
Cecil	3,053	1,000
Charles	3,757	2,327
Dorchester	6,521	2,296
Frederick	2,351	506
Garrett	167	167
Harford	2,475	807
Howard	1,192	391
Kent	6,711	2,041
Montgomery	1,814	501
Prince Georges	126	95
Queen Anne's	7,412	2,109
Somerset	638	106
St. Mary's	1,071	453
Talbot	10,789	2,796
Washington	2,330	661
Wicomico	602	540
Worcester	823	530
State Totals	68,261	24,586

Using MDP's protected lands database and 2000 land use pictures, MET held easements on 68,261 acres, of which 24,587 were in forests, 36,704 were in agricultural uses, 5,000 were in wetlands and the remainder were spread among several other uses.

Rural Legacy

In addition to these two State agencies, Maryland has several programs, such as Greenprint, Forest Legacy, the Transportation Equity Act and Rural Legacy, which aim to preserve resource lands through the purchase of easements. Of these, Rural Legacy is the most ambitious. Approved by the General Assembly in 1997, Rural Legacy seeks to preserve large contiguous tracts of agricultural, forested and natural resource lands through the purchase of conservation easements.

Rural Legacy sought easement acquisitions on the order of 200,000 acres by 2011 and, during its first three years of funding over \$53 million was expended. Using MDP figures for 2000, this funding obtained easements on 28,468 acres of rural land, among which forests composed about 35 percent, agriculture 60 percent, and wetlands about 4 percent of the total. Average price of these preserved acres, if the MDP acreage data capture all the easements purchased by cumulative expenditures through 2000, was \$1,876/acre.

County Easements

Counties can also hold conservation easements on properties, particularly through such programs as the Forest Conservation Act and the Critical Areas Law, both of which are described below. County easements may be held as Tradable Development Rights (TDRs), Purchased Development Rights (PDRs) or as Open Space (OS) for development densities. In total, county TDRs, PDRs and OS provided protection for 103,710 acres across the State.

Private Easements

In addition to State-run programs, private entities can and do purchase (or sell) easements. These easements are recorded in County land records and are just as binding as those registered through MALPF and MET. As of 2000, MDP found 28,106 acres in private easements. Of these 17,989 acres were forested, 5,472 were in agriculture, and 2,926 were in wetlands.

Discussion

Clearly, conservation easements play a significant role in Maryland land markets. Table 55, below, shows acres under easement broken out by forest, agricultural and wetland uses and by easement holder.

Table 55
Maryland Land in Conservation Easements (2000) by Land Use and Easement Holder*

	Agriculture	Forests	Wetlands	Other	Total
MALPF	191458	63847	3190	2989	261484
MET	36704	24587	5001	1969	68261
County TDR/PDR	59959	37245	1279	5227	103710
Private	5472	17989	2927	1719	28107
Rural Legacy	17113	9893	1135	327	28468
Total	310706	153561	13532	12231	490030

*Data provided by Maryland Department of Planning based on Property View 2000

MDP provided MALPF acreage by land use. Due to a coding problem, their figure included errors. These data are being revised and new figures will be available early in the new year. Since those results are not yet available, this table has not yet been adjusted.

In combination with publicly-owned land, these conservation easements comprise Maryland's Protected lands. The total acreage for these protected lands, using the 2000 MDP easement and public lands figures, is about 1.13 million acres, or 18 percent of the State's total land area. Of those total acres, 605,103 are in forest uses, 363,708 are in agricultural uses, and

94,436 are wetlands. The forested lands in this set of protected acres (including Public ownership) constitute about 23.6 percent of the State's forestland.

A caveat for these figures is that a great deal has been done to acquire new easements over the past two years, and the fruits of this effort do not show up in these figures. The State's holdings have increased by at least 6,583 acres over this period²¹. Between 2000 and 2001, MALPF acquired options to purchase easements on an additional 12,987 acres. And, the most recent figures for MET, if accurate, show that they have increased their easement holdings by 17,025 acres over the past two years.

Maryland's protected lands and, more specifically, forested protected lands constitute an important determinant for land use. It is less clear how these lands break out between timberland and forestland. As discussed in the description of DNR lands, less than 28 percent of their managed lands operate as timberland. While many of the easements sold on forested lands do not specifically exclude timber uses of preserved forestland, it is uncertain how much of this land will ever be used for timber harvests.

It is also less than clear how these protected lands impact the larger market where land is able to move into different uses. For instance, if having a conservation easement on forest and agricultural land increases the value of adjoining properties, this will, all other things being equal, increase the likelihood that development occurs on those adjoining properties. While empirically testing this hypothesis is beyond the scope of this study, it seems an important consideration for the future of forestland and timberland in the State. Anecdotally, we have heard speculations that easement purchases may affect prices of nearby lands.

C. REGULATIONS FOR FOREST CONSERVATION

In addition to preserving forestland through fee-simple ownership and by purchasing conservation easements, the State also has the option of controlling the rate of forest loss through regulation. Maryland has a number of regulations on forestry and related practices (Maryland DNR and AG's Office, 2001), but, among these, two stand out as focusing on and significantly effecting forestland retention. These are the Critical Areas Act and the Forest Conservation Act.

Critical Areas Law

The Critical Areas Act was enacted in 1984. The Act identified as Critical Area all land within 1,000 feet of the mean high water mark of tidal waters or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and its tributaries. It also authorized the creation of a Critical Areas Commission which would oversee the development and implementation of land use programs for the Critical Area. These programs were intended to mitigate environmental and, in particular, water quality and habitat impacts of development, principally by slowing down the rate of development in these areas. Retention of natural cover, such as that provided by forests, was viewed, under the Critical Areas Act, a means for achieving water quality and habitat benefits. *To our surprise, there exists no official estimate of the area of forest potentially affected by this provision.*

In implementation, the Critical Areas Act has generated an overlay of three new zoning categories on property in and around the Critical Areas. These categories – Resource Conservation Area (RCAs), Limited Development Areas (LDAs), and Intensely Developed

²¹ This does not include the 2002 Gattfelter acquisition on the Eastern Shore.

Areas (IDAs) – were established, based on land uses current on December 1, 1985. The regulations associated with each classification are applied alongside those of local zoning districts. In the case of conflicts, the more restrictive provision usually applies.

Timber harvests are permitted in the Critical Area, but owners need to present a Timber Harvest Plan for such harvests. Harvests that exceed 5,000 square feet require a Sediment and Erosion Control Plan as well. Commercial timber harvests within the Buffer also require a Buffer Management Plan. While these regulations are reported in several descriptions of the Critical Areas Law, they also generally apply in all other areas of the State.

Further limitations are applied on timber harvests within LDA and RCA zones. These harvests require reforestation and forest retention. Cleared forests must be replaced on a 1 to 1 basis. No more than 20 percent of any cleared forest can be removed from forest use except that a developer can clear up to 30 percent of a forest if he creates compensating forestland (within the critical area) on a 1.5 to 1 basis (Maryland DNR and Attorney General's Office, 2001). The ultimate goal of the Critical Areas Act with respect to RCAs is that there will be no net loss of forest cover in these areas.

The question of whether there is more or less forestland in the Critical Areas due to the Critical Areas Law is an interesting one, but is beyond the scope of this study. We think that analyzing some case studies would be worthwhile.

Forest Conservation Act

The Forest Conservation Act addresses forestland retention fairly directly. The purpose of the act is to minimize losses of forestland that occur when land is developed for residential or commercial uses. Under the Act, a developer must identify forested acres and other sensitive areas in the site planning process. Then, following a schedule based on zoning, the developer is required to retain or reforest portions of the development. Lower-density zoning requires larger portions of existing forestland to be left; commercial and industrial uses require less of the forests to be retained (Galvin, Wilson, and Honeczky, 2000).

Maryland DNR reports that during the first five years (1993 to 1997) of implementation: "Statewide, the Forest Conservation Act and Regulations' effect on development has resulted in the retention of 22,508 acres of forest, the planting of 4,314 acres of trees and the clearing of 12,210 acres" (Honeczky, 1999). The report describes this achievement as "120 percent more forest was retained and planted on development sites than was cleared." It can also be said that, of a total development acreage including about 34,627 acres of forestland, 35 percent (12,210 acres) of those forest acres were lost to development and 26,822 acres of the (unknown) total development acreage were protected by County Forest Conservation Programs (primarily through conservation easements).

Such protection of forested acres will be useful to the extent that these forests are large enough to provide habitat or open-space benefits, provide corridors between forested tracts, protect streams and other waterbodies -- and to the extent that they will not be further developed. Care must be taken, however, to not confuse these additions to protected lands with increases in forestland acreage. They are not. It is not clear whether any of the forests preserved through the Forest Conservation Act fall into the category of timberland. We suspect the proportion is small. We have heard of an example, however, in Worcester County of an FCA tract maintained in a manageable tract that has had timber harvested since the development was complete. Further, some of this area might have been retained by developers in trees even without regulations.

Table 56, below, shows the record of forestland preservation and income from the Forest Conservation Act, since implementation (MD State Forest Conservation Program, var. yrs.).

Table 56
Forest Conservation Act Set Asides and Income

Year(s)	Acreage Protected	Collections
1993 - 1997	26,822	\$91,561
1998	3,261	\$117,172
1999	6,033	\$60,810
2000	2,251	\$60,112
2001	4,893	\$0
Totals	43,260	\$329,655

By June, 2001, the Maryland State Forest Conservation Program had protected 43,260 acres of forestland near developed areas. The Program had also generated around \$329,655 in fees in lieu of reforestation, part of which has been distributed to various tree-planting and forestry activities. Each year for which data are available, the polity with the greatest amount of development also earns recognition for achieving the greatest amount of newly protected land.

Discussion

Associating protected forestland with land development is useful for the reasons noted. The resulting forest, however, is a remnant of a remnant. The Counties are responsible for much of the implementation and monitoring of both the Critical Areas and the Forest Conservation Acts. With regard to the latter, MD DNR does undertake an annual statistical summary FCA achievements, but this is developed from County summaries.

The annual reviews of County achievements target total forest conservation, not characteristics of the lands set-aside. Therefore, it is not possible to establish whether the forest acres set aside in a given county are narrow strips of boundary trees, large contiguous plots, corridors, etc. Without this information, it is difficult to determine whether the FCA is achieving its wildlife, open-space, timberland retention, and other goals.

Some concern has also been voiced that the terms of conservation easements on FCA properties do not permit effective management of the forested acres preserved. In fact, forest management is allowed, but requires a Forest Management Plan, approved by a local forestry board. Our case studies show that in many developments, retained forest acres are parceled out to individual lot owners and not retained as manageable units. The total net area of manageable forest affected -- or retained -- by these regulations is unknown.

D. INCENTIVE PROGRAMS

Publicly supported financial incentive programs aimed at keeping land in forest uses and improving the forestry practices on existing private forest land include:

State and Federal Programs

- The Forest Conservation and Management Program
- The Income Tax Modification Program,
- The Buffer Incentive Program
- Woodland Incentive Program
- Forest Incentive Program
- The Conservation Reserve Enhancement Program.

These programs are described, below.

The **Forest Conservation and Management Program** (not to be confused with the Maryland State Forest Conservation Program) is one of the older forestry incentive programs, dating from 1957. It encourages landowners to manage their forest land in return for a reduced and/or frozen property tax assessment. Requirements for participation include five or more contiguous forest acres that do not double as a home site, cropland or other non-forest uses.

Under this program, a forest management plan (also known as a forest stewardship plan) is drawn up for the property that forms the basis for an agreement between a landowner and MD DNR. The agreement remains in force for fifteen years, during which the landowner must abide by the terms of the forest management plan. In return for this, the landowner becomes eligible for a reduced and frozen property tax assessment on this land. Under FCM agreements, forestland is assessed for tax purposes at \$125/acre.

The agreement between DNR and the landowner is a legally binding agreement that is recorded in the county land records. If the landowner breaks the agreement or sells the property and the new owner will not agree to continue participation, both a penalty and back-taxes are assessed on the property. In the event the property is sold and the new owner is willing to maintain the plan, however, the agreement is transferable.

Since 1985, over 10,900 forest management plans have been drawn up on 513,725²² acres of Maryland forestland. Given that forest management plans stay in effect for 15 years, the sum of all acres coming into the program over the past 15 years provides an estimate for the number of acres currently being managed under this program. While some acreage may have left the program, for those that were part of a FCMA, the cost of doing so seems likely to have kept most of these acres under forest management.

In addition to the Forest Conservation and Management Program, the State also provides a somewhat less valuable, but less restrictive tax reduction program known variably as Private Management Plans or Woodland Management Plans. Under this alternative, land is taxed at an assessed value of \$187/acre – though this changes in some counties. Landowners are required to have and to be implementing a forest management plan, but there is no penalty for withdrawal

²² Information provided by Patrick Meckley, MD DNR. These statistics represent DNR tracking of Forest Stewardship Plans, which may or may not be used by the landowner to garner tax benefits under the FCMA.

from the program. These acres are included in the forest management plans/stewardship plan statistics cited above.

The **Income Tax Modification Program** provides a State tax benefit for reforestation and undertaking stand improvement practices on qualifying timberland. Participants who own or lease from 10 to 500 acres of timberland are eligible to receive an income deduction on their State tax return equal to twice the costs incurred, net of any other subsidy for the practice. Practices receiving the modification must remain in effect for at least 15 years. If they are not maintained, then the tax savings must be repaid.

The income tax modification program has been in effect for fifteen years and DNR reports that, to date, 411 land owners have signed up. They do not track total enrolled acres. Given that properties must fall between 10 and 500 acres, the program accounts for more than 4,000 and less than 200,000 acres.

The **Buffer Incentive Program** supports targeted reforestation along the edge of the Chesapeake Bay and its tributaries. Owners of non-forested land (parcels of from one to fifty acres) falling within 300 feet of a qualifying waterbody are eligible for a one-time payment of \$300 per acre for planting trees as riparian buffers. The full payment is contingent on a survival rate of at least 65 percent one year after planting.

The Buffer Incentive Program has been used in conjunction with the Enhanced Conservation Reserve Program (discussed below) as an incentive to increase forestland along the water's edge. Since its inception in 1996, the BIP program has signed up 1,531 acres.

The **Woodland Incentive Program** also provides cost share for tree planting and timber stand improvement practices, but this program does not target riparian buffers. The program pays up to 50 percent of the costs of eligible practices to owners of 10 to 50 acres of woodlands. A limitation under the program is that no other federal cost share assistance has been received for this same practice over the past 5 years on the property. Also, the practice can not have received Woodland Incentive Program support in the 15 years preceding application for funds.

The program targets a number of forest management and timber production practices. DNR estimates that approximately \$100,000 is distributed to 75 to 100 landowners for improvements on 1,500 to 2,000 acres per year.

The **Forest Incentive Program** is very similar to the Woodland Incentive Program, except that it pays up to 65% cost-share assistance for reforestation, site prep and timber stand improvement. Landowners must own at least 10 acres of forest land but no more than 1,000 (up to 5,000 with a waiver).

The **Conservation Reserve (Enhanced) Program** (CREP) is by far the most significant incentive program for afforestation, in terms of funding, ongoing in Maryland. Out of a total of 45,313 acres contracted for conservation practices since its inception (1998 to 2002), 13,768²³ acres have been planted with trees, either as riparian buffers or as treatments for highly erodible land.

CREP agreements require a commitment on the part of the landowner to maintain afforested acres for at least 15 years. Over this period, the CREP program pays, on average, including rent, maintenance and incentive subsidies, over \$1,680/acre. This is actually the average for all CREP acres. Because forested buffers receive higher incentive rates, this number underestimates the average for those acres. Total "life of contract" commitments and incentive payments to date are over \$76 million. It is anticipated that, by completion, up to \$300 million

²³ USDA Farm Service Agency data as of July, 2002.

will be spent on this program (in Maryland) by the federal government. Programs funded through Maryland Department of Agriculture and two private funds (Ducks Unlimited and the Chesapeake Bay Foundation) offset, after federal cost-share, remaining establishment costs on forested CREP acres.

The principal purpose of the CREP program is to address water quality impacts of farming. Riparian buffers are an effective way to reduce nutrient loads into waterbodies affected by agricultural run-off. The program originally limited riparian buffers to 100- foot widths, but they are currently allowed to go up to 300 feet.

State regulations limit harvests within 35 feet (plus one foot for every degree of slope) of a qualifying waterbody and require buffer management plans for harvests within 100 feet of such waterbodies. However, harvest is allowed within both the 100 and 300 foot buffers. Thus, there is a potential that some portion of these acres will qualify as timberland. While the number of acres is not particularly large at present, the incentives are such that it is possible that as many as 55,000 acres could become forested through this program. These would represent an increase in timberland acres, since the land is coming out of agricultural uses.

The State of Maryland has also targeted CREP forested riparian buffers for permanent conservation easements. To date, easement agreements have been completed on 2,691 acres. Another 3,000 acres have been given letters of commitment by the State and can be treated as “pipeline” acres.²⁴ It is estimated that 95 percent of the CREP acres on which easements have been effected are treed buffers.

Discussion

The Forest Conservation and Management Program, Income Tax Modification Program and the Forest and Woodland Incentive Programs tend to target timberland for improved forestry practices, including timber production. The Buffer Incentive Program and CREP are motivated more by water quality issues and use reforestation and forestland retention as a means for mitigating nutrient pollution impacts from farming and other uphill land uses. In both cases, however, the incentives serve to increase forestland acres and to improve management of these acres.

All told, these incentive programs have brought over 533,134 acres into either better management or forested uses. The programs acres that contribute to this total are summarized in Table 57.

²⁴ Personal communication with Jeff Horan, MD DNR.

Table 57
Acreage Estimates for State Forestland Incentive Programs

Program	Current Acres
Forest Conservation and Management Program	513,725
Income Tax Modification Program	4,110*
Buffer Incentive Program	1,531
Conservation Reserve (Enhanced) Program	13,768
Total Acres	533,134

* This number is not known and the value given here is the minimum number of acres, given current enrollment.

While forest management incentive programs are not as clear-cut as public ownership or conservation easements in their forestland preservation impacts, they are an important component in the State's program to promote forestland uses and, in particular, timberland uses in Maryland. By providing a financial incentive to better manage their land, these programs reduce the costs of forest management among the State's largest set of forest landowners; namely, non-industrial private forest landowners.

As will be discussed below, such incentives can be a useful incentive for forest management practices that provide both social and private benefits but which may not be justified by private returns. At the margin, such programs should increase landowner's willingness to keep land in forest uses, thereby increasing the amount of forestland in the State. Very likely they improve the quality of management on the average acre enrolled.

E. EDUCATION PROGRAMS

On privately-owned forest land that is not under a conservation easement nor constrained by other (forest conserving) contractual agreements, forest stewardship is one among numerous choices available to the landowner. The likelihood that the landowner will choose forest stewardship over any of his or her alternatives is subject to a variety of influences. Public preferences for this can, however, enter the mix of influences through education and outreach.

Forestry education and outreach in the State includes forestry curricula developed by a Forest Service Information/Education group within DNR, special programs developed by the Forest Conservancy District Boards, and advanced training for forestry professionals developed under the Forest Conservation Act. The Maryland Forest Association provides education and outreach for forest stewardship, as does Maryland Cooperative Extension. In addition, forest

landowners can receive technical assistance for forest management at a nominal fee through DNR's Forest Stewardship Program.

There is little monitoring of these programs with respect to their impact on keeping land in forest uses. To the extent that they respond to issues of concern to forest landowners, or that they provide compelling arguments for beneficial management practices, it is likely that they do increase the level of management on those lands.

Recent research on the adoption of conservation practices in the presence of extension efforts from Ohio suggests that education and extension does not, alone, achieve its objective (Napier and Bridges, 2002). On the other hand, if education and extension is associated with a financial incentive, it can have a significant effect on landowner behavior. For instance, forest landowners who wish to reduce their tax burden through any of the incentive programs discussed in the previous section will typically become more aware of useful forest management options in the course of accessing these programs. Certainly, better information may help motivate landowners, and knowledge will enable them to manage more effectively for their objectives. Education seems likely to be a necessary but not sufficient condition for retention and management. The constant turnover of owners, however, means that the job is never finished.

F. PUBLIC POLICIES AND MARYLAND FORESTLAND

Toward a Model for the Supply of Forestland

A brochure distributed by the Forest Services Northeastern Research Station (Widmann, 2002) makes these comments about Maryland's forests.

“Forests protect watersheds, provide opportunities for recreation and settings for aesthetic enjoyment, serve as habitat for wildlife, and produce wood and other forest products. The forests of Maryland contribute greatly to the quality of life of the State's residents, making the Old Line State a better place in which to live.”

This is a good starting place for a review of public policies and Maryland forestland. Forests provide a number of benefits, some of which can be enjoyed privately by owners of forestland, and some of which are public benefits. Protection of watersheds, provision of aesthetic or existence value, and habitat for wildlife are public benefits or, in the language of economics, positive externalities produced by forestland. On the other hand, the value of wood and other forest products are private benefits because they will accrue fully to the owner.

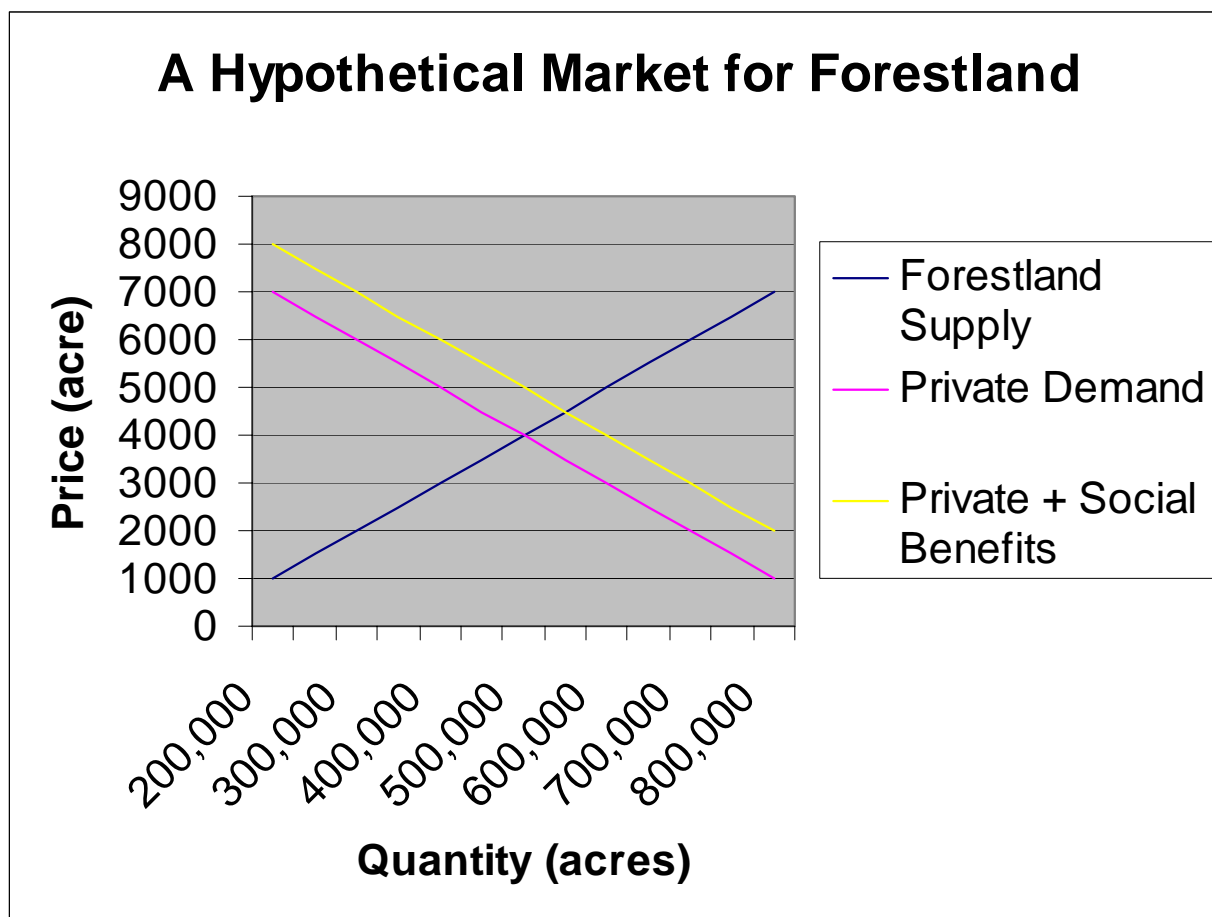
It is useful to distinguish between public and private benefits of forestland and it is useful to think of forests' public benefits as externalities. If we consider the public benefits of forestland as a positive externality, economic theory predicts that if there is no way for forest landowners to be compensated for these external benefits, forestland will be under-supplied from an economic welfare viewpoint. This under-supply can be thought of as the difference between the amount of forestland that would be supplied if all its private and public values could be captured by its owners versus the amount that is supplied when only private benefits are captured.

The inability of land markets to deliver an optimal amount of forestland, given positive externalities, constitutes a “market failure.” To some extent, this market failure is recognized in the myriad of public programs described in this paper. The public, through the State, increases the private benefit of keeping land in forest uses by providing forest landowners tax-breaks and other subsidies, free or below-cost forest management services, and by purchasing easements on

forestland. Public purchases of forestland replace the private owner with a public agency who acts as a steward for the public to ensure that forest benefits are supplied.

A preliminary review for North Carolina by Murthy, Sills, and Cabbage (2001) is instructive. They preliminarily suggest that nonmarket values could be equal to or larger than market values, though they observe that the information is very rough. See also Lerner and Poole (1999).

In order to achieve optimal supply of forestland in the presence of such a market failure, it would be necessary to estimate the value of forests' positive externalities and their impact on forestland supply. While an empirical estimation of the social benefit of forestland in Maryland is beyond the scope of the current study, a conceptual representation of what such a study might find is shown in Graph 1, below.



This graph shows a hypothetical market equilibrium for forestland supply at a range of prices. When only private benefits are captured from ownership of forestland, the market equilibrium is reached at a price of \$4,000 per acre and when 500,000 acres of forestland are supplied. When social benefits are added to the picture, the equilibrium price rises to \$4,500 per acre and 550,000 acres are supplied. In place of the unknown external value, we placed a \$1,000 dollar social benefit on each forest acre. We are not suggesting that this is the value of the external benefit of an additional forest acre, but offer it as a representative value to show the impact of a positive externality in the market for forestland.

Because we do not know the value of the social benefits supplied by forestland, this stylized picture of the market failure only shows the direction of the impact of those benefits. For simplicity, it assumes that the social benefits of forests are constant across forested acres -- which is not likely, given the importance of location for the watershed impacts and contiguity for wildlife impacts. It also assumes that capturing the social benefit does not preclude any of the private benefits being realized by the owner. This last assumption is particularly important for the question of preserving land in forest uses.

If an owner's reasons for owning and supplying forestland include the value of the timber growing on it, then a subsidy or the purchase of an easement that precludes harvests negates that timber value. In that case, the value of the subsidy or easement is no longer additional (as shown in the graph). Instead, it has to substitute for the timber value and still supply some positive margin, in order to call forth additional supply of forestland. Many who support the idea of increasing the supply of forests in Maryland seem to not appreciate that retaining the option to harvest timber on forestland, in general, allows a greater increase in forestland for any given level of funding for forestland subsidies.

In fact, current State initiatives aimed at increasing (or retaining) forestland do seem to recognize this market characteristic. More often than not, they do not preclude timbering. On the other hand, local implementation of some forest-preserving policies such as the Forest Conservation Act and programs such as Rural Legacy have, at least anecdotally, restricted timber harvests.

The stylized model for market supply of forestland does not apply to State-owned forestland. Under State ownership, all of the private preferences mediated by prices in the market have to transpose to the political process. The economics do not change with respect to welfare and the various benefits of forestland, but the process by which decisions about uses are made is much more complicated. The current ratio of State-owned forestland that cannot be timbered versus State-owned acres that is greater than three to one. This implies that a relatively lower value is placed on the timber uses of State-owned forestland.

Impact of Policies and Programs Supporting Forestland Retention

Because the purpose of this paper is to assess policy impacts on forestland and, in particular, keeping land in forest uses, the policies described in the previous sections are discussed below with primary regard to their impacts on keeping land in forest uses. As noted in the introduction, however, these policies and programs are not necessarily focused solely on this limited objective. To the extent that other objectives are being pursued, it should follow that their impact on retaining land in forest uses will vary, independent of their funding or costs.

The **purchase of forestland** by the State and other public owners is perhaps the most stable method for ensuring that land stays in forest uses. It is unlikely that the State would ever shift their forestland into some other land use. On the other hand, the management of forestland as either reserves or "timberland" does change over time. Forestland ownership permits a range of forest uses and management practices to be pursued by the State. The allocation of lands among those uses does shift over time.

The development of a total value for State forestland or even a record of purchase prices paid for these lands would be a study in itself. For our purposes, however, it will suffice to examine purchase prices for recently acquired State forestland. The Chesapeake Forest acquisition cost the State about \$16.5 million. However, this expenditure only purchased about one half of the total 58,257 acres that comprise Chesapeake Forests. The other half of the

property was donated to the State by the Conservation Fund and the Mellon Foundation. Using the figure, \$33 million as the purchase price for the total acreage, then, the per acre cost of this acquisition was about \$566.

Once purchased, other costs are born by the State such as property tax foregone and management and administrative costs. These costs will be paid in part through income generated from the property through use fees and the sale of timber and, in part, through funding from the State's general fund. The goal is that the property should be largely self-sustaining in funding.

Conservation easements are another definitive policy employed to ensure that land stays in forest uses. Using the expenditure and acreage figures reported by MALPF in their 2001 annual report, the average per acre cost for conservation easements acquired through the life of the program is \$1,301. Additional costs not captured in this estimate include taxes foregone on the difference between the purchase price and the market value of development rights on MALPF easements.

MET easements are funded by reductions in State tax revenues. This income foregone by the State is very difficult to estimate, but it is likely to be proportionate to MALPF expenditures. While MET easement donors are typically not paid, they are eligible for reductions of their income, estate and/or property taxes. These tax reductions can amount to 80 percent of the value of the easement. In the absence of an empirical record, it can be supposed that the value of MET easements were similar to the value of MALPF easements and that they were bought at a discount through tax abatements. While the State did not have to write a check for these easements, income was foregone.

If the Rural Legacy Program comes even near to securing the conservation easement acreage set out in its mandate, it will be a major new source of protected lands. Its per acre easement cost is estimated to be \$1,876/acre.

All three of these conservation easement institution/programs have more agricultural acres than forested – and all have slightly different perspectives on forestland acquisition. Of the three, Rural Legacy has perhaps the most constraining objectives in acquiring its easements. Rural Legacy seeks larger, contiguous parcels in targeted sections of the State. This limitation on the market for Rural Legacy funds would be expected to raise the price for their easements, all other things being equal²⁵.

It is possible that the prices for forested acres that have been protected by conservation easements under these three programs have been lower than for the agricultural acres. It would take a more in-depth study of those easement purchases to determine this. But, since forestland that remains in the State tends to be on less developable land, it is likely that the development rights on forestland are cheaper than development rights on agricultural land. A suggestive indicator from the private sector that there is a difference between forested and agricultural easement values is the preponderance of forested acres in private easements throughout the State.

With regard to **regulatory protection of forestland**, forested acres that are brought into a protected status through the Forest Conservation Act are very likely the least costly to the State. Leaving trees on or near developed parcels (or planting them where they were not, previously) is turning out to be beneficial for most parties, generating more forested acres than might have been in the absence of the program and, from what little research has been done on it, increasing

²⁵ It should be noted that MALPF has been requested to implement more refined targeting in their easement purchases, but it is not yet clear what this will imply for their portfolio of easements.

values for developers²⁶. However, it is also likely that the forested acres resulting from the regulation are not as valuable with respect to the external social benefits discussed, above, as larger, contiguous tracts of forested land.

From a cost perspective, the foregoing suggests that regulations and fee-simple ownership may be the cheapest ways to ensure that Maryland land stays in forest uses. The obvious caveats – how far regulations can squeeze the development process, how many deals such as Chesapeake Forest come along, regularly, – apply. But, with regard to recent performance, these two policies have secured greater acreage at less cost than has the purchase of conservation easements.

A Summary of Public Policies and Forest Use Characteristics in Maryland

This study has described the range of forest-conserving and forest management policies and programs currently implemented by the State of Maryland. In describing these policies and programs, acreage impacts and cost impacts have been accounted with the most current figures available. In addition, we describe the impacts of these programs and policies with respect to different categories of benefits or uses that accrue to forests.

In Table 58, only the first two categories of protected lands (Public Ownership and Conservation Easements) represent fully separate categories of properties. The remaining programs overlap to some unknown degree with these earlier categories and, while some are doubtlessly additional, the extent of overlap cannot be ascertained.

²⁶ For a literature review, see: U.S. EPA. 1996. Green Development: Literature Summary and Benefits Associated with Alternative Development Approaches. EPA 841-B-97-001. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water.

Table 58

Acreage and Use Summary of Policies and Programs Category of Protection/Management	Total Forested acres	Available uses			
		Public Access	Amenity Value**	Timber	Water/Air Quality
Public Ownership	451,542				
County	78,210	Most	Most	Nil	Most
State	328,419	Most	Most	Some	Most
Federal	44,913	More	More	Nil	Most
Conservation Easements	153,561				
MALPF	63,847	Nil	Most	Most	Most
MET	24,587	Nil	Most	Most	Most
Counties (PDR/TDR)	37,245	Nil	More	Nil	More
Private	17,989	Some	Most	Some	More
Rural Legacy	9,893	Nil	Most	More	More
Critical Areas Law	640,000*	Nil	Most	More	Most
Forest Conservation Act	43,260	Some	Most	Nil	Some
Forest Management Incentives	533,134	Nil	Most	Most	More
Conservation Reserve Program	13,768	Nil	Most	More	Most

** Includes wildlife habitat values

Measures of Available Uses: Nil (0 to 24%), Some (25 to 49%), More (50 to 74%), Most (75 to 100%).

* Total acres (including non-forest) – rough estimate. GIS-based estimate is not yet complete.

In absolute terms, a significant portion of Maryland's forests are protected, either by public ownership or by conservation easement. *Using the most recent US Forest Service estimates for Maryland forestland, 23.6 percent of the forestland in the State is protected.* In addition to those protected acres there are over 500,000 acres of private non-industrial forestland that are being managed under forest management plans. Taken together, the State's policies and programs aimed at retaining and improving forestland have had a significant impact.

Table 58 addresses the same question that was raised in the discussion of public forest ownership, above. Namely, for what uses is forestland being retained? Almost all of it provides air and water quality benefits. Public ownership, in addition, delivers forests that provide public access and amenity values. To be sure, at the State level it also provides some timber benefits but, most significantly, public ownership of forestland is tilted toward access and amenity. On the other hand, much of the forestland that is preserved through conservation easements provides amenity, timber and air and water quality benefits, but not much of this land is accessible to the public.

Critical Areas forestland is available primarily for water quality and amenity values, though some of it could, theoretically, be used for timber. Forest Conservation Act properties provide some amenity value. And, private forestland under forest management plans targets timber, amenity and air and water quality benefits. Clearly, there is something for everyone in the distribution of uses for protected forests in the State. Yet, the opportunistic pattern of acquisitions, riparian strips, plantings, managed forests, easements, state, county, and local parks and forests, and nonprofit reserves may fit only roughly into plausible landscape conservation and financial viability objectives. As the MDP put it:

"...integrity of many natural rural resources, such as breeding habitat for forest interior dwelling birds and healthy low order streams, are also affected by the amounts and geographic distribution of rural land uses, land cover types, and development.

For these reasons, we believe that efforts to preserve land (the 20% commitment) on the one hand and to control sprawl (the 30% goal) on the other must be fully integrated to seriously benefit agriculture and most natural rural resource.

Without doing so, we very well may statistically preserve over 20% of the land, and reduce something defined "harmful sprawl" by more than 30%, but do little or nothing significant to preserve agriculture and natural rural resources dependent on large, contiguous or concentrated tracts of protected lands. This is due to the fact that, to really benefit agriculture and many rural natural resources effectively, efforts to achieve these two key C₂K commitments for sound land use are mutually dependent. Neither financial-based easement acquisition nor rigorous but realistic levels of land use control will provide these benefits alone, because neither can ensure a geographic pattern and distribution of farmland and development that provides a supportive and necessary land use environment."

Source: Maryland Dept. of Planning (2001a).

The need for both effective growth management and acquisition is supported by Irwin, Bell, and Geoghegan's (2003) Calvert County case study. This concern is the motivation for the strategic forest land assessment, now under way at the DNR.

While these successful forestland retention efforts are considerable, there are still a number of problems facing forests in Maryland. As a point of reference, having somewhere between one quarter and one third of the State's forestland under protection or management becomes significantly less impressive if the remaining portion is lost to development, parcelization or poor management. Loss of preferred timber species, economic constraints to stand management, and the loss of large contiguous blocks of forestland are just a few good reasons for continuing to commit public resources toward the retention and management of working forestland in the State.

In the next stage of protecting Maryland forestland, however, it may be useful to take into account the successes already achieved so that efforts can be more narrowly focused on the remaining problems. Toward that end, a suggestive list of questions that might help to better target policies and programs is provided in the final section. In addressing these questions, a good deal more empirical work may be needed, as well as extensive consultation.

Questions Remaining

1. The impact that conservation easements have on contiguous properties is not understood as well as it should be. By setting aside far-flung but smaller parcels of forestland, is an increased incentive provided for developing surrounding properties? If this is the case, it would be an important factor for program decision-makers to consider in their acquisition of conservation easements.
2. Can forested acres be acquired at a lower cost than agricultural easement acres? If so, do the external benefits of keeping land in agricultural uses generate greater value than keeping land in forest uses? If they do not, then why not focus more narrowly on forestland in the purchase of conservation easements?
3. Using regulations to keep land in forest uses seems to have been effective in terms of total acres protected. But, the question remains, to what extent do these protected acres provide either the private (timber, forest products) benefits or social benefits (aesthetic, wildlife, water quality) of forestland? A review of the Forest Conservation Act that assessed the various values of forestland protected under the Act could be useful for refining it or for providing information to other States who might wish to adopt a similar regulation.
4. Because the external social benefits of forestland are not priced in a market and, because the valuation of these benefits requires consideration of a wide range of physical and biological factors spanning a number of disciplines, there is limited appreciation for attempts to measure them in dollars. However, without some idea of the value of these benefits, policy-makers are shooting in the dark in their efforts to ensure that the "right" amount of forestland remains in the State. Efforts should be made to estimate values for the external social benefit of forestland and their expected impact on forestland supply in Maryland.
5. The fiscal costs of conservation easement programs and property tax reduction programs are, likely, considerable. These programs are quite likely significant in bringing in, retaining and improving forested acres in the State. A more detailed understanding of what is working among these two sets of programs and what it costs could be useful with respect to the management decisions of policy-makers.

6. It is likely that the area of land converted to other uses is demand-driven. If so, it is possible that land conservation programs simply shift development around without changing the net amount converted.
7. It is not clear that the pattern of ownership, management, and protection that is emerging is supportive of "landscape"-level goals for habitat, open space, water quality, or economical resource management.

Maryland faces a rapidly shifting economic situation for forest land, and has numerous active public programs. In light of the high stakes involved, it is unfortunate that the capability for professional training (college and career), research, and independent review and evaluation is so limited within the State. Effective follow-through on issues identified in this report will require attention to this weak spot.

11. FINDINGS AND RECOMMENDATIONS

In this final chapter we draw together our general findings about Maryland's forests and the economic situation of the State's industry and timber supply. We then offer some general findings concerning the State's forest policies. We summarize our suggestions for information needed and recommendations for policy consideration. Matters at the federal level (such as federal income taxation) are not within the scope of this work. Our policy suggestions are stated very generally -- working them out in detail was not part of our project. Detailed study may reveal that some are not as promising as may first appear.

Obviously, when it comes to implementing recommendations, the critical financial circumstances now faced by state government will limit what can be done right away. If only a few of these ideas can find their way into discussion and implementation, this report should be helpful, however.

GENERAL CONCLUSIONS

1. The current economic situation for Maryland's forest industry is very challenging. Poor operating conditions are being experienced nationally in all major branches of the industry, including paper, softwood and hardwood lumber, and value added products. It is difficult to judge the long term future at such times.
2. Manufacturing in general is relatively weak in Maryland compared to the nation, and the Northeast has lost jobs heavily in its manufacturing sector since 1980. About 14,000 total jobs currently exist in Maryland wood products and paper manufacturing. Only about 2,500 depend directly and heavily on Maryland-grown wood; a total of some 5,000 full-time equivalents rely in some degree on locally produced wood. Many of the others, however, depend on wood from nearby areas that face the same adverse supply and cost trends as exist in Maryland.
3. In our opinion, the State as a whole is not an appropriate base for assessing the relative importance of wood base industries. The relevant basis is rural communities. Wood based manufacturing is extremely important to the economic base of a number of rural Maryland communities. Baltimore County contains a significant concentration of value added wood processing.
4. Maryland's wood-based primary industry consumes about 3.3 million green tons of wood fiber per year, while producing 2.2 million tons. The State's interstate trade in various forms of wood fiber is complex. Its dependence on net fiber imports is 38%.
5. Only 36% of Maryland's forest area lies outside of metropolitan counties. Changing land uses, as seen by the aerial photograph, are only part of the supply challenge faced by the Maryland industry. The bigger challenge is the erosion of timber availability due to parcel fragmentation, increasingly passive management on public lands, changing owner preferences, and to a lesser extent, regulations.

6. Sustaining the logging sector may be a critical challenge. Smaller and smaller tracts make logging more expensive every year. This reduces returns in logging, drives down stumpage prices, and thereby reduces incentives for private owners to manage their land. It must be admitted that given Maryland land prices, those incentives are already low to nonexistent in many areas.
7. To support Maryland's existing wood based manufacturing would require the complete use of the annual growth from 2.2 million acres of forest land. Within the State at present there are at most 1.7 million acres of available land – the true figure is probably smaller. For reasons of availability, not all of the growth on those acres is being harvested. This allows the forest to advance in average age and stocking – which cannot be a bad thing. The fact that not all growth is being cut does not mean that there is too much wood.
8. To meet the needs of Maryland consumers for wood products, we estimate that wood is harvested from 9.7 million acres of forest land each year. The State contains a total of 2.4 million acres of timberland, not all of which is available for timber cutting. The State consumes almost five times as much wood fiber in the end products used by consumers as the wood cut in its own forests.

Comment: the previous two observations reflect our view of the current situation. They do not imply any suggestion that 100% self-sufficiency, at primary fiber level or end product level, would be feasible or desirable.

9. While the pace of change is uncertain, there is little doubt that conversion of rural lands to other uses, and fragmentation of forest ownerships will continue. From 1973 to 1997, according to the MDP, developed land in Maryland increased by 49%. From 1997 to 2020 the agency predicts that about 14,000 acres per year of rural land will be converted to developed uses.

In our opinion, parcel fragmentation will reduce supply on far more acres by 2020 than will the actual conversion of land to other uses.

10. There is no “threshold” that defines a Critical Mass for forest area needed to support the Maryland wood industry. Instead, as parcel sizes decline, owner interest in management declines, management costs increase, revenue possibilities decline, and the available commercial forest resource leaches away, acre by acre. Our results imply that, if a threshold did in fact exist, it has already been crossed.
11. As available timber supply erodes away, the base for the remaining wood-based manufacturing economy of rural areas erodes away with it... not in dramatic declines, but a job at a time here, a small mill there.
12. The reason for retaining forest land in general is the positive externalities provided by forests, for which owners receive no compensation. We believe that a wide range of social values are promoted by retaining actively managed forests, even in a highly suburbanized state in which the direct employment in primary wood processing is small.

13. When decisions are considered that will reduce commercial timber availability, we think the burden of proof ought to lie on the shoulders of those arguing that the marketplace does not need the wood. We believe that continued timber production, under a multiple use philosophy and under high quality practices, remains important to the State's rural economy. There is simply no evidence to the contrary. Losing timber supply is not free of impacts – impacts on real people, and on real communities.
14. The financial and social forces propelling land use change and parcel fragmentation in Maryland are awesome and cannot be halted. Freezing the current pattern of land use and ownership is not possible, and is probably not desirable. Nonetheless, future changes should be managed in order to ensure that Maryland residents of the future are not saddled with unnecessary public service costs on top of losses of important environmental and economic assets.

POLICY FINDINGS

1. Maryland has enacted a diversified suite of policies aimed at retaining forest lands, improving their management, and educating forest owners. Retaining forests for open space and as part of farmland and park protection efforts has wide public support. These programs involve all levels of government and a vigorous sector of private NGO's.
2. Based on public ownership, regulations, and easements, about 24% of Maryland's forest land has been "protected" from conversion to other uses. This is a substantial achievement. Only a fraction of this acreage is suitable or available for timber harvesting, however. This would be expected given the primarily nontimber objectives of much of this land.
3. The State also has a suite of regulations designed to protect riparian areas and waters, and to retain trees and forests in larger development projects. Some are nominally focused on The Bay, but they in effect cover the bulk of the State. Few eastern states exceed Maryland in thoroughness and detail of these regulations.
4. Maryland has a series of cost-sharing and tax modification programs designed to retain land in forest uses and to motivate owners to practice more active forest management, including timber production.
5. The State does not, however, have readily accessible, current, and specific information on the participation in these programs, how it is changing and may change in the future, or what the effect of participation is on forest retention and management.
6. Due to the lack of a forestry program at UMD, there is a lack of independent expertise for critically analyzing urban and rural forest policies and their effects.
7. An unprecedented period of inflation in real estate values and in development has brought large and rising revenues into the coffers to fund land conservation initiatives. This situation is in itself unsustainable, even apart from the current revenue crisis in which state government now finds itself. The counties with the most rapid rates of

growth have also seen the largest increase in use of easements. The ability to fund aggressive acquisition and easement programs is likely to decline, however. Other approaches will have to take a more prominent role, at least for a time.

8. Important questions need to be asked about the actual net effect of these policies on forest retention. The total amount of land developed is largely determined by demand and by overall land use practices. Programs “protecting” given bits of land may be merely moving the development around.
9. Tax relief programs, cost share programs, and extension efforts have helped keep rural lands in forests and under management. But with only a few exceptions, the policy focus for regulations thus far has been much more firmly on retention of forest acres and trees (often in tiny patches or strips) than on retention of actively managed land that is available for harvesting.
10. Maryland has nationally recognized growth management programs. We believe that more effective growth management is the only long-term hope for retaining forests and commercial timber supply in much of Maryland. There is little doubt that many subdivision projects are of higher quality and will function at lower long-term social costs than would have been the case without these policies. Yet, in our sample counties, we are unable to see evidence that policies to date have had noticeable effect on the scattering of these subdivisions around the landscape.
11. Some land use practices, such as minimum lot size zoning, may still be in effect which are increasing the amount of land converted beyond what the market would dictate and beyond what makes sense from an overall perspective. To the extent this is true, forest productivity and habitat values are being wasted.
12. It is not clear that the acquisitions, regulations, and other policies have yet left behind a coherent footprint on Maryland’s landscape that reflects reasonable priorities for protection of habitat, recreation and open space values, water protection, or other major nontimber resources. We cannot criticize decisionmakers for taking acquisition opportunities as they arise, but would hope that the results of the SFLA and other planning efforts might in the future be brought to bear more clearly on program decisions. If this is not done, the numbers will continue to be impressive but the results on the land may not be.
13. It should be possible to enable future generations of Maryland residents to benefit from lower-cost public services, denser and more livable communities, and a more valuable Green Infrastructure. We believe this can be accomplished, with retention of a substantial working forest and farm landscape, in ways that do not excessively interfere with property rights of current landowners. The program tools are already available, especially if counterproductive policies can be addressed.
14. It does not seem that public land ownership, in a political setting that is hostile to active forest management, is a reliable means of sustaining a commercial forest landbase in a suburbanizing state. When properly drafted and managed, conservation easements do

have the potential to immunize farms and forest tracts from further subdivision and development and thereby retain the potential for multiple use management. But there remains much to be learned about drafting and managing “working forest conservation easements.”

SUGGESTIONS FOR INFORMATION NEEDED

1. Conduct a new and thorough forest landowner survey, through the USDA Forest Service’s FIA program. This is badly needed to update the 1980 information.
2. Conduct a detailed wood usage survey in the secondary sector. The results would enable the State to see how local wood could be marketed more effectively to local manufacturers. Such information would be valuable to local producers for their marketing efforts. Current information of this kind can be valuable in business retention and attraction efforts.
3. Periodically review local land use trends using county and local data, to identify emerging trends in forest uses and land markets.
4. Conduct a focused assessment of the strengths and weaknesses of Maryland’s secondary (value added) wood sector to identify opportunities for retention and expansion of existing firms, and improved means of marketing Maryland products within the State.
5. Periodically update the woodflow analysis supplied in this report (every three years should be adequate if a credible job is done).
6. Every two years, the DNR should assemble an overview of State programs and policies identifying lands protected and managed, number of participants, and program cost measures. This could be done by building on the format of the policy assessment chapter in this report. That biennial review would be the occasion for discussion of new information on program effectiveness and proposals for improvements.
7. Similarly, every two years the DNR should issue a fully up-to-date summary of public ownership and easements and the degree to which these lands can be considered part of the potentially available commercial forest landbase, and to which the lands are managed for other competing objectives.
8. The valuable MDP Publication, Maryland’s Changing Land, should be updated as soon as possible to bring it up-to-date with the dramatic real estate boom since 1997, and to take account of the effects of land acquisitions, easements, and growth management policies during that time.
9. Markets for low value wood are essential to forest management. Further efforts to identify cost-competitive ways to use wood fiber direct from the forest, and mill residuals, for energy generation should be pursued, possibly cooperatively with neighboring states.

10. Information, education, and safety programs designed to sustain the viability of the logging sector, and aid in its adaptation to a more parcelized landscape, should be improved and expanded.
11. A thorough economic assessment of timber availability, along lines of studies done elsewhere and cited above, should be conducted in Maryland, recognizing the regional differences within the State. This assessment should draw on the experience in these other analyses, and should attempt to develop at least illustrative cost and supply curves.
12. A thorough assessment of lessons learned to date concerning the effectiveness of working forest and farm conservation easements is needed. Experience elsewhere should be considered. Specific lessons for drafting should be determined.
13. An effort should be made to at least roughly measure the nonmarket benefits generated by forest lands in different parts of Maryland. Survey data relating to such values should be collected and existing information reviewed that would help document these values.

POLICY RECOMMENDATIONS

Maryland has no shortage of policy recommendations. We find that many recommendations contained in recent reports have merit, but will make no effort to comment on all of those points here. We will focus instead on points that emerge from our own work. We are offering these in highly compact form and were not assigned to bring them to full and detailed development.

1. Adopt a working bias for a No Net Loss of commercial timber availability policy under which public policy changes that reduce availability will be compensated, over time, by policies and practices that offset that change. For example, no one doubts that there is a role for reserves and that outstanding examples of rare ecosystems and habitats may yet be located. The importance of protecting such places is not outweighed by timber supply needs, and need not be, if offsetting actions are undertaken.
2. Review the State's approach to the federal Forest Legacy program and expand its use of that program.
3. Every week, the Forest Conservation Act process is missing opportunities to maintain manageable tracts of forest in developments. Potentially manageable tracts are being retained in trees but are being unnecessarily cut into tiny bits as part of residential lots that yield little real value and create only maintenance problems. Significant benefits could result if the same areas are simply retained in some common ownership instead of being chopped up. DNR should fully review the FCA's implementation, using local records and field visits, and determine if education and training or additional incentives might yield improvements on this tragic situation.
4. Conduct training workshops and other outreach on the drafting of effective and workable "working forest conservation easements," as well as on easement documentation, monitoring and administration.

5. The soon to be completed SFLA should be used as the basis for a Gap Analysis that would identify lands most needed to complete the State's "Green Infrastructure." This analysis should guide future acquisition and easement activity.
6. Consideration should be given to a program of land trades that would block up the extensive recent Glatfelter and Chesapeake acquisitions into units better manageable for timber, recreation, and nontimber values. Some lands best suited for timber management might be swapped back into private ownership in order to obtain tracts of greater environmental, aesthetic, or recreational significance.
7. A detailed assessment must be made of options for managing the effects of ownership fragmentation. Previous reviews emphasize this issue. This assessment will take time. The list of ideas is long, but successes in this area are few and far between. Many efforts, funded with heavy subsidies, have vanished from the scene with only temporary results. We think there has been inadequate recognition of the complexity and multi-actor nature of this problem, and an underestimation of the stringent requirements for success. But the topic cannot be avoided in this state: Maryland's forest land is already extremely fragmented and will only become more so.
8. Pilot tests of various ideas might be considered – there is no one way. Practices already in use by mills and loggers could be examined. Farm cooperatives could be contacted to see if they might provide an institutional base for multi-owner efforts. The classic "forestry cooperative" has seen a resurgence of interest in recent years, and there may be merit in seeing what new lessons are being learned. Use of local landowner groups to share information and boost informal cooperation could be explored. New approaches will be needed.
9. The intellectual capital for addressing forest issues in this suburbanizing state must be ramped up. The DNR leadership and the forestry community should work with the University system to seek to obtain the appointment, in existing academic and extension units, of individuals assigned, supported, and motivated to spend large proportions of their research and service time on forest policy and forest assessment issues. Innovative funding options need to be explored. In so doing, the State should take advantage of skills available at large, nearby institutions such as VPI and Penn State.
10. We would recommend that Maryland's state and county business and economic development programs give full attention to the needs and opportunities of the wood based sector, as they do for other rural manufacturing enterprises.
11. A process should be instituted whereby every 5-7 years, every major family of Maryland forest policies receives a searching critical review for results and cost effectiveness in view of multiple objectives. Such reviews should employ disinterested fact finders to the extent feasible, as well as extensive consultation by program participants, administrators, and stakeholders. Effectiveness and efficiency audits will enable the State to be on an effective learning curve. Periodic efforts to learn lessons from best practices in other states are also needed.

12. Maryland has a good suite of incentive programs in place now. These need careful review, as they were not designed to cope with land price and development pressures on the scale of what Maryland is now experiencing. Given these pressures, it may be worth considering whether even deeper subsidies, properly designed, for active commercial management might be worthwhile. Delaware's Sussex County, a program fostering active pine management makes available a zero annual property tax plan (with suitable recapture on change of use). This may deserve detailed consideration.
13. Maryland has an active state and local institutional structure that is capable of reaching landowners with information and education. We urge that efforts be made to make more use of this capability, and to try different experiments in different parts of the State to reach more owners with information.
14. Finally, it would be valuable to review the detailed practices and procedures used in the many forest regulatory programs. Are they providing the most cost-effective achievement of program goals at the most reasonable cost in terms of compliance cost, burdens on landowners, and fiscal cost to state and county government? Learning from experience will be essential in order to meet the goals of these programs at a time of increasing budget stresses.

APPENDIX

COUNTY LAND USE CASE STUDIES

12. Eastern Shore Land Use Case – Three Counties

13. St. Mary’s County Case

14. Carroll County

15. Western Maryland: Garrett County

12. EASTERN SHORE LAND USE CASE – THREE COUNTIES

SETTING AND GEOGRAPHY

The Eastern Shore has its own climate, geology, and land use and social history, distinct from the rest of Maryland. Nearby Kent Island claims the earliest English settlements in Maryland. The tidewater areas along the Bay supported some of the earliest farming in the Eastern Shore. In colonial times, markets for wheat and corn developed, giving rise to a cropping pattern that persists to this day in some areas. The imprint of the region's agricultural history persists in the landownership pattern. Along the Dorchester County shoreline is a belt of "estate" properties representing something of a holdover from Colonial times.

Large farms persist throughout the area, growing winter wheat, corn, and specialty crops. Farms may reach 1,000 acres in size, often with much rented land. Extensive areas of wetter soils are largely forested, or take the form of marshes along tidal rivers and creeks. Wetlands are especially prominent in Dorchester County, where 60% of the land is within the 100-year floodplain. The County contains 39% of the State's wetlands.

In this area the softwood forest is dominated by loblolly pines, second growth on old farmland and at times planted. Much of the acreage is a mix of loblolly and hardwood species. The whole economy and land use picture was changed by the completion of the first Chesapeake Bay Bridge in 1952, and subsequently by the new Bridge (1973). These counties include a large proportion of the Chesapeake lands, which display evidence of systematic industrial management over many years. They also include numerous private tracts, large and small, which have been managed for timber over the years.

The three counties studied here were chosen to reflect the variations from the Bay to the Atlantic shore using a transect along Route 50. Any individual county might not be fully representative of ownership and economic conditions and land use pressures.

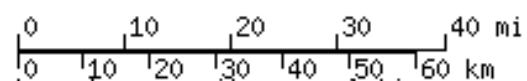


LEGEND

- | | |
|-----------------|---------------|
| State | Military Area |
| County | National Park |
| Lake/Pond/Ocean | City |
| Expressway | County |
| Highway | |
| Connector | |
| Stream | |

Scale 1:1097596

*average--true scale depends on monitor resolution



ECONOMY AND POPULATION

The area's economy had been in a downtrend for many years until the recent surge in development following the new Bay Bridge. Mechanization continually reduced the labor needs in farming, fish and seafood, food processing, and other manufacturing plants. The Pocomoke City plywood mill closed in the 1987. Several medium sized sawmills continue to operate in the area, supported by a logging sector of small to medium sized operators. Driving along the back roads, evidence of roadside cutting and planting is frequently encountered.

Construction and real estate are significant employers. Tourism spending is a major driver for the Salisbury area as well as Ocean City and its environs. The Ocean City Area's summer peak population is estimated "in the millions" by the County Planning Commission. Cambridge has also seen significant commercial strip development that appears to be related to traffic along Route 50 to and from the Coast.

The area's economy is strikingly dependent on manufacturing, much of it food processing and wood products:

Comparison to State Economy: Three Counties Location Quotients, 2000

	Percentage in Sector Compared to State Average		
	<u>Dorchester</u>	<u>Wicomico</u>	<u>Worcester</u>
Manufacturing	456%	182%	137%
Trade	83%	125%	136%
High-End Services	28%	54%	21%
Education/Health	103%	125%	43%
Accommodation/Food Services	78%	108%	373%

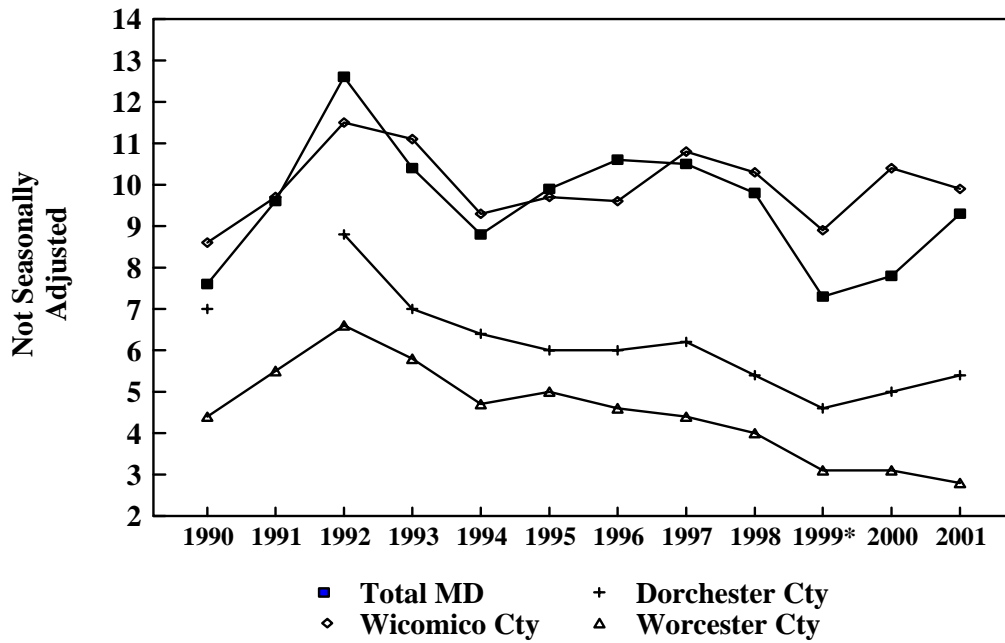
Source: Table 7 above.

The general structure of the economy may make it more difficult here for workers losing jobs in manufacturing to find similar, year-round employment.

Dorchester County's population actually fell slightly from 1960 to 1990. Worcester County experienced a dramatic upswing in growth in the 1980s and 1990s. It experienced significant net immigration, much of it from the Baltimore and D.C. areas. During the 1990s, 60% of the immigrants to the Lower Eastern Shore were coming to Worcester County. In 1990, resident population was 62% concentrated east of Route 113. After 1970, the three counties as a whole began to grow slightly faster than the State as a whole (Figs. 21 and 22).

Figure 20

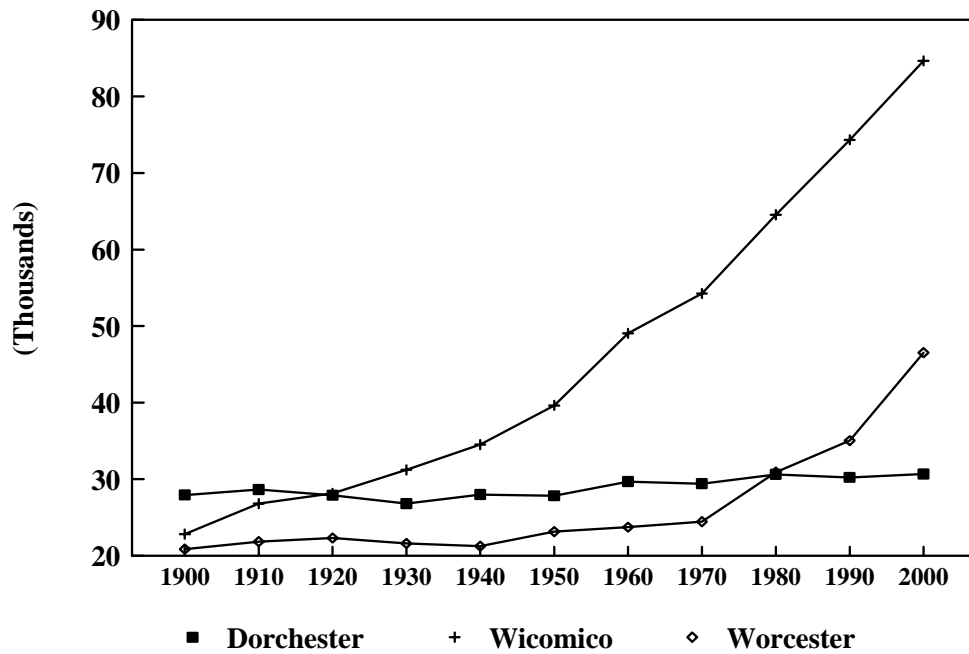
Maryland Unemployment Rates, 1990-2001 **Maryland & Lower E. Shore Counties**



Source: US Bureau of Labor Standards.

Figure 21

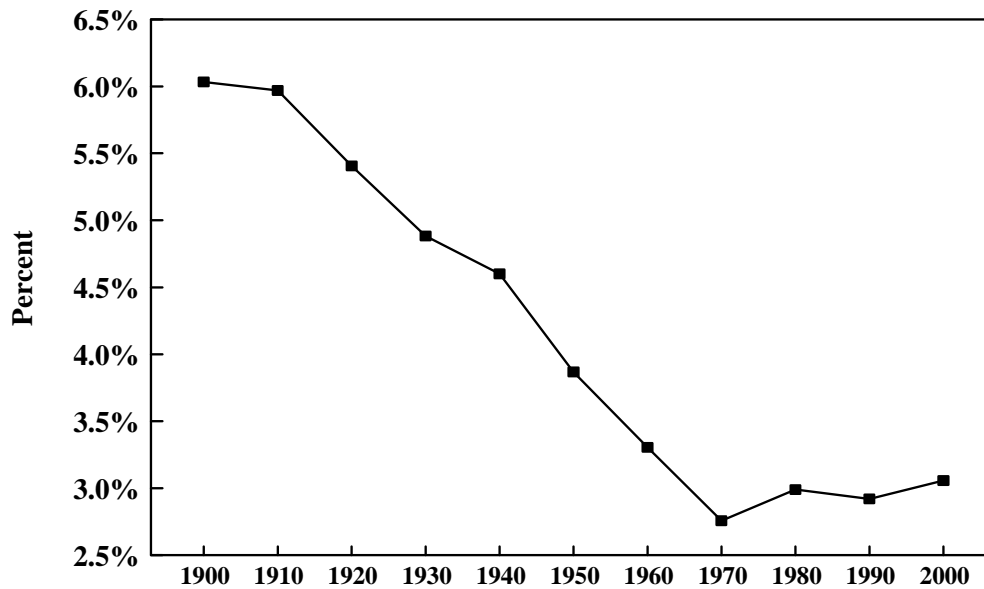
Three Counties Population, 1900 to 2000



Source: U.S. Bureau of the Census.

Figure 22

Three Counties Population as a Percent of Total Maryland, 1900-2000

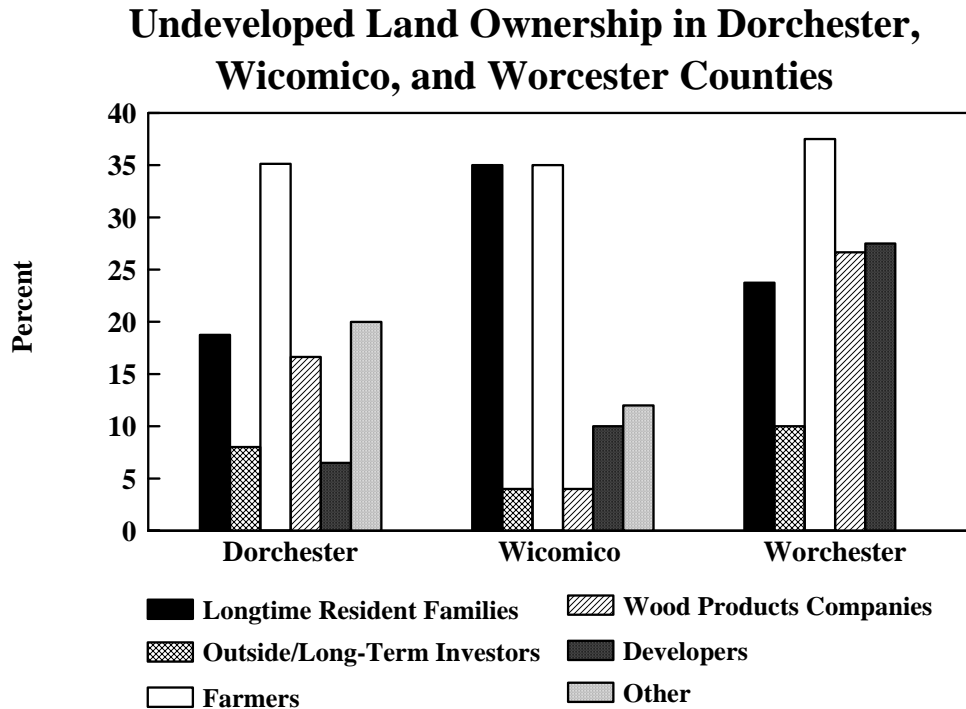


Source: U.S. Bureau of the Census.

LAND OWNERSHIP

According to interviews with Realtors, land ownership patterns vary among the counties (Fig. 23). Longtime resident families, farmers, and wood products companies are leading owners in the region.

Figure 23



Source: As reported by local realtors, foresters and planners.

Developers play their largest role in Worcester, while farmers continue to be major owners in all three counties.

In the 1980 survey (Kingsley and Birch, 1980) the Lower Eastern Shore had:

- the highest percent of forest owned by farmers;
- among the largest parcel sizes;
- the highest percentage of forest landowners who were retired (31%).

Hunting is a significant factor in this area. Individuals and groups own small to medium sized tracts for hunting, or they lease rights from landowners. Hunting values are touted in the real estate ads.

Land ownership here is less affected by public ownerships except in the southwesterly areas where the Blackwater Wildlife Refuge and the Fishing Bay Wildlife Management Area have blocked up marsh and lowland forest habitat for migratory waterfowl.

The Chesapeake lands account for a significant portion of forest in these counties:

	<u>Acres</u>	<u>Percent of “Timberland”*</u>
Dorchester	10,945	8%
Wicomico	15,722	14%
Worcester	12,970	8%

Source: MDNR

* FIA Estimate

Of the 58,000 Chesapeake acres, 68% are in these three counties.

CURRENT LAND USE AND RECENT TRENDS; DRIVING FORCES

Wicomico, despite being the smallest county, has the most development according to the MDP dataset (Table 59). This is largely due to the presence of the eastern Shore’s largest city, Salisbury, and the extensive development along Route 13. Forestlands in these three counties total about 400,000 acres; in these counties are found some of the most extensive areas of intact forest cover east of the Panhandle. Worcester County is more than half forested. Development pressures have been light, with percentages of forestland loss below the State average for 1973 to 1997.

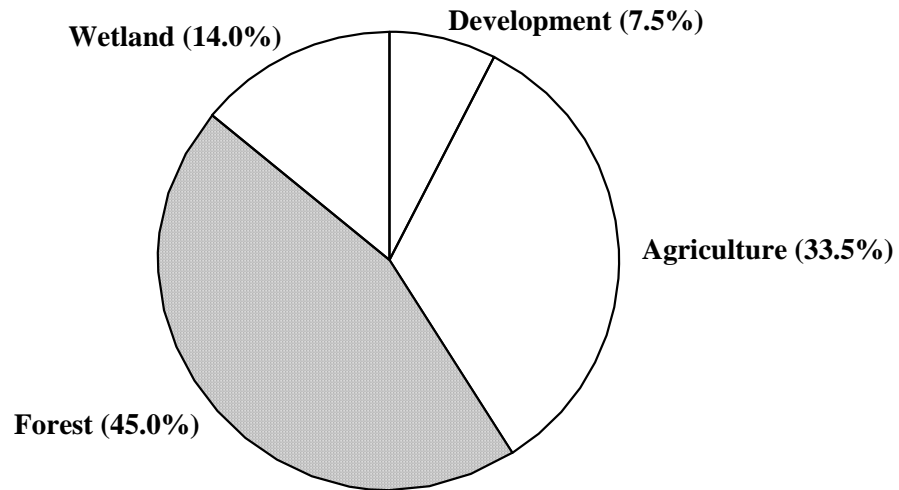
For the period 1990-1997, average new lot size in subdivisions diminished from West to East: Dorchester, 2.15 acres; Wicomico, 1.25 acres; and Worcester, 0.52 acres (MDP). Worcester had the smallest lots in the State, reflecting no doubt the high cost of land in new developments near Ocean City.

This three-county area illustrates growth patterns driven heavily by transportation patterns. There are several key forces at work:

- Strip development, largely commercial in nature, along the Route 13 corridor and the new bypass around Salisbury. This is gradually becoming an almost continuous ribbon of development along this highway, from the Bridge Tunnel north to the Cape May-Lewes Ferry and Wilmington areas of Delaware.
- Scattered leisure home development, adjacent to prime waterways along Atlantic seashore areas, selected tidal waterways such as the Choptank, and the Bay Shore. Some of this development takes the form of “estate” properties on fairly large lots, especially along the Bay Shore.

Figure 24
Land Use, Three Eastern Shore Counties

Three Eastern Shore Counties
Land Use, All Land = 893,828



Note: Counties are Dorchester, Wicomico, and Worcester.
Source: MDP.

Table 59
Three Counties – Land Use, 1997

	<u>Dorchester</u>	Percent of <u>All Land</u>	<u>Wicomico</u>	Percent of <u>All Land</u>	<u>Worcester</u>	Percent of <u>All Land</u>	<u>Total</u>	Percent of <u>All Land</u>
Developed	16,296	4.6%	30,258	12.6%	20,761	6.9%	67,315	7.5%
Agriculture	119,310	33.6%	87,851	36.5%	92,094	30.5%	299,256	33.4%
Forest	127,751	36.0%	107,060	44.5%	166,974	55.4%	401,786	44.8%
Wetland	91,163	25.7%	14,821	6.2%	19,487	6.5%	125,471	14.0%
All Land	355,175	100.0%	240,430	100.0%	301,641	100.0%	897,248	100.0%

Source: MDP, 2001.

- Development pressure is pressing westward from the Ocean City area, concentrating along Route 50 from Ocean Pines toward Berlin and along north and south routes parallel to the coast. On prime water access, condos are sprouting up.
- In addition, in and near the small towns of the area, informal, low-budget strip development of small lots for small homes and mobile homes is common.

It does not appear that pressure of large compact developments has yet pushed down Route 50 from Talbot County, but some observers believe this is only a matter of time. The large developments (planned in some instances to reach as many as 700 homes) in Talbot are oriented toward long distance D.C. Beltway commuters and “active” retirees.

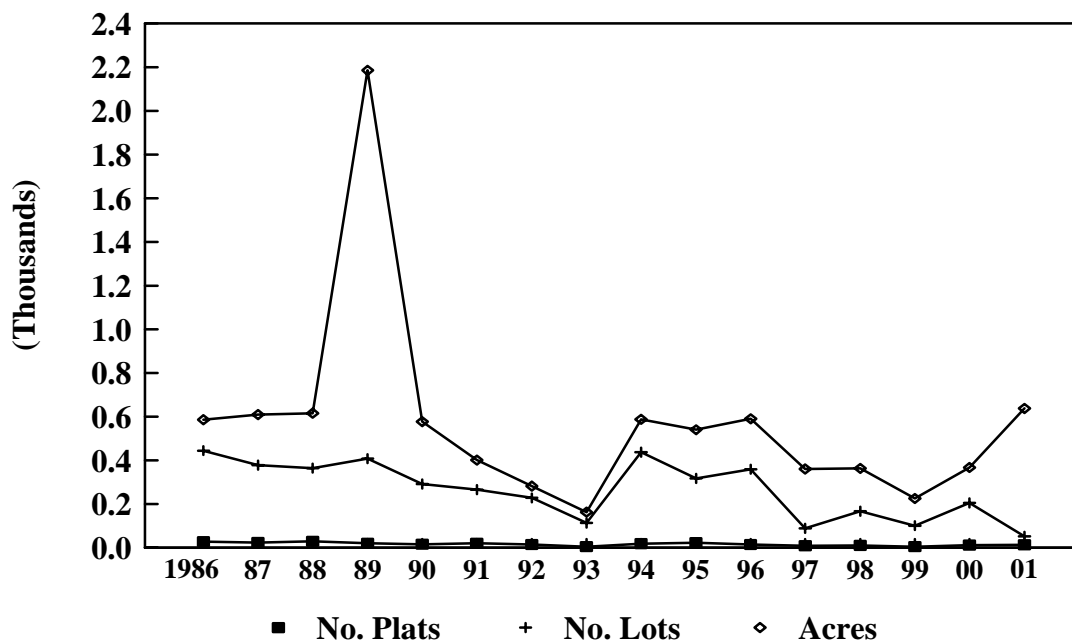
Regulations have become a pervasive factor affecting land use. In Dorchester County, 50% of the land area is in the Chesapeake Bay Critical area (1000 foot zone from waterways)

SUBDIVISION ANALYSIS: WICOMICO, 1986-2001

Data are available for Wicomico County on subdivision activity and trends (WCPZD, 2001). From 1986 to 2001, for subdivisions of 3 or more lots, a total of 269 final plats were filed. These accounted for 4,239 lots and 9,094 acres of land. 63% of the lots and acres were west of Route 13. In what the Commission describes as the “Metro Core” lots averaged 1.04 acres, and outside that area in the rural areas they averaged 2.78 acres. Sixty-one percent of the lots were outside the metro core, as were 80% of the subdivided acres. An average of 568 acres per year were subdivided over this period.

Figure 25

Wicomico County Subdivision Activity 1986-2001



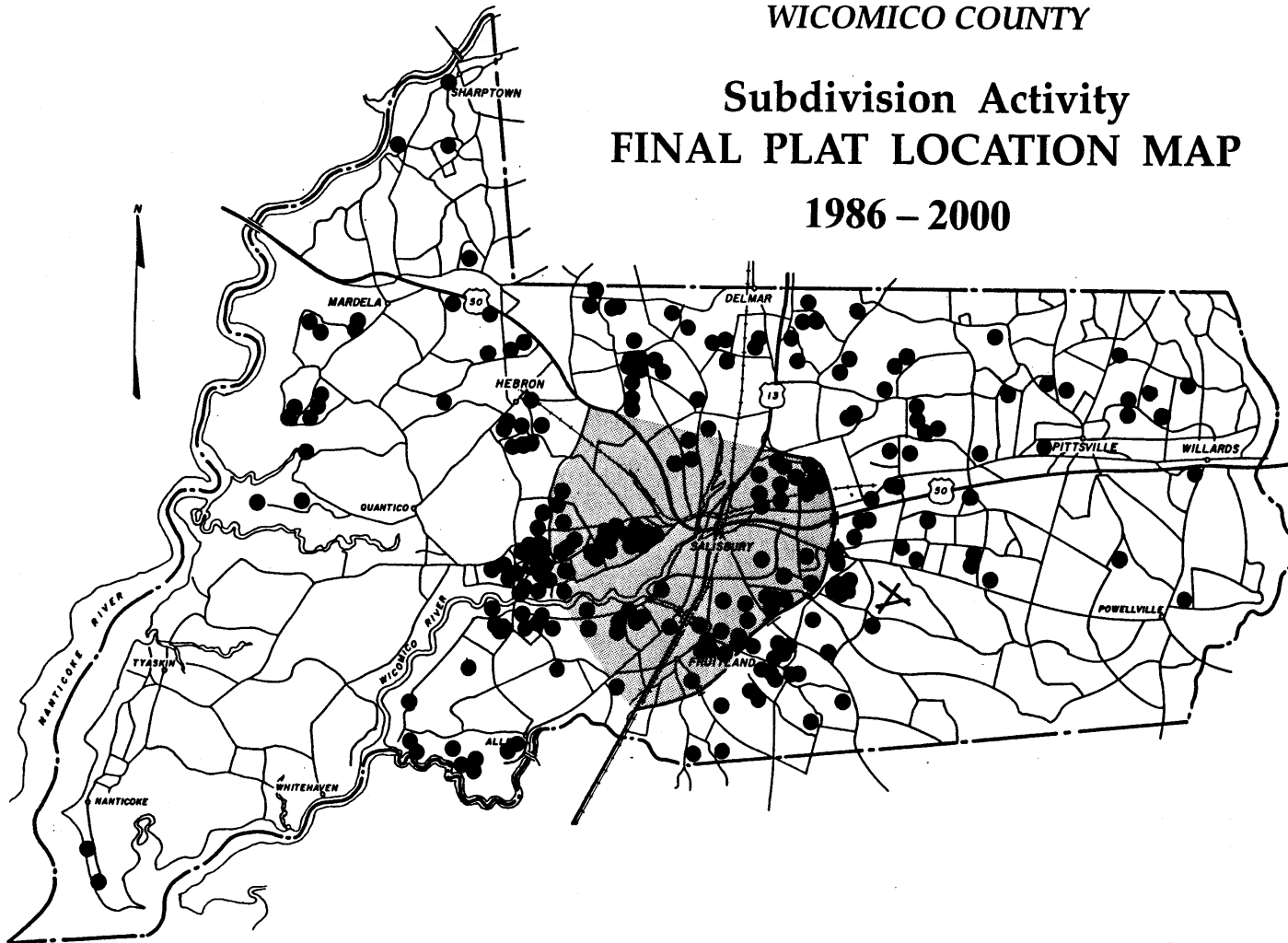
Source: Salisbury - Wicomico County Dept. of Planning, Zoning, and Community Development.

Figure 26

WICOMICO COUNTY

Subdivision Activity
FINAL PLAT LOCATION MAP

1986 - 2000



MARKET SITUATION AND TREND – INTERVIEW RESULTS

Trend in Real Estate Market for Larger Tracts in Past 10-15 years

Dorchester – From 1997-2002, it was extremely difficult to find land in the 50 to 500 acre market. Major reasons include: Environmental Regulations (Critical Area Protection Program, Non-Tidal Wetlands, Reforestation Program); longtime residents are holding on to land; buyers from outside (Western Shore, New Jersey, Pennsylvania, New York, etc) are coming to Dorchester for land availability because there is little land available in Talbot, Kent, and Queen Anne's counties. Prices and demand for land in the area have been at all-time highs.

Wicomico -- Woodland prices and timber values are rising. There is less and less acreage available for development. Realtors report other causes for this trend, including: Environmental Regulations (Critical Area Protection Program, Smart Growth, FCA easements); outside buyers are willing to pay more for land than local buyers; increasing fragmentation and parcelization of land; and increasing competition among wood products companies for land.

Worcester -- There has been an increase in the demand for land and, therefore, land value in the past ten years. This situation has been particularly pronounced in the last three years. In addition, it is getting harder and harder find, buy, and develop rural land. Major growth is coming from metropolitan retirees (according to one interviewee, Worcester County has the second highest growth rate in the State); many are taking money out of the stock market to invest in real estate in the area. Some outside buyers have decided to live in the area and work from their homes.

MARKET CONDITION FOR LOT MARKET

There has been an increase in value for lots in the past few years in all counties. This is because they are in high demand, but are getting harder and harder to find. For example, one Realtor in northeastern Worcester County noted that of the 1,200 lots in Ocean Pines, only 50 are on the market. Waterfront lots in these counties are particularly scarce. This situation is due mostly to the increase in the demand for land from outside buyers and the restrictions on development from state and federal environmental regulations.

SIZES OF SUBDIVSIONS AND LOTS ON FORESTED PROPERTIES

Total Acres of Property

A Realtor in Dorchester noted that there have been only ten subdivisions in the last ten years in the county and not many of these have been on forested property. The majority of the time forestland there is not developable due to the presence of wetlands or wetland vegetation.

Acres Retained in Woods/Open Space -- For All Counties

Forest Conservation/Reforestation Regulations require that at least 15-20% of developed land be maintained as forestland after development.

Typical Lot Sizes -- For All Counties

If septic – 2-5 acres

If sewer – ¼ - 1 acre

Market for Multiunit -- For All Counties

There is a definite market for multiunit housing, but only in city, town, and community limits. There has been some interest in multiunit construction in rural areas, but these developments are still in the early planning stages, particularly in Dorchester County.

Our interviewer found a list of typical subdivisions (Table 60).

Largest Subdivisions of Forest Property – Worcester County

Using a printout provided by the Worcester County Planning Commission, we extracted the subdivisions larger than 10 acres 1990-2002 (mid year). In this size class alone, an average of 1,000 acres a year was subdivided 1990-2002, with an average lot size of 4.26 acres (Fig 27, Table 61). This average was affected by the years 1992, 1995, and 1998 when unusually large lots were common. Over the period, there is no obvious trend in lot size.

Table 60
Typical Subdivisions of Forest Property, Summer 2002

	<u>Overall Tract Size</u>	<u>No. of Lots</u>	<u>Average Lot Size (Acres)</u>	<u>Forest/Wetlands Left Undeveloped</u>	<u>Building Status</u>
Dorchester					
McKeil Point (1987)	202 acres	31	6.5	N/A-before FCA	Almost completely built out
Brannock's Neck	36 acres	12	1.8	14.22 acres	Early stages -- one housing permit issued
Osbourne Glade	16.13 acres	14	1.2	N/A-before FCA	Still being builtout -- five housing permits issued
Wicomico					
Misty Creek	250 acres	67	2.4	87 acres	Still being built on
Rosewood Estates	115 acres	20	5.8	36.9 acres	Still being built on
Heather Glen	71 acres	69	1	11 acres	Still being built on
Worcester					
Riddle Farm	995 acres	4	28	287 acres	Still under development
Jenkins Orchard	134 acres	82	0.9	60 acres	Has been built out

Source: Local real estate advertisements.

Table 61
Worcester County Subdivisions Larger Than 10 Acres, 1990-2002

TOTALS BY YEAR

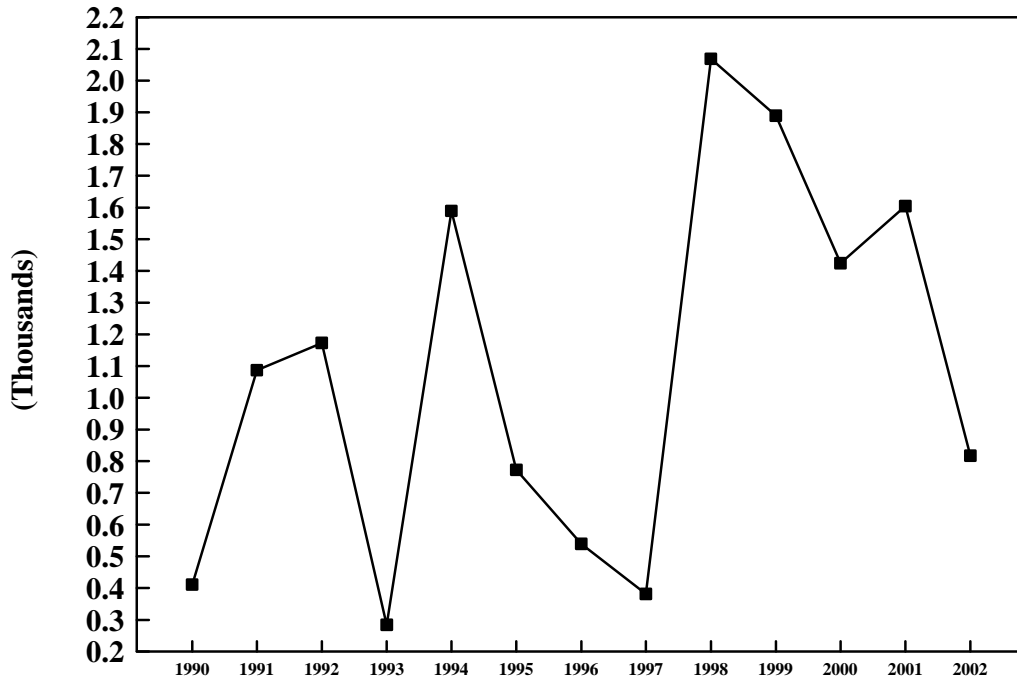
<u>Year</u>	<u>No. Lots</u>	<u>No. Acres</u>	<u>Ave. Lot Size Acres</u>	<u>No. Subdiv > 10 Acres</u>	<u>No. Subd. w/ Out-of-State Address</u>
1990	154	410.97	2.67	7	2
1991	488	1,086.65	2.23	15	1
1992	155	1,172.79	7.57	10	4
1993	85	283.29	3.33	5	1
1994	987	1,589.08	1.61	16	12
1995	93	773.29	8.31	4	1
1996	142	538.98	3.80	10	1
1997	112	381.81	3.41	8	2
1998	231	2,068.59	8.95	7	2
1999	422	1,889.62	4.48	15	4
2000	307	1,423.89	4.64	6	4
2001	774	1,604.73	2.07	10	4
2002	359	817.32	2.28	10	3
Total	4,309.00	14,041.01	n/a		
Average	331.46	1,080.08	4.26		

Source: Worcester County Planning and Zoning Subdivision Printouts.

Note: In each year, details were lacking for a few subdivisions.

Figure 27

**Worcester County Acres Subdivided,
1990-2003, Larger than 10 A.**



Source: Worcester County Planning and Zoning Commission printouts.

WORCESTER COUNTY: CURRENT SUBDIVISION DATA

By the courtesy of a Realtor, Marlene Ott, we were able to use MLS summaries for large sample of Worcester County properties on the market during summer 2002 (Tables 62 and 63). These show a few interesting traits:

- a) A virtual absence of really large parcels (the 450 acre tract in Newark stands out as a rarity).
- b) A tendency for tract sizes to concentrate at arbitrary sizes such as 10, 20, 30, and 40 acres.
- c) Extremely high land costs per acre, especially near the coast. None of the larger lots noted could support their purchase price by forest management.

The tiniest lots are hardly relevant to the market for “acreage.” They are cited to indicate the extreme prices being asked for the most desirable small developed lots.

Table 62
Worcester County Real Estate Offerings: Wooded Lots (Summer 2002)

<u>Parcel</u>	<u>Acres</u>	<u>Amount</u>	<u>\$/A</u>	<u>Remarks</u>
Wooded lot (overlooking parcel near Rt. 50)	0.24	109,484	456,183.33	Ocean City, in developed subd. w/sewer/water
Wooded lot	0.30	104,900	349,666.67	Ocean City.
Homesite	17.28	79,900	4,623.84	Near SnowHill. Permits for septic well not appl. for
Acreage; 2 parcels	30.85	120,000	3,889.79	Near SnowHill. Central sewer avail.
Teeming w/Deer and Turkey	34.52	179,900	5,211.47	Near Whaleyville
Waterfront, Trappe Creek	14.49	275,000	18,978.61	Berlin; 429 ft. water frontage
Road restr.	13.14	300,000	22,831.05	Berlin; Indian Creek subdiv.
Bay views; pristine	38.98	325,000	8,337.61	Scotts Landing; SnowHill
Waterfront, Trappe Creek	30.93	425,000	13,740.70	Onsite well, Berlin. 868 ft. waterfront (creek)
Lots, Waterfront, Trappe Creek	30.57	445,000	14,556.75	1190 ft. water frontage; sewer (septic)
Wooded; horses, hunting	29.13	172,500	5,921.73	Berlin
A great project	13.80	59,900	4,340.58	Ready to build, Whaleyville
Last lot left	10.68	109,000	10,205.99	Berlin; near resorts
Privacy... pond	27.04	125,000	4,622.78	12 A marsh and cleared. Septic/well not appl. for
Can be subd. to 5 lots	94.61	525,000	5,549.10	Ocean City
Farm close to beach	175.00	600,000	3,428.57	Berlin "farm"

Source: MLS, courtesy M. Ott.

Table 63
Worcester County: Typical “Farm” Real Estate Offerings (Summer 2002)

<u>Tract Size</u>	<u>Acres Wooded</u>	<u>Type of Farm</u>	<u>Location</u>
164	30	n/a	Newark
242	93	Soybeans	Berlin
166	26	n/a	Some W/F
222	62	n/a	Berlin
53	20	n/a	SnowHill
94	94	n/a	Ocean
79	60	Active	Whaleyville; w/home
223	208	Chickens	SnowHill
853	all	Timber, hunting	Berlin. Asking \$2,000,000
450	327	n/a	Newark; w/home
76	26	Crops; hunting	Berlin

Source: MLS, courtesy M. Ott.

Rate of Sale of Subdivisions and Development of Lots: Interviews

Dorchester -- Subdivisions usually sell out within two to ten years. With the increase in buyers from the outside, however, one Dorchester Realtor noted that subdivisions will likely be able to sell out within five years. Subdivisions in the northern part of the county tend to sell out more quickly than subdivisions in the lower part of the county. In the past, lots have been held by developers, but now, because of the high demand from outside for land, lots are generally built on quickly.

Wicomico -- Typically subdivisions sell out quickly and lots are built on quickly (usually within one year). One Wicomico planner noted that the relatively rapid sale and development of land is due in part to the fact that developers do not want to plant trees (under Reforestation regulations) until all houses are built out. Again, location affects the rate of sales. The closer the subdivision is to towns and cities, particularly Salisbury, the faster they sell out.

Worcester -- In the northeastern areas, subdivisions tend to be sold out and built on quickly. This has become more pronounced in the past few years. In some cases, however, developers hold land for later development. In the southern part of the county (in Pocomoke and surrounding areas) lots are built on quickly and developers sell both house and land as a package. Here, however, subdivisions tend to sell out at rather a slow, steady rate. One Realtor noted that he usually sells about six to ten houses per year.

Types of Firms Doing Subdivisions

Dorchester -- Local and regional builders: Powell Realtors, Valerie Brown; Rundell Corporation; John Luthey, III.

Wicomico -- Local and regional Builders: ES Adkins, Tom Ruark, Jack Causey, and Robert Messick

Worcester -- Major national builders (Northeastern Worcester): Centex, Carl Freeman, Boise Cascade. Local and regional builders (Northeastern Worcester): Betsy Scolinck, Barbara Passwater (Cambre Realty), and Burbage. Local and regional builders (Southern Worcester): Carlton and Mason

Table 64
Amenities Sought by Buyers

<u>Amenities</u>	<u>Dorchester</u>	<u>Wicomico</u>	<u>Worcester</u>
Forest	2	2	1
Water Views/Access	3	3	3
Topography	1	1	1
Near Atlantic Coast	1	2	2
Proximity to Bay Bridge	1	1	1
Golf Courses	2	3	2
Towns	2	3	2
Public Land/Reserves	1	1	1

Legend

1-Not Significant

2-Important

3-Very Important

Table 65
Typical Land Values – Three County

<u>Land Description</u>	<u>Condition</u>	<u>Dorchester</u>	<u>Wicomico</u>	<u>Worcester</u>
Undeveloped	Cut-over	\$1000/acre	\$750-1000/acre	\$300-600/acre
Wooded	Mature	\$3000/acre	\$5000/acre	\$1500-2000/acre
Farm	--	\$2,300/acre	\$1000-2500	\$1500-3000/acre
Lots	Rural (wooded/farm)	\$25,000	\$20-25,000	\$20-30,000/acre
	In Development	--	--	\$50-75,000/acre
100-acre	Cut-over	\$100,000	\$75,000-100,000	\$30-60,000
Woodlot	Mature	\$200,000	Up to \$500,000	\$200,000
	Water/Resort	\$2,000,000	--	Up to \$1,500,000
	Proximity			

Outlook

Dorchester -- Realtors believe there will be fewer rural subdivisions (subdivisions on septic systems and individual wells) in the future due to Maryland's Smart Growth policy. There have been no new waterfront subdivisions in over five years, there will probably be none in the future. Also, available waterfront property values will continue to increase with the high demand from outside and the scarcity of the property. Due to the increasing shortage of lots in the county, one Realtor believes that developers may start building more on wooded land. Most believe, however, that farms, wetlands, and forestland will continue to be secure due to the success of environmental regulations.

Wicomico -- There will be more and more small wooded lots (5-10 acres) on the market, leading to greater fragmentation of woodlands. This is due in part to wealthy outsiders moving into the area to retire. There will also likely be more development along route 50 leading from Salisbury to Ocean City. Also, there is likely to be a continuing demand for homes and land in close proximity to Salisbury and clustered development in the vicinity, due to higher pay in the area, greater opportunity for employment, and Maryland's Smart Growth policy. Agricultural land and poultry and grain industries will continue to be preserved, due to agricultural preservation laws. Also, farm and forestland will continue to be secure due to the environmental regulations in place.

Worcester -- Due to county and state environmental regulations, land will be harder and harder to buy and develop. Thus, there will be less subdivisions and development in the county. The majority of the subdivisions will be close to the city due to Maryland's Smart Growth policy. There will still be a high demand for development due in part to outside buyers. Because northeastern Worcester County is filling up, there will be increased movement to the southern part of the county. Waterfront lots in the southern part of the county have tripled in the last two years for this reason.

DISCUSSION AND SUMMARY

These 3 counties are projected by MDP to see rates of forest loss to 2020 as low as any part of the State. Trends noted in our fieldwork lead us to wonder if this is not an underestimate. Further, it seems that parcel fragmentation will be severe across these counties. Growth management programs do not seem to have affected the dispersion of major subdivisions, but the regulations have affected development along waterways. Realtors expect growth management to be more important in the future.

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13. ST. MARY'S COUNTY CASE

St. Mary's is the oldest county in Maryland, organized in 1637, just 3 years after the founding of the town of St. Mary's, one of Maryland's first English settlements. St. Mary's is the only county in Maryland that consists of more salt water than land, its boundaries running some distance out into the Potomac Estuary and Chesapeake Bay. The county retains significant forested sections. Overall, its land area is 47% commercial forest (FIA data), the lowest of the three Southern Maryland counties. The leading forest type is oak-hickory, which accounts for about half of the forest area. The second most important type is loblolly/shortleaf, and the third is oak-pine. There is no northern hardwood and very little of the bottomland types.

SETTING AND GEOGRAPHY

Though it is a part of the Coastal Plain province, the terrain in Southern Maryland is somewhat more rolling than the flatter terrain on the Lower Eastern Shore. In a few of the subdivision plats we examined, small areas of slopes greater than 25% were mapped; such slopes are unusual on the Eastern shore. Soils are relatively well drained; wetlands are relatively uncommon -- only 1% of the area.

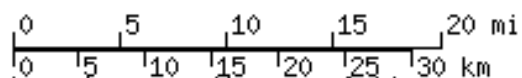


LEGEND

- State
- County
- Lake/Pond/Ocean
- Expressway
- Highway
- Connector
- Stream
- Military Area
- National Park
- City
- County

Scale 1:548798

*average--true scale depends on monitor resolution



ECONOMY AND POPULATION

In 1850, virtually all of the county's land was "in farms," though some of it was in woodland and pasture. St. Mary's saw a dramatic contraction in farmland area after the Civil War as a result of the shrinkage of tobacco cultivation following Emancipation. Since 1870, farmland has followed a generally steady downtrend. As farming contracted during the 20th century, the County's location away from major rail connections and from the urban corridor meant that it was not a prime location for manufacturing or other industries. Historic business connections to Philadelphia and northeastern cities facilitated the growth of a food-processing sector on the Eastern Shore that did not occur in the Southern Maryland counties.

In recent years, increased activity at NAS Patuxent has been a major contributor to increasing employment (St. Mary's County Planning and Zoning, Annual Report 2000). This has been reflected in the economy's structure (Table 66 below). The county's unemployment rate fell steadily after 1992 before easing upward again after 1999. The county's population grew steadily after 1940 (Fig. 29), and during this period its growth was significantly faster than the State as a whole. As of 2000, less than 2% of the State's population lived here.

Table 66
Comparison to State Economy: St. Mary's County Location Quotients, 2000

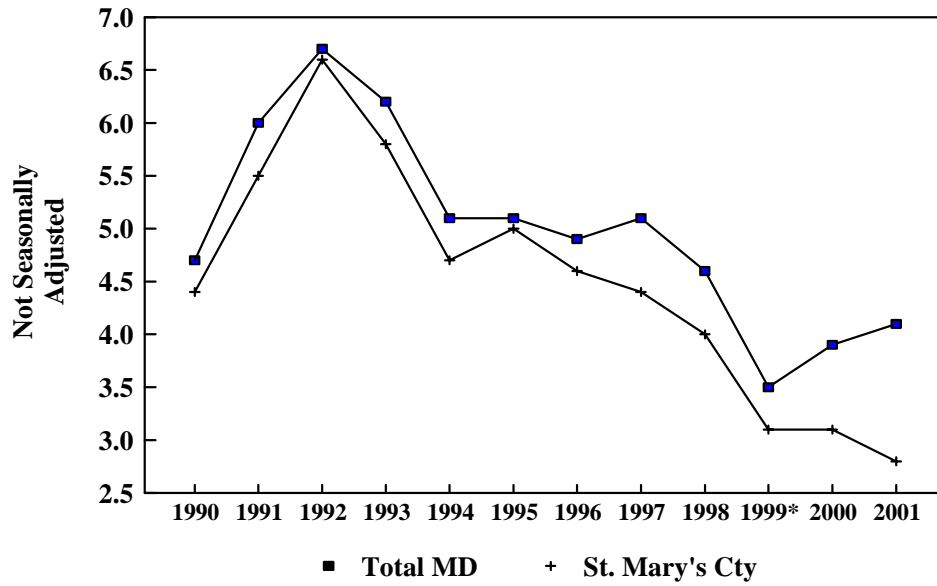
	Percentage in Sector <u>Compared to State Average</u>
Manufacturing	39%
Trade	95%
High-End Services	171%
Education/Health	88%
Accommodation/Food Services	121%

Source: Table 10 above.

Due to distance from Washington and Baltimore, commuting is less important here than in the counties to the north. Just over 70% of the workforce works in the county, compared to just over 40% for Calvert and Charles counties (County Planning Commission, p. 26).

Figure 28

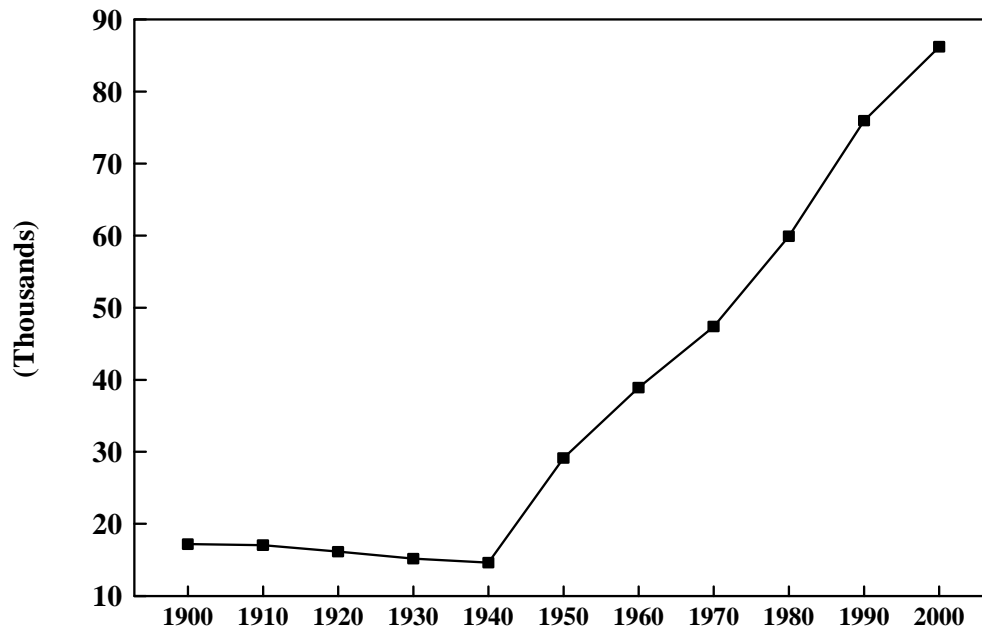
Maryland Unemployment Rates, 1990-2001
Total Maryland and St. Mary's County



Source: US Bureau of Labor Standards.

Figure 29

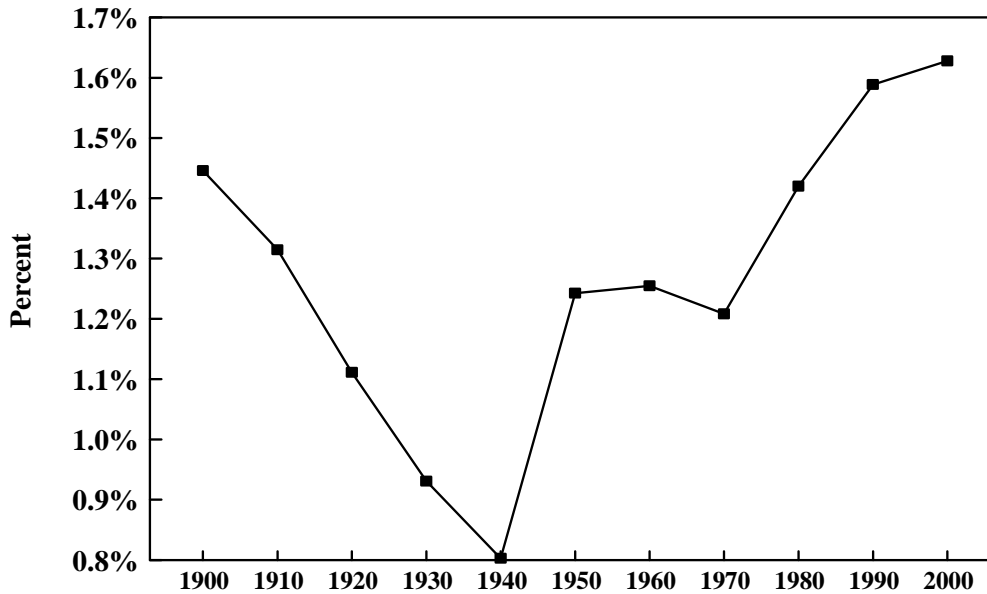
St. Mary's County Population, 1900-2000



Source: U.S. Bureau of the Census.

Figure 30

St. Mary's County Population as a Percent of Total Maryland, 1900-2000



Source: U.S. Bureau of the Census.

This county's economy was for centuries dominated by tobacco. Even in 1954, it continued to produce tobacco in a major way. Tobacco's effect in draining soil nutrients is well known, and the forests of this area are the result of repeated clearings and regrowth over three and a half centuries.

LAND OWNERSHIP

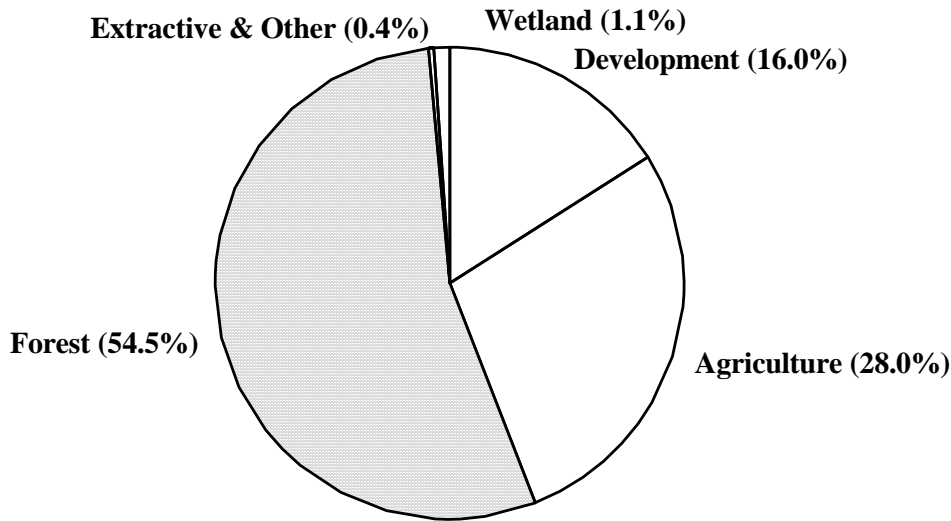
No forest industry ownership is recorded in St. Mary's in the FIA dataset. The bulk of the county's forestland is privately owned. Public forest ownership is small in St. Mary's, only about 6,000 acres of forest, or 6% of the county total, according to the DNR estimates (but it amounts to 22,400 acres according to the FIA 1999 data). The largest public ownership is the Patuxent NAS.

CURRENT LAND USE AND RECENT TRENDS

In St. Mary's, agriculture still employs almost twice as much land as does "development" (Fig 31). Forest, in turn, is about twice as extensive as is cropland, amounting to just over half the land area according to MDP's dataset. The MDP estimates that forest covers 125,700 acres in the county. According to the MDP dataset, commercial industrial and transportation land use barely increased over the 1973-1997 years, reflecting the relative weakness of those sectors of the economy. Instead, low density development doubled, to reach 22,000 acres by 1997. This accounted for the vast bulk of the total increase in developed land.

Figure 31

St. Mary's County Land Use, 1997



Source: MDP, 2001, p. 64.

Development	36,990
Agriculture	64,703
Forest	125,705
Extractive & Other	839
Wetland	2,552
ALL	
LAND	230,789

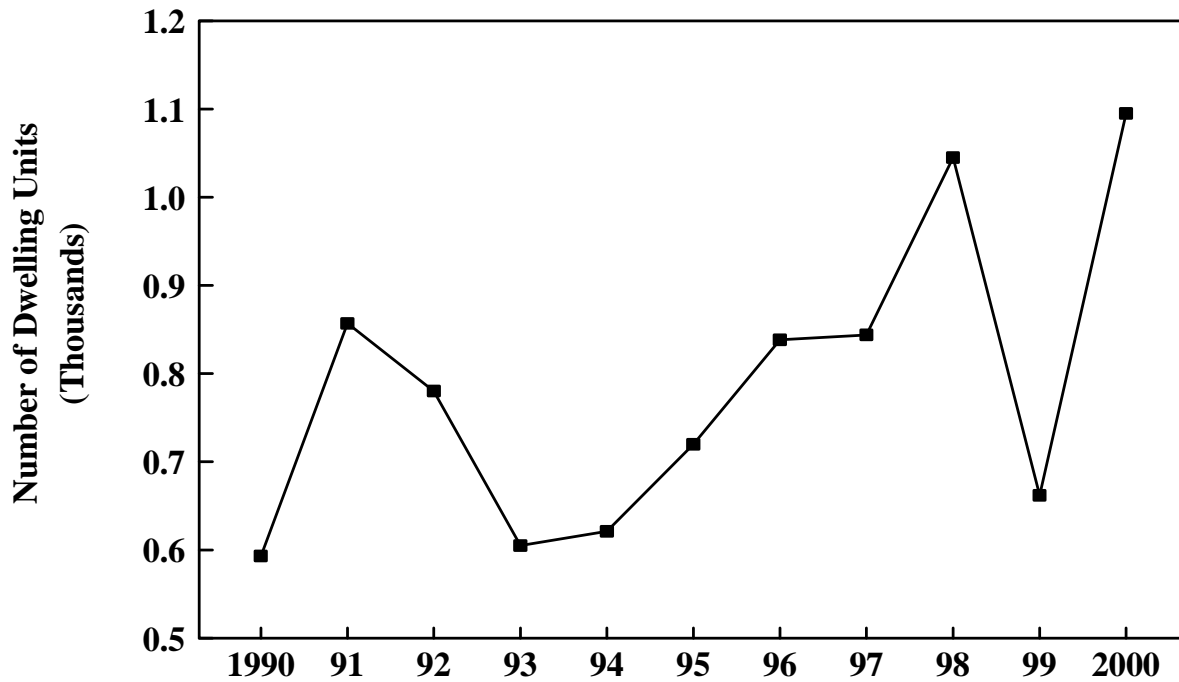
SUBDIVISION ANALYSIS AND INFORMATION

As the County Planning and Zoning Department notes, “the demand for housing in the suburbia on sprawling lots, waterfronts, or on scenic settings is stretching to on to the county because of its relative proximity to Washington D.C. and Baltimore. The county’s typically flat, well-drained farmlands make them generally easy to convert to residential and commercial uses” (County Planning Commission, p. 5).

Building permits increased steadily through the 1990s, almost doubling over the period (Fig. 32). Permits were heavily concentrated in Election District 8, which surrounds NAS Patuxent. On average, 1991-2000, 786 permits were issued each year, of which 52% were in designated growth areas. There is no evidence, however, of any upward trend in the share of permits in concentrated areas.

Figure 32

St. Mary's County Building Permits Issued, 1990-2000



Source: St. Mary's County Planning Commission,
Annual Report, 2000.

Housing prices in St. Mary's county are significantly lower than the counties to the north, as would be expected.

LAND OWNERSHIP PATTERNS

Thousand-acre forested properties are rare; most of the larger forested properties fall in the 100- to 200-acre range.

MARKET SITUATION AND TRENDS

Trend in Real Estate Market in Past 10-15 years

In the past ten years the real estate market has been strong, and land values have more than doubled. This is due, in part, to the influx of new buyers with the relocation of the Patuxent Naval Air Station in the early 1990s.

Current Market Condition for Lot Market

The lot market is especially hot right now due to the absence of a “perc season” last year, which caused 531 applications to be denied, according to one Realtor.

SIZES OF SUBDIVISIONS AND LOTS ON FORESTED PROPERTIES

On average, subdivided tracts are smaller than we see in other counties, about 50 acres on average. Lot sizes are as large as 5 acres. There is a definite, yet limited market for the multiunit, in city, town, and community limits.

Largest Subdivisions of Forest Property

	Overall Tract Size	# of Lots	Avg Lot Size
Forrest Farms	849 acres	39	22
St. James	457 acres	29	16
Chestnut Hills	126 acres	23	5
Porto Bello Estates			

Subdivisions typically sell out fairly quickly throughout the county, usually taking from three to five years. Lots are also built on quickly rather than being held for later development.

AMENITIES SOUGHT BY BUYERS

As elsewhere, forests are a desired amenity in the lot market.

Amenities	St. Mary's
Forest	3
Water Views/Access	3
Topography	1
Proximity to Baltimore/Washington	1
Proximity to Bay Bridge	1
Golf Courses	1
Public Land/Reserves	1
Proximity to Schools	3
Walking/Bike Trails	3

Legend

1-Not Significant

2-Important

3-Very Important

A 100-acre woodlot could be purchased in this area for \$150,000 to \$300,000 in areas with no water views.

LAND VALUES

Land Description	Condition/Location	Price
Undeveloped Wooded/Farm	Non-Waterfront	\$1,500-3,000/acre
	Waterfront	\$5,000-7,000/acre
Five-Acre Lots	Rural	\$42,000-60,000
	Suburbs	\$65,000-75,000
100-Acre Woodlot	Non-Waterfront	\$150,000-300,000
	Waterfront	\$500,000-700,000

OUTLOOK

Realtors expect an increase in residential development over the next few years for the county. More land will be needed in the future due to the recent zoning changes that requires at least five acres per lot. According to one appraiser, this will reduce the availability of land, increase the cost of development, and increase land prices. Realtors, however, believe that both farm and woodland will be preserved in the future as a result of state and local environmental regulations.

We examined plats for several of the largest subdivisions approved in 2002. The largest was a phase of a 2,292-acre project. The smallest was 71 acres. These subdivisions seem to be well designed and the plats reflect the abundance of regulations developers must address. Several of the plats reflected fairly large FCA easements, though the value of these easements is reduced by the fact that the forests are fragmented among the owners of numerous lots. In several instances, significant buffers for streams or wetlands were evident. Lot sizes varied, but sizes of roughly 1 acre, up to 2.3 acres were common.

DISCUSSION AND SUMMARY

St. Mary's County seems to have been sheltered by distance from the intense wave of suburbanization of the 1950s through the 1980s that so changed the face of the Suburban Corridor counties. As that corridor has filled up, and seen escalating real estate prices, demand has moved southward. Regulations on large-scale subdivisions are clearly affecting land allocation practices in the larger subdivision projects. There has been little progress, according to the Planning and Zoning Commission, in reining in individual lots and permits around the county in accordance with the Commission's hoped-for concentrations of development in and around existing developed areas. Indeed, as lot sizes have increased, land absorption has surely risen proportionately in the outlying areas.

The MDP's projections suggest that another 15,000 acres of forest will be lost by 2020, the bulk of this accounted for by yet another doubling of area in low density development (MDP, 2001, p. 64). Over the coming decades, even though conversion pressures may be more manageable than elsewhere, further parcel fragmentation is likely to be intense given land prices at these levels. A detailed case study, with statistical analysis, of nearby Calvert County by Irwin, Bell, and Geoghegan (2003) contains many observations that are relevant here.

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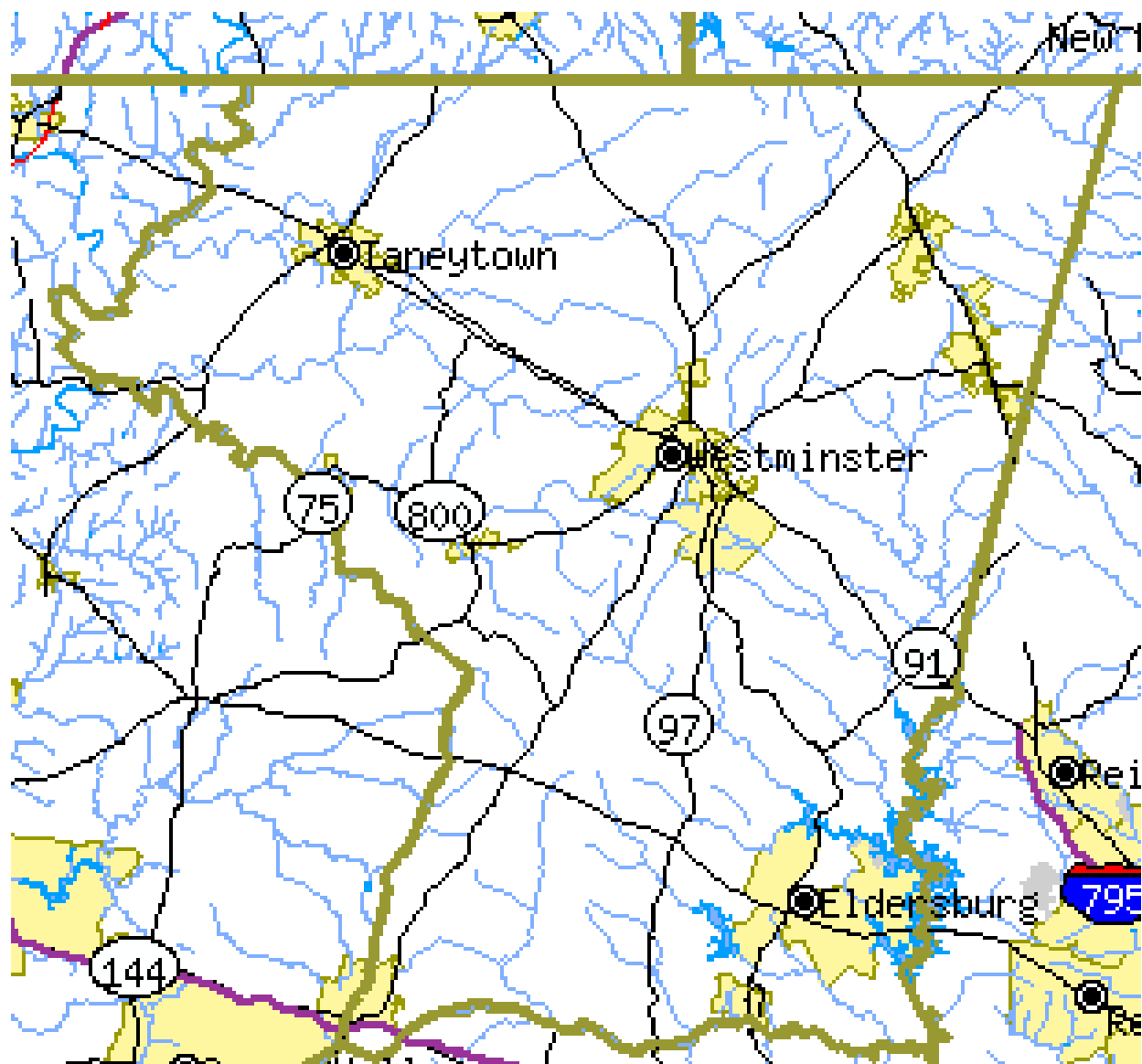
14. CARROLL COUNTY

SETTING AND GEOGRAPHY

Carroll County lies in the fertile belt of agricultural soils of the Piedmont, just to the West of the Urban/Suburban Corridor as defined for this report. Actually, the boundary is a bit arbitrary in this instance as the influence of development is already well in evidence along the county's eastern fringe. Before the Revolution, settlement did not penetrate extensively west of Baltimore. Carroll County was not organized until 1836. Its original settlement was heavily influenced by population movements southward from Pennsylvania and by new immigration, rather than moving upward and inland from the coast, where farming systems and practices were quite different.

In general landforms, the County is split north to south by an imaginary line dividing the eastern from the Western piedmont. This line follows the crest of a low ridge system stretching down from Pennsylvania that forms the western watershed boundary of small streams flowing eastward to the Chesapeake Bay.

According to the FIA data, Carroll has the lowest proportion of forest cover in the entire State – only 22% (essentially tied with Frederick at 22.1%). Of the 63,000 acres rated as timberland, more than 70% is oak-hickory, with the balance mostly northern hardwoods. A tiny amount of white/redpine type occurs. The county, then, is at the eastern end of the broad transition from oak hickory to the northern hardwood type that dominates the more hilly areas to the west. The fact that 87% of the timberland is in the sawtimber stand size class may reflect minimal management and harvesting on the generally small lots characteristic of this area.

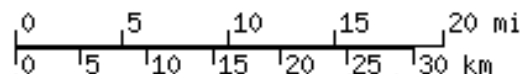


LEGEND

- | | |
|-----------------|---------------|
| State | Military Area |
| County | National Park |
| Lake/Pond/Ocean | City |
| Expressway | County |
| Highway | |
| Connector | |
| Stream | |

Scale 1:548798

*average--true scale depends on monitor resolution

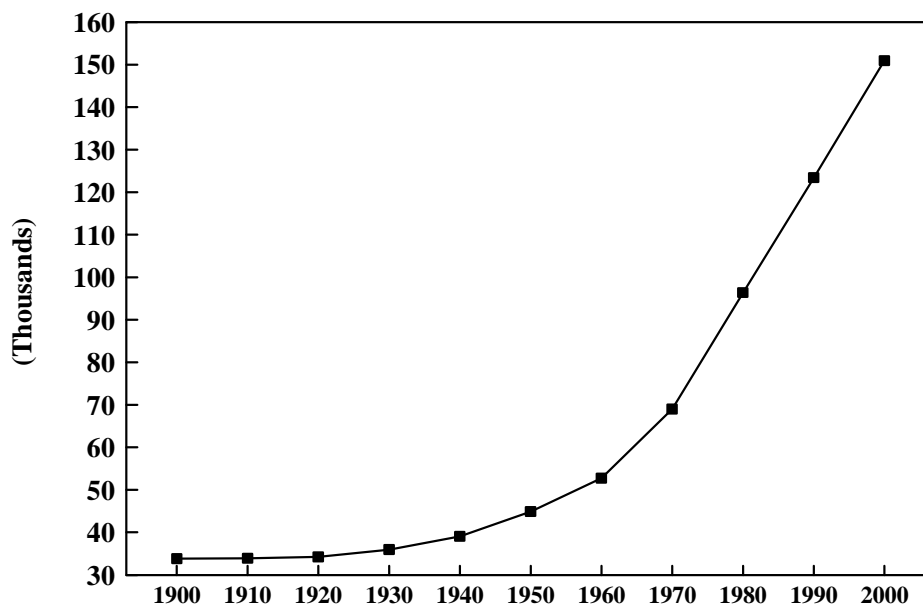


ECONOMY AND POPULATION

The county's population stood essentially still from 1900 to 1930. It then began a steadily rising curve that continued to the present decade (Fig. 33), and overtook the State's total rate of growth after 1960 (Fig. 34). During the 1990s, the county's unemployment rate has been well below the State average (Fig. 35). Much of the development is based on commuting: in 1990, 35,000 county residents left the county for work. The county had the highest median travel time to work of any of its neighbors in 1990.

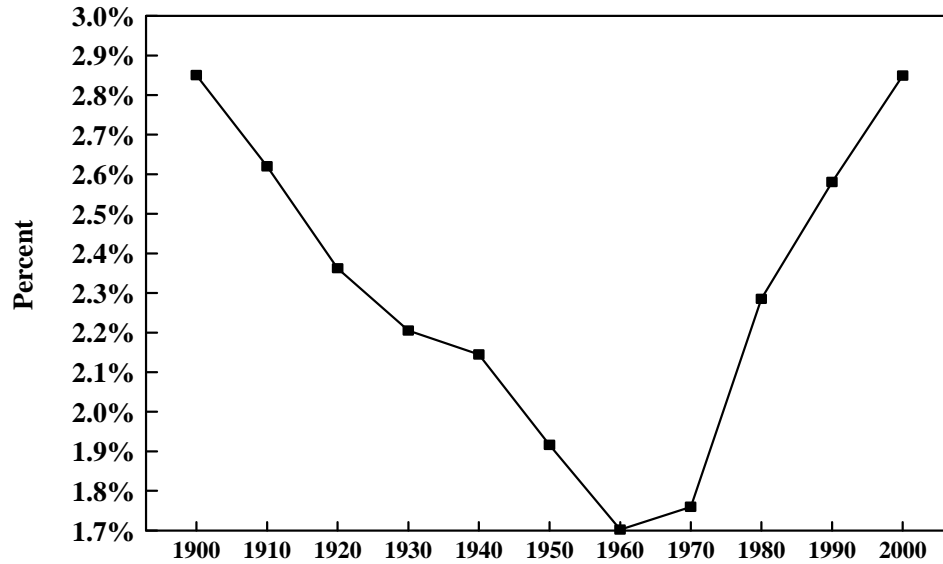
Figure 33

Carroll County Population, 1900-2000



Source: U.S. Bureau of the Census.

Figure 34
Carroll County Population as a
Percent of Total Maryland, 1900-2000



Source: U.S. Bureau of the Census.

Comparison to State Economy: Carroll County Location Quotients, 2000

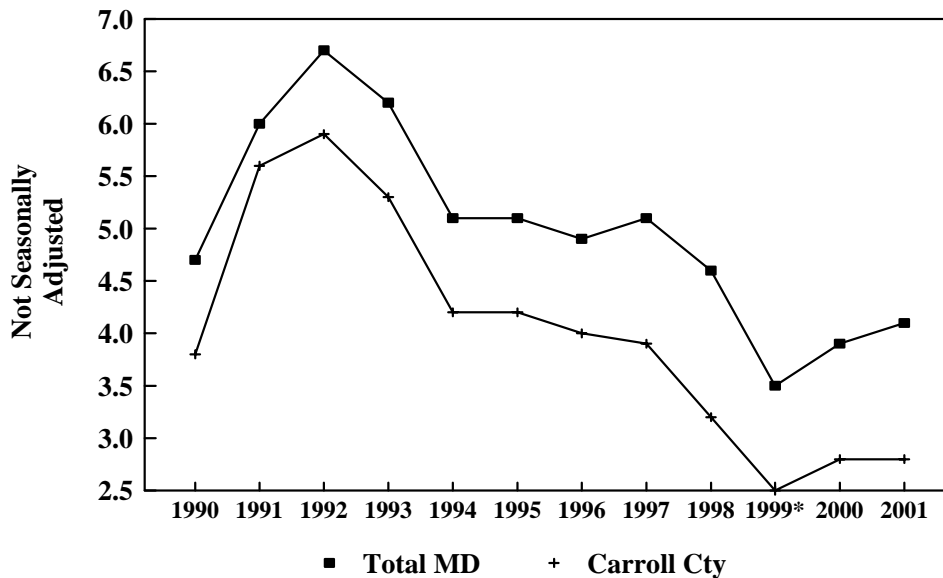
Percentage in Sector
Compared to State Average

Manufacturing	123%
Trade	112%
High-End Services	48%
Education/Health	114%
Accommodation/Food Services	122%

Source: Table 7 above.

Figure 35

Maryland Unemployment Rates, 1990-2001
Total Maryland and Carroll County



Source: US Bureau of Labor Standards.

Agriculture has had a somewhat different history in this part of Maryland. Land in farms showed a broad peak from 1880 to 1930, and the county has retained proportionately more of its land in farming than have the other case study counties. This has been due to the fertility of the soil, and the distance (until recently) to the urban areas. Soil quality and proximity to transportation and urban markets have probably enhanced the staying power of the area's farmers. The crop mix has always been different from the eastern shore and tidewater areas, with far less influence by large plantation ownerships. By 1992, there were only 1,080 farms in the county, averaging 146 acres in size.

LAND OWNERSHIP

Public ownership, at about 8,000 acres, is modest (mostly county), yet still accounts for 13% of the forest in the county. Of the conservation easements, there are an additional 6,000 or more forested acres.

CURRENT LAND USE AND RECENT TRENDS

In 1997, only 13% of the county was developed land, though this was a significant increase from 1973. Forest land outweighed developed, and agricultural uses accounted for more than half of the total land area (Fig. 36). Total developed land doubled from 1973 to 1997, to 50,000 acres. The bulk of this increase was due to low density residential development. Commercial and industrial uses grew by only about 1000 acres. Carroll is the only case study county identified as having "high development pressure" by the American Farmland Trust (n.d.).

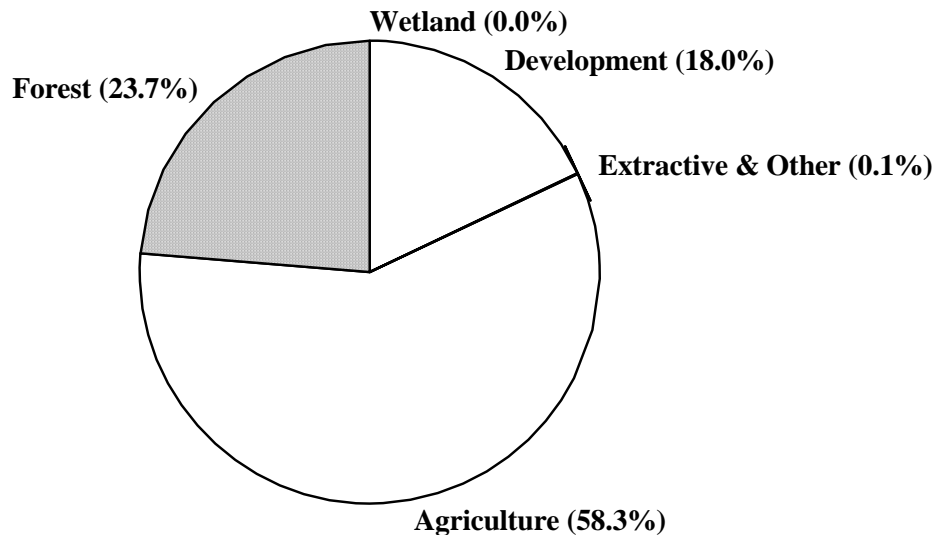
LAND OWNERSHIP PATTERNS

Lots are highly fragmented. 100-acre forested properties are rare, most of the larger forested properties fall in the 30- to 40-acre range.

Figure 36

Carroll County Land Use, 1997

All Land = 286,984 thousand acres



Source: MDP, 2001, p. 40

SUBDIVISION TRENDS AND INFORMATION

New development from 1990-1997 occurred mostly in the eastern half of the county, but in patches scattered almost everywhere – there was no clear concentration. The county maintains no overall summary record of number of subdivisions, lots, and acres affected. From 1986-1995, an average of 1,279 dwelling units were built per year (Comp Plan, ch. 2). Under the 1996 zoning, potential exists for a total of about 20,000 additional units. At the pace of 1986-1995, the zoning limit would be reached by 2012, less than ten years from this writing. The Plan projects that 42% of the new units will be on large lots.

Subdividing has been widely scattered, with roughly 60% of the lots falling outside of incorporated areas. In the year 2001 (County Report, p. 12), final subdivision approvals were granted for 55 new residential subdivisions, as follows:

	<u>Unincorporated Area</u>	<u>Incorporated Area</u>
No. new subdivisions	44	11
New lots/parcels	608/4	413/0

In 2001, preliminary approval was granted in unincorporated areas for 26 plans, including 168 new lots, and likely to account for an addition to county population of 479 people at an average household size of 2.85 per household. Impact fees are stiff -- new single family units pay more than \$4,000 each for schools, and an additional \$547 for parks.

The County has identified 9 Community Planning Areas, comprising 24% of the land area. These account for 60% of the population, a percentage that remained stable from 1964. Available zoning capacity in these areas is limited, however, and the County calculates that an additional 10,000 units will have to be built outside of them in the rural areas. The Plan poses the challenge to maintain a 25% limit on size of the CPA's while accommodating needed new development. The Plan hopes for a slowdown in the rate of growth to about 800 units per year until 2020. This may not be unreasonable in view of the overheated real estate economy of recent years.

Of hundreds of individual subdivisions in the 1990's, only a few exceeded 100 acres in size, due to the extensive fragmentation of ownership that had occurred previously. The largest was 440 acres before subdivision. Of the larger subdivisions listed in the County's cumulative printout, it was not uncommon to see forest acreages retained in the 20- to 40-acre size range, but it without inspecting the properties or reviewing files it is not possible to determine if these are contiguous blocks or the sum of numerous stringers and patches.

MARKET SITUATION AND TREND

Trend in Real Estate Market in Past Several Years

In the past three years (1999-present) there has been a boom in the real estate market. Demand for land has increased significantly due to buyers from the surrounding metropolitan areas looking for rural land. This has caused Carroll County, traditionally a farming county, to move further in the residential direction. With farm incomes under stress, according to one Realtor in the area, there has been a push to convert farmland to residential land and a rise in the number of "gentleman" farmers.

Current Market Condition for Lot Market

The lot market is very strong. Lots in Carroll County used to be less expensive than in Baltimore County, but now buyers from outside are willing to pay more, especially in the eastern side of the county. Lots, however, are scarce. One Realtor noted that there were presently (August 2002) only 50 lots on the market.

SIZES OF SUBDIVISIONS AND LOTS ON FORESTED PROPERTIES

On average, properties are in the 20- to 40-acre range. Typical lot sizes in new subdivisions are large, often two to three acres. There is a definite, yet limited market for multiunit housing, in city, town, and community limits.

Largest Subdivisions of Forest Property

	Overall Tract Size
River Valley Ranch	440 acres
The Woodlands	105 acres
Spruce Meadows	100 acres
Woodsyde Estates	76 acres

Rate of Sale of Subdivisions and Development of Lots

Subdivisions sell out quickly and lots are built on quickly in southeastern Carroll County due to the influx of metropolitan buyers and the resulting demand for land. In northwestern Carroll, subdivisions sell out less quickly (taking up to ten years), but lots are usually built on quickly. Development firms include, as elsewhere, a mix of local, regional, and national companies.

AMENITIES SOUGHT BY BUYERS

Not surprisingly, presence of forest is a sought-after amenity by homebuyers in this area. This means that tracts of larger size with woodlots will be preferentially sought after for development.

Amenities	Carroll
Forest	3
Water Views/Access	1 (very limited)
Topography	1
Proximity to Baltimore/Washington	3
Proximity to Bay Bridge	1
Golf Courses	1
Public Land/Reserves	2
Proximity to Schools	3
Walking/Bike Trails	1

Legend

1-Not Significant

2-Important

3-Very Important

LAND VALUES

With the strong demand for land, a 100-acre woodlot could cost as much as a million dollars in southeast Carroll County.

Land Description	Location	Price
Undeveloped Wooded/Farm	Southern and Eastern	\$5,500-10,000/acre
	Northern and Western	\$3,000-4,500/acre
One-Acre Lots	Southern and Eastern	\$110,000-130,000
	Northern and Western	\$55,000-65,000
100-Acre Woodlot	Southern and Eastern	\$550,000-1,000,000
	Northern and Western	\$300,000-450,000

CONSERVATION/RETENTION ACTIVITIES IN CARROLL COUNTY

The December 20, 2000 Comprehensive Plan identifies a goal for the County of 100,000 acres of tillable farmland preserved from development. The Plan also supports protecting, maintaining, and restoring environmental resources, but states no specific goal for those. It also includes the usual goals for efficient and sensitive development design.

The County's 2001 Annual Report notes that Carroll County ranks fifth in the nation in acres preserved by easements, with 37,000 acres preserved. About 2/3 of this area had been done before 1996. Most of the acreage is under MALPF. From 1995 to 2001, farm acreage settled for easements rose from 1,173 acres to 2,830 acres. By 2001, cost per acre settled was \$2,496. At year end, 49,700 acres were in agricultural districts. A computer printout supplied by the County Planning Department shows a cumulative total of 15,974 acres of development covered since the FCA took effect, up to July 2, 2002. Of this amount, 1,178 acres are listed as being retained. From 1993 to 2001, the County had supported retention of 32 Critical Farms totaling 4,125 acres (Report, p. 16). At an average size of 129 acres, these would appear to be viable units for at least specialized forms of farming.

OUTLOOK

In eastern and southern Carroll County, Realtors believe that there will be a continued shift from farm to residential use, due to the increasing land values caused by the influx of buyers from the Baltimore and Washington areas looking for rural land. Realtors believe that agricultural land, as well as forestland, will be preserved in accordance with environmental regulations. In western and northern Carroll County, it is believed that as land becomes less available in eastern and southern Carroll County, outside buyers will look more to these locations for rural land, thereby raising land values and increasing the population density there.

The MDP projections suggest that Carroll County will lose only 435 acres of forest per year to 2020. We lack a precise estimate of total land loss to development per unit. Let us assume that, say, two acres of land will be converted per new unit (this could be low). If the County's projection is correct, that there will be 800 units per year, this would be 1,600 acres of

total conversion per year. If only 25% of the land converted is forest, the MDP projection could come true. Farmland protection and buyer preferences, however, may slightly shift the focus of conversion towards forest, however. So the loss of forest could exceed the MDP projection rather easily. Whether this occurs in 23 years or 46 years is of no particular consequence in the long run.

Even if the County is successful in confining most development to efficient paths, more land use conflicts with forest management will emerge, and parcel sizes will get smaller. Given the average ages of farmers in Maryland, this will happen sooner rather than later.

DISCUSSION AND SUMMARY

If the MDP projections are accurate, by 2020, developed land in Carroll County will far outweigh remaining forest acreage, with 80,000 developed, compared to 59,000 remaining in forest. Of the 80,000 acres developed, fully 75% will be in low density residential. Perhaps more significantly, it is likely that the remaining private forest acreage will be further “parcelized,” such that ownerships larger than 20 acres will be scarce to nonexistent. The traditional role of the forest as a supplier of locally needed items such as posts, building materials, and firewood -- will largely come to an end unless new ways of cooperation to manage such tiny lots emerge. Of this county in 1919, Besley and Dorrance (p. 98) remarked: ...”this county pays the highest prices in Maryland for the wood which it manufactures. It is a stirring argument in favor of local production for home consumption.” Whatever public uses continue on these forest at present are likely to disappear.

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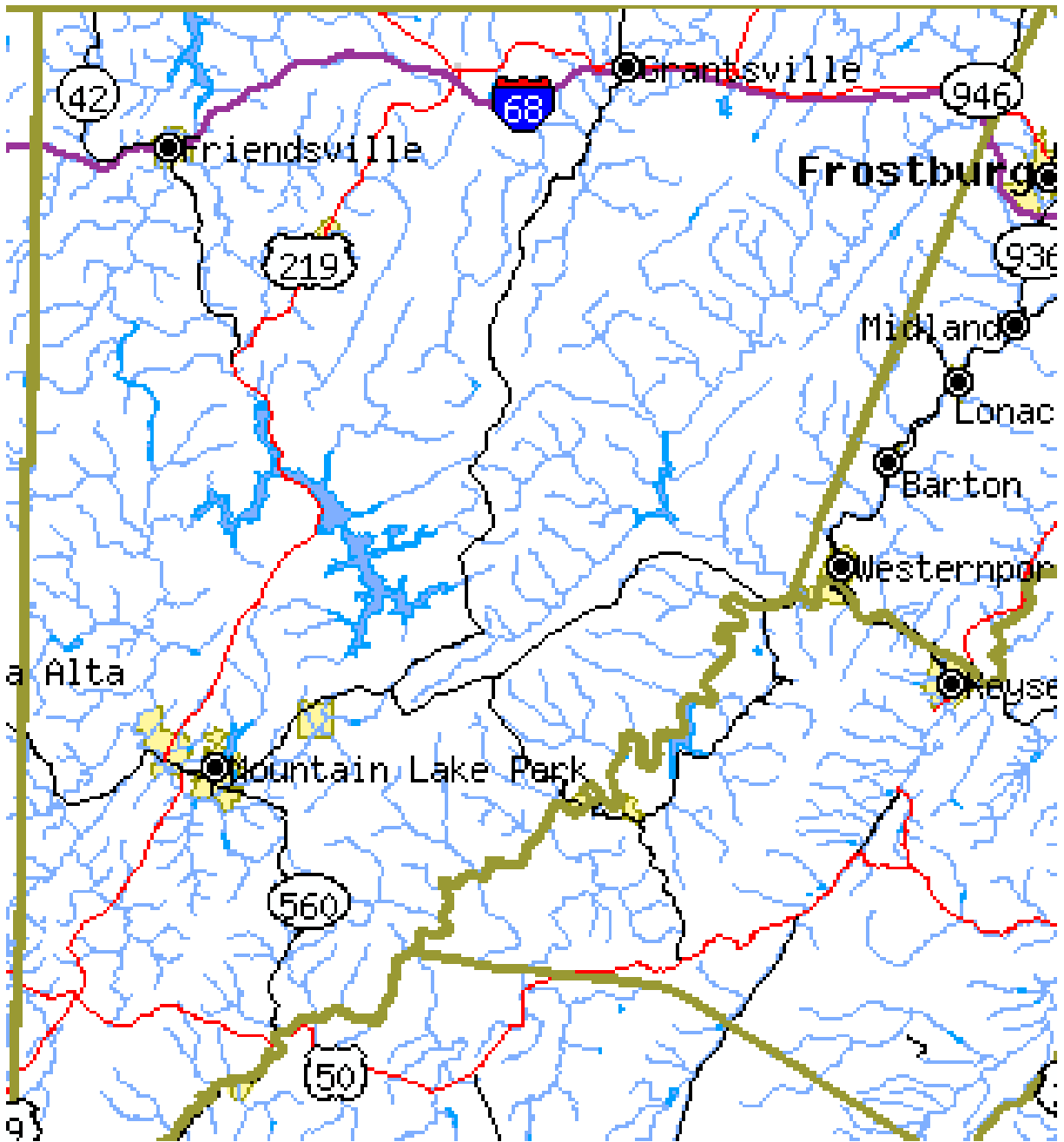
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5. WESTERN MARYLAND: GARRETT COUNTY

SETTING AND GEOGRAPHY

At the western end of Maryland stands Garrett County, a world very different from the low-lying Eastern Shore or the urban corridor with its bustling interstates, malls, office complexes, and suburbs. The county is 69 % forested, one of the highest in the State. Most of the county drains into the Ohio River Valley, the only part of Maryland to do so.

This area has a long history of connection to the urbanized Chesapeake Bay area, along the old National Road from Washington to Wheeling, West Virginia. These connections primarily affected the northerly portions of the county, though, so that Garrett was the last county in Maryland to be organized (1872). Due to conflicting original surveys, the County's western boundary was not finally fixed, through Supreme Court action, until 1912. Until the completion of Interstate 68 to Grantsville (1991), however, Garrett County was a tedious drive from Baltimore. An excellent dam site led to construction of Deep Creek Lake in the 1920s by a private power company.

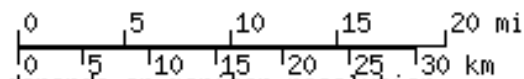


LEGEND

- | | |
|-----------------|---------------|
| State | Military Area |
| County | National Park |
| Lake/Pond/Ocean | City |
| Expressway | County |
| Highway | |
| Connector | |
| Stream | |

Scale 1:548798

*average--true scale depends on monitor resolution



ECONOMY AND POPULATION

Western Maryland has endured employment cutbacks in basic industries as agriculture contracted, as mines closed, and other manufacturing employment has been cut back. Coal production in Western Maryland peaked between about 1890 and the 1920s, and declined irregularly since. By the 1990s there were only 8 mines (Garrett County Economic Development Department). Completion of the C&O Canal to Cumberland and the B&O railroad gave this area early connections for bulk products -- such as coal -- to coastal markets. The county's economy depends somewhat less on manufacturing and government than the U.S. as a whole, and more on mining, agriculture, and services. But compared to Maryland, it is more dependent on manufacturing.

This area of the Appalachians is very hilly, with farmlands along the valleys. Amish and Mennonite farmers are prominent in parts of the area. The area's growing season is a full two months shorter than that of Salisbury, and its annual temperature is 10 degrees lower. So the crop mix is naturally quite different. Population growth has been slow, with the number of households rising from just over 7,000 in 1973 to about 11,000 in 1997 (Figs. 37 and 38).

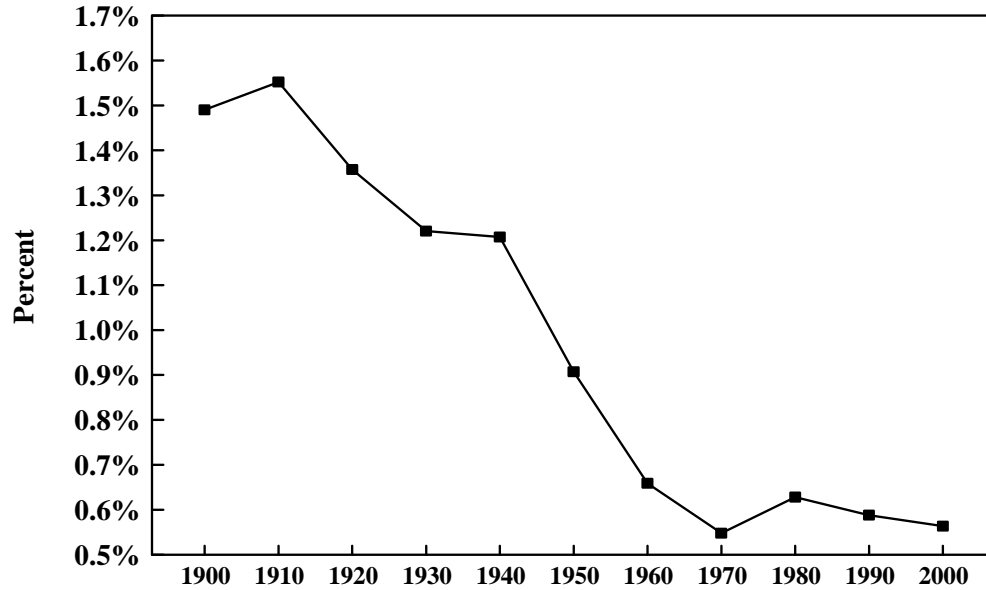
Comparison to State Economy: Garrett County Location Quotients, 2000

Percentage in Sector <u>Compared to State Average</u>	
Manufacturing	173%
Trade	101%
High-End Services	16%
Education/Health	97%
Accommodation/Food Services	153%

Source: Table 7 above.

Figure 37

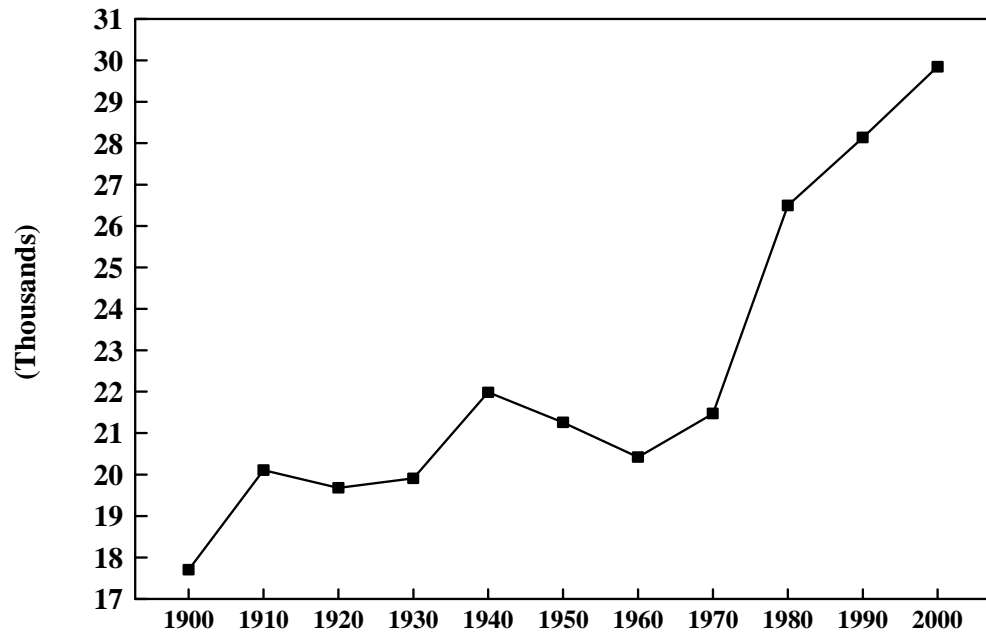
Garrett County Population as a Percent of Total Maryland, 1900-2000



Source: U.S. Bureau of the Census.

Figure 38

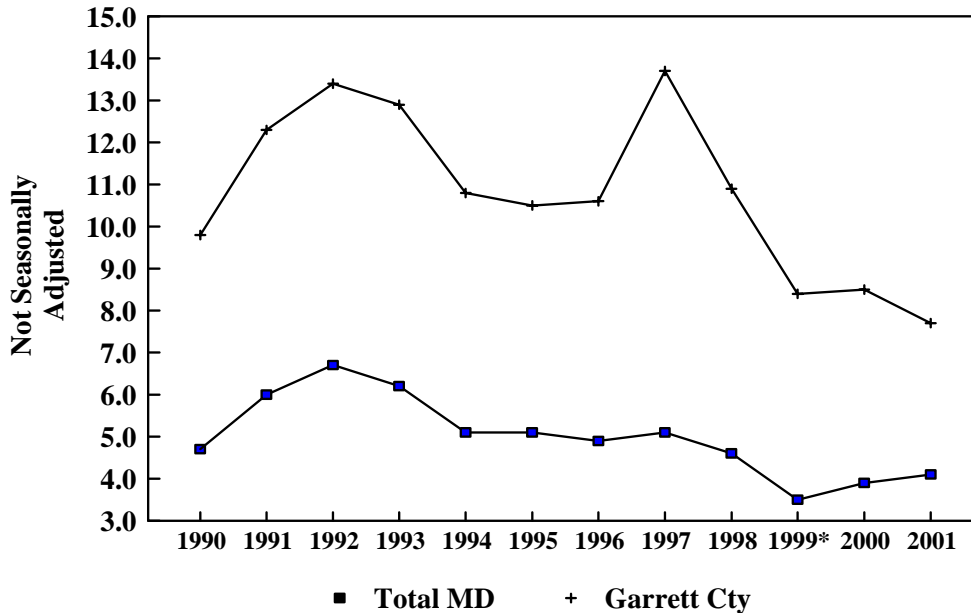
Garrett County Population, 1900-2000



Source: U.S. Bureau of the Census.

Figure 39

Maryland Unemployment Rates, 1990-2001 Total Maryland and Garrett County



Source: US Bureau of Labor Standards.

The current growth center for the County is the area around Deep Creek Lake. The reservoir was developed by Pennsylvania Hydro-Electric Corp. for hydropower in the 1920s. By the late 1940s, it had become lightly developed with cottages by steelworkers and others from the Pittsburgh area -- two hours drive away. This lake with its many arms has 65 miles of shoreline, so that considerable waterfront land was available to absorb development. In the late 1990s, the Lake area accounted for 45% of all the tax base of the county. In 1999, the lake was sold to the State. Other development is mostly strip development in and near existing municipalities around the county.

A small ski area, Wisp, was built in 1954. Downhill and cross country skiing and snowmobiling give a three season balance of activities to the area, which is also very busy during the boating and fishing season.

After the Interstate connection was fully completed, a dramatic tourism and leisure home boom began. Not only did lakefront land increase dramatically in price, but also extremely high end view lot developments began to spread over the slopes and nearby highlands. In recent years, 60 to 90 new homes have been built just within immediate area of the Lake. Existing cottages in prime locations are being demolished and replaced with condos. There are more than a few executive retreat mansions with asking prices above two million dollars on professionally landscaped lots. These can rent for \$5,000 and more per week in the peak weeks, amounts similar to the Hamptons and other tiny Northeastern saltwater resorts. The prices of lakefront lots are now on a par with oceanfront property at Ocean City. Property taxes for a one million dollar home can be \$10,000/year. Tax increases for Maryland residents are capped at 5% per year.

Table 67
Economic Indicators – Deep Creek Lake Area, 1980-2001

	Assessed Base Dist. 18 (MM)	Wisp Skiers (1,000)
1980	\$37.1	
1985	\$63.3	89.0
1990	\$154.1	119.0
1995	\$233.0	166.6
2001/02	\$159.3	
2001/03	\$1,063.0	

Source: Garrett County Economic Development Department. n.d. Deep Creek area growth analysis, Oakland, and P. Jamison, pers. comm.

Total visitation is very high, about 750,000 in 2001, sufficient to support construction of several new retail strip malls and to attract a large number of restaurants, including at least one national chain, Pizzeria Uno. This indicates a large total market and a relatively high degree of seasonal balance among visitation. Many resort areas that are more widely known have not achieved such a balance yet. The County Economic Development Department estimates that tourism generated \$95 million in direct impacts to the county in 1996, and accounted for 1,923 jobs.

After the closure of a large employer, unemployment was very high in the late 1990s. The intense construction activity has been welcomed as a result. A leading sawmill, Wood Products, Inc, at Oakland, is completing major upgrades to its equipment and facilities and employs 165 workers. Several other wood products plants make pallets, dimension cutstock, and other products.

CURRENT LAND USE

As farms have cut back in the region, the forest acreage of Garrett County has increased significantly (Table 68). Currently, only 5% of the County's land is developed. Most of the development is in low density residential. Forests cover 69% of the area, and just over 90,000 acres (22%) remain in agriculture (Fig. 40).

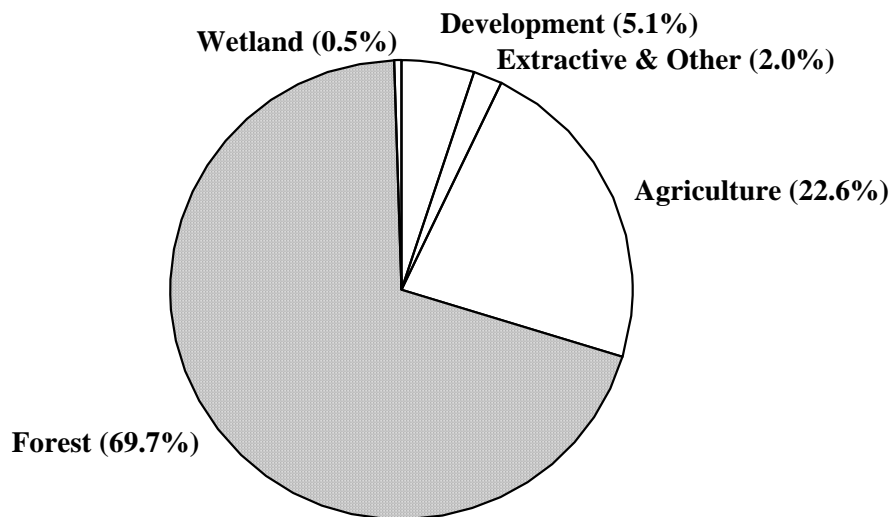
Table 68
Reported Estimates of Forest Land in Garrett County, 1900 to 1986.

Author	Date	Forested	%	Uncut
Curran	1902	235,200	56	25,000
Hu and Besley	1910	273,357	65	---
Besley	1916	274,483	65	8,477
Stone and Matthews	1974	290,076	69	---
Frieswyk and DiGiovanni	1986	299,300	71	< 1000

Source: Gary Blank, NCSU, unpub. paper., n.d.

Figure 40

Garrett County Land Use, 1997
All Land = 419,585 thousand acres



Source: MDP data.

LAND OWNERSHIP

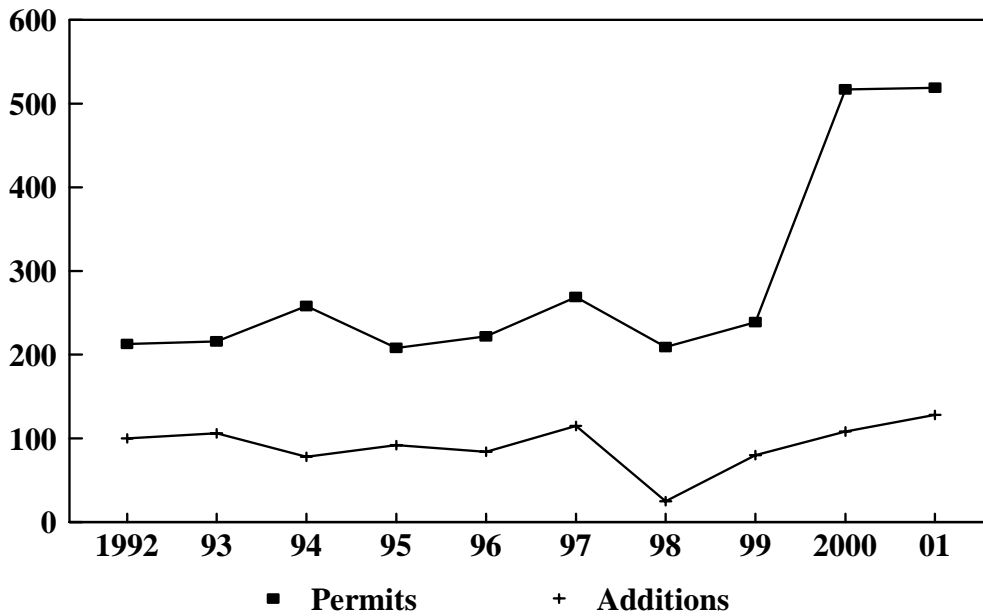
Land ownership is widely dispersed. The State is the largest single owner, accounting for about 25% of the land (see Table 10 above). The Savage River State Forest, Potomac State Forest, and Deep Creek Lake State Park are the largest publicly owned areas. MeadWestvaco formerly held some lands in the Panhandle, but all of that has been sold. Several mining companies have ownerships in the range of several thousand acres, and a few private individuals

and local companies have holdings, mostly scattered lots and farms, of 5,000 acres or less. The tax records in the County are maintained in a form that does not yield readily to summarization for this purpose, and widespread use of temporary corporations or nominees can obscure true ownership patterns. Nonetheless, based on several different interviews we can conclude that there are no more than a few private holdings in the County exceeding 5,000 acres, and these are not blocked up in single units. We cannot exclude the possibility that some owner with a larger total holding has covered their tracks effectively, but it does not seem likely. This means that future changes in land ownership and use will take place on relatively small units and not in extensive tracts. In the 1980 survey, the Western Maryland unit (Garrett, Allegany, and Washington Counties) had the largest average parcel size, at 50 acres (Kingsley and Birch, 1980).

The diversity of ownership is hinted at by the residences of owners participating in three forest tax programs (FCMA, Private Management, and Tree Farm). Of 5,416 accounts shown, 3,301 were Maryland residents, and 1,091 were from Pennsylvania. Virginia (495), West Virginia (228), and DC (74) were also notable. Owners from as far away as Florida (51) and Ohio (53) appeared (J. Keating, pers. comm., to A. Goetzl, Jan., 2002). According to the Garrett County Economic Development Department, the markets for land sales have shifted significantly. In 1985, 25% of sales were local; by 1994 only 12.7% were local, reflecting increased buying by nonresidents as well as higher prices. Maryland buyers from outside the county increased from 17% to 45% in these years. The DC area declined to insignificance. Northern Virginia increased to 11%, and Southwest Pennsylvania fell from 25% to 18%. County data show a significant jump in building permits and additions in the late 1990s (Fig. 41, Table 69). This is the period of the recent tourism boom.

Figure 41

Garrett County, Maryland Residential Permits and Additions



Source: Garrett County Planning & Zoning.

Table 69
Garrett County Residential Permits and Additions

	<u>Permits</u>	<u>Additions</u>
1992	213	100
93	216	106
94	258	78
95	208	92
96	222	84
97	269	115
98	209	25
99	239	80
2000	517	108
01	519	128
Avg	287	91.6

Source: Garrett County Planning & Zoning Office.

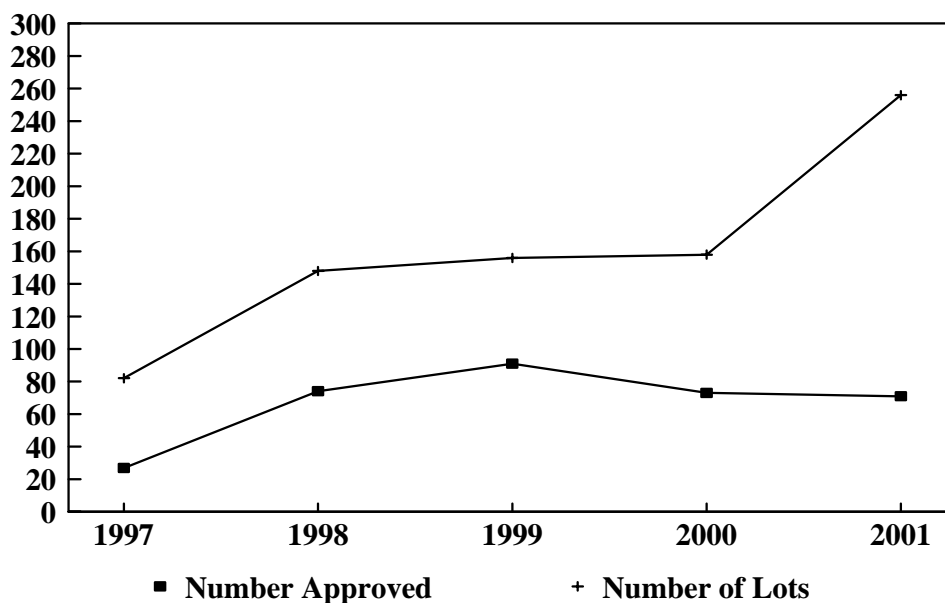
SUBDIVISION ANALYSIS AND TRENDS

Demand for lakefront has become so high that buyers are demolishing cottages and building modern, high end leisure homes and even condo complexes. To support the infrastructure needs and manage the growth, a special zoning district around the lake was established. Development pressures were so moderate elsewhere that only limited subdivision controls existed in the rest of the county. A countywide subdivision ordinance was only passed in 1998. Reflecting the existing fragmentation of ownerships near the Lake, most of the subdivisions are in the 50-100 acre size range. Projects of this size seem to suit infrastructure development and marketing considerations well.

Despite the scale of the boom, the amount of land affected has not been large, only about 4,000 acres in the 5 years, 1997-2001. This is just under 1,000 acres per year. This is the acreage subdivided, all of which has not been actually built out yet. From the point of view of the forest, however, this land has been “converted.”

Figure 42

Garrett County Maryland Subdivision Analysis, Approved & Lots, 1997-2001



Source: Garrett County Planning & Zoning Office.

Figure 43

**Garrett County Maryland Subdivision
Analysis, Acres, 1997-2001**



Source: Garrett County Planning & Zoning Office.

Table 70
Garrett County, Maryland, Subdivision Trends, 1997-2001

	<u>No. Approved</u>			<u>Number of Lots</u>			<u>Acres</u>			<u>Acres</u>	<u>Acres per</u>
	<u>Major</u>	<u>Minor</u>	<u>Total</u>	<u>Major</u>	<u>Minor</u>	<u>Total</u>	<u>Major</u>	<u>Minor</u>	<u>Total</u>	<u>Per Lot</u>	<u>Subdivision</u>
1997	3	24	27	51	31	82	408.310	216.030	624.340	7.61	23.12
1998	7	67	74	57	91	148	368.989	460.735	829.724	5.61	11.21
1999	2	89	91	24	132	156	25.445	757.668	783.113	5.02	8.61
2000	5	68	73	53	105	158	159.298	554.864	714.162	4.52	9.78
2001	9	62	71	148	108	256	340.828	663.905	1004.733	3.92	14.15
TOTAL	26	310	336	333	467	800	1,302.870	2,653.202	3,956.072	4.95 *	11.77 *
<i>Per Year</i>			<i>67.20</i>			<i>160.00</i>			<i>791.21</i>		

* Acreages

Source: Garrett County Planning and Economic Development Department.

Because of the extensive public lands, low rate of past development, and high level of forestlands, Garrett County development is exempted from the Forest Conservation Act. Realtors note that many buyers seek to buy lots in the 5-10 acre size range, but when they look at the costs and the options they will settle for 2-4 acres. Garrett County had the largest average new lot size in the State from 1990 to 1997 (MDP, 2001, p.9) -- this was 2.3 acres. Hunting is a factor in the land market here, and small groups of individuals or clubs may seek hunting leases on tracts as small as 50 acres, especially if it is near another leased parcel. The real estate ads make a point of hunting possibilities on suitably sized tracts.

This area had its brush with the outsized subdivisions of the early 1970s land boom. This took the form of the Youghiogeny Resort subdivision west of Oakland, which was in part a speculation on the potential development of a lake on that reach of the river. The lake never was built. This 2,500 acre property was subdivided into the half-acre uniform grid of lots of the time, and reflected the totally unregulated land industry of the day. Many of the lots have proven to be totally undevelopable. Lots that sold for \$2,000 for a half acre at that time can be had for little more than that today, and some of the undevelopable parcels can reportedly be bought for \$30 at a tax sale. This is the kind of project that gave "development" a bad name throughout the Northeast in the 1970s and 1980s. Buildout on this subdivision has not exceeded 10% of the lots. We were made aware of no additional examples of this kind of development since then.

INDICATIONS OF MARKET PRICES

One has to take care in using asking prices as an indication of prices in a real estate market, but they can serve as one source of information for a general portrayal. Overall the market for acreage and lots in this County is rather finely differentiated into submarkets reflecting potential uses, location values, and buyer incomes. The most valuable properties are view lots in the prestige subdivisions that can sell for up to \$250,000, and asking prices in the \$100,000 range for 2 acre lots are common for these properties. In many of the larger subdivisions, 1 to 2 acre lots range from \$14,000 to \$25,000. These may have 30 or more lots.

Fairly common are the 5 to 25 acres pieces, often partly open ground. These offer opportunities for further subdivision in many instances. Depending on location, these parcels sell for \$2,000 to \$8,000 per acre. A tiny 1/3 acre lot on the "Yough" is offered at \$26,790 per acre, which was the highest per acre value we found outside of the prestige subdivisions.

There are actually few advertisements for tracts of forested backland. When these come into the market, they seem to be purchased first by developers or agents who subdivide and then offer the lots at one stage or another of development. The few examples we noted of tracts in the 100 acre size range had per acre values in the \$2,000 to \$3,000 range. A so-called "game ranch," a 1,000 acre property in nearby West Virginia, is offered at more than \$4,000 per acre.

Table 71
Garrett County Land Values: Examples of Asking Prices, Summer 2002

<u>Tract</u>	<u>Acres</u>	<u>Asking Price</u>	<u>Price per A.</u>	<u>Comments</u>	<u>Source</u>
Great escape	9	\$23,900	\$2,656	Secluded; wooded	Amer. Acreage
Almost heaven	5	\$24,900	\$4,980	Country meadow	ssame
Whitetail haven	22	\$29,900	\$1,359	Surrounded by farms	same
Country farm	5	\$39,900	\$7,980	Partly wooded	same
Adjoin state forest	6.7	\$52,900	\$7,896	23K a of nature...	same
400 a farm	400	\$800,000	\$2,000	Maybe last chance! old house.	Railey, p. 16
Hunting land	32.25	\$59,900	\$1,857	Completed surrounded by state forest	same
Pleasant Valley	6	\$39,900	\$6,650	Mountain views	same
Ridge Road	8	\$25,900	\$3,238	Prime lot	same
Private wooded lot	2.34	\$12,000	\$5,128	Two miles to D.C.	same
Frontage on yough	0.33	\$8,900	\$26,970	Low priced waterfront	same
Deerfield Woods	2	\$19,900	\$9,950	Perc	same
BethlehemArea	2.235	\$15,000	\$6,711	Wooded, perc	same
Views of the Valley	5.11	24900	\$4,873	Wooded, perc	same
Pleasant Valley	101	179900	\$1,781	Wooded; mobile home; metal building	Railey p. 15
100 acre farm	100	279000	\$2,790	Sand flat; has creek, near DCL	Railey p. 13
Northern Garrett	20.86	119000	\$5,705	Stream; views, two lots	railey p. 18
Put your hunting cabin	9.7	49900	\$5,144	900 ft front, trout stream	same
Oakland	18.7	39900	\$2,134	Partly wooded	same
View lots	3.5	19900	\$5,686	Partly wooded	same
344 ft river front.	3	25900	\$8,633	Mature timber	same
Dream Mtn. game ranch	1,087	4530000	\$4,167	Wild, wonderful WV	Long & Foster p. 30
Farmland	180	910000	\$5,056	Operating dairy farm	same
Hunters paradise	154	360000	\$2,338	Log home, 3 BR	same

Source: Various real estate advertising booklets.

We have been unable to study buildout of subdivisions in detail, but it appears that many of the largest ones still contain unbuilt lots. A point is reached in any building boom where the unbuilt lots at desirable locations become formidable competition to lots from newer and more remote subdivisions. At that point, or when overall demand takes a downturn, the production of new lots may cease or at least slow down. Whatever surplus has been generated is then available to support lower levels of demand for some years.

The prevailing levels of land prices are prohibitive for any investor seeking an investment in timber growing and hunting leases. Such investors no doubt exist in this area, but they likely view these activities as transitional ones until the time is ripe to subdivide and sell. There are operators in the region that will buy suitable tracts of backland with a view to at least some holding period. Those with some financial strength may be able to conduct fairly conservative initial cuts; others cut more aggressively because of the high costs of the property. On lands ripe for immediate subdivision, a “development cut” often occurs. This leaves a lightly wooded appearance, and at the least amounts to a salvage of some useful wood before conversion of the land to other uses.

DISCUSSION AND SUMMARY

To date, the land use and ownership changes have actually had only modest effects on the bulk of the forestland in the county. At any distance from Deep Creek Lake, it does not appear that prices on larger backland forest tracts are much higher than they are in Allegany county or elsewhere. Much of the development has been in the form of subdivisions, which have concentrated construction in limited areas, most of them around the lake.

Given the limited availability of large tracts, much of the development will emphasize existing farms and wooded tracts of smaller size. Much of the subdividing seems to be of an informal kind, often within families.

The questions for the future are: how much will visitation and real estate sales continue to grow? Will the huge price spreads between river and lakefront versus backland drive development to scatter out to longer distances from these attractions? It is often said that skiers will drive up to half an hour from a ski chalet to get to the lifts. If this is true, this would limit the dispersion of development aimed at ski users. It remains to be seen how widely the appeal of the lake will affect nearby real estate development, though one Realtor places the range of the Lake’s influence at 20 miles. If this is so, it would represent a very large area of forest.

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INTERNET WEBSITE INFORMATION

Conservation Reserve Program:

<http://www.fsa.usda.gov/pas/publications/facts/html/mdcrep.htm> and,
<http://www.fsa.usda.gov/crpstorpt/06approved/r1meptrx/MD.htm>

Critical Area Commission:

<http://www.dnr.state.md.us/criticalarea>

Forestry Boards:

<http://www.dnr.state.md.us/forests/programapps/fboards.html>

Green Print:

<http://www.dnr.state.md.us/greenways/greenprint>

MALPF:

<http://www.mda.state.md.us/agland/main.htm>

Maryland Environmental Trust:

<http://www.dnr.state.md.us/met/>

Maryland Forests Association:

<http://mdforests.org>

Rural Legacy:

<http://www.op.state.md.us/smartgrowth>, and
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